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# World Factory in Crisis

Global Economy Downturn as a Speedbump on the Path of Development in China's Pearl River Delta, and the Twisty Road for Recovery

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<p>As one of the world's largest and most dynamic economies, as well as an important member of international matters, China attracts enormous attention and the focus is on the opportunities and challenges associated with China's emergence. The Pearl River Delta Special Economic Zone of Guangdong province in the southeast China, is the pioneer of the Chinese Economic Reform initiated by Deng Xiaoping in 1978, and has been the most dynamic economic region since then. During the ongoing reform process, this region has become a manufacturing center of global importance, the province with the highest GDP, and one of the fastest growing economic regions in the world.</p> <p>Being the leader of China's economic reform and global manufacturing centre, the region is suffering from a sharp decline in export demand, large-scale of small and medium companies shutting-down and lay-offs of migrant workers. The traditional industry mode based on cheap labour and low value-added manufacturing is facing much limitation due to rising cost of land and labour. An industrial upgrading and restructuring is the solution. To cope with the problems caused by the crisis and to transform traditional industries into high value-added and high-tech industries, local governments have implemented a series of policies to support the region's industrial upgrading. Some relevant and valuable lessons can be learnt from Taiwan's industrial upgrading. With the once-in-a-decade political change in China in November 2012, how will the new national political body affect the Pearl River Delta's revolutionary road?</p>	
Keywords	Pearl River Delta, World Factory, Industrial Upgrading, China Mainland, Economic Crisis, Manufacturing Industry, Economic Downturn, Foreign Direct Investment, Value Chain, Labour, Regional Integration, Hong Kong, Taiwan, High-tech Industry

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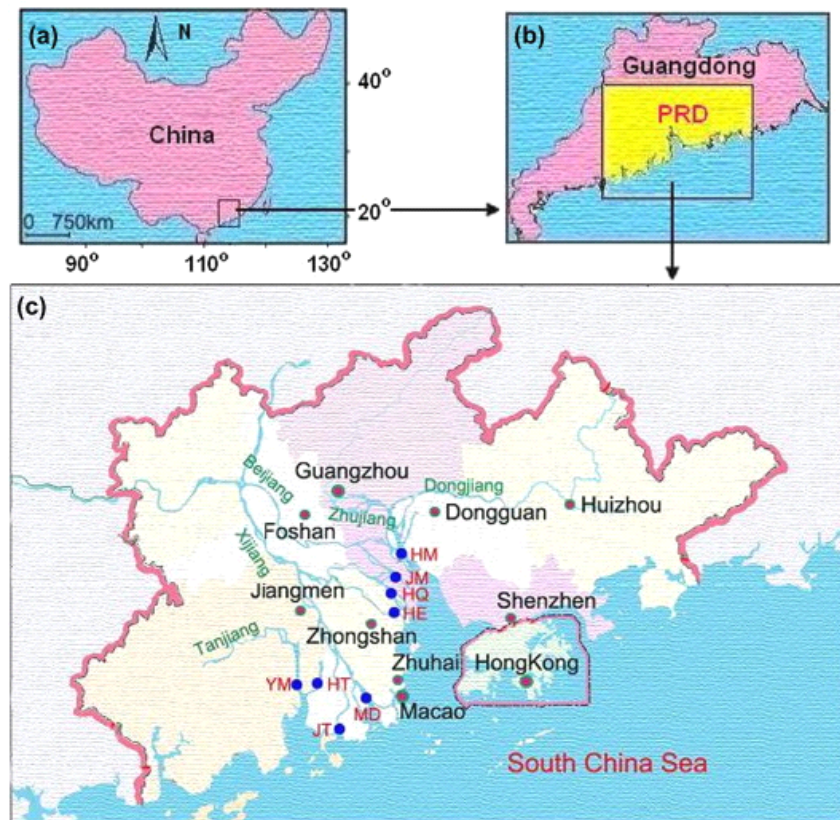
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# 1 Introduction

## 1.1 Research Background

The Pearl River Delta (PRD) is a complex of deltas located in Guangdong province in the southeast China, initially including the cities of Guangzhou, Shenzhen, Dongguan, Foshan, Jiangmen, Zhongshan, Zhuhai, and the urban areas of Huizhou and Zhaoqing. The total area of the region is over 110,000 square kilometers. The concept of the Greater PRD became popular in the late 1990s, adding Hong Kong Special Administrative Region and Macau Special Administrative Region to this economic zone. In this thesis, the term "PRD" refers to the region in mainland China while the Greater PRD consists of the PRD, Hong Kong Special Administrative Region and Macau Special Administrative Region.

Figure 1. The Pearl River Delta in China (ScienceDirect 2008)



The PRD region has been historically active in international trade. Guangzhou is the capital of Guangdong province and a city with the leading role in the region. It became the centre of foreign trade in south China in 221 BC and pioneered the so-called Silk Road on the sea during the Han Dynasty (from 206 BC to AD 220). During the Qing Dynasty (from AD 1644 to AD 1911) when the central government implemented the Seclusion Policy, Guangzhou port was the only port that was kept open to the world. As results of the First Opium War (from 1839 to 1842) and the Second Opium War (from 1856 to 1860), Hong Kong was fully occupied and administrated as a British colony in 1842, while Macau became a colony of the Portuguese empire in 1887. These two regions originally belonged to Guangdong province. Since the economic reform in China which started in 1978, the PRD has become one of the most rapidly growing economic regions in the whole world.

The long-awaited entry to the World Trade Organization (WTO) in 2001 required China to implement further economic liberalisation and deregulation. After joining the WTO, China had to significantly reduce a wide variety of tariff and non-tariff trade barriers within a few years. By 2011, ten years after its admission, China had relaxed over 7,000 tariffs, quotas and other trade barriers (The Economist 2011). The country's economy has been more and more integrated into the global economic framework: its rich and cheap labour resource, large domestic market and easier market entry for foreign companies attracted large number of foreign investors. China's private sector, which had been discriminated against and restrained for many years, gained rapid growth thanks to a much more liberal economic environment. At present, China is a major importer of raw materials, leading manufacturer of basic goods, and starring exporter of consumer goods. Large state-owned enterprises play a ruling role in its economy, but private enterprises also have their significant contribution. As for the PRD, the number of private enterprises increased rapidly since private enterprises became free to do business with foreign partners. The traditional manufacturing industry based on cheap labour in the region has largely benefited from the more liberal international trade and the region became a world workshop.

However, despite its status as the most open and dynamic region in China, the PRD is suffering from a sharp decline in export demand caused by the global economic crisis started in 2007. A large number of small and medium enterprises (SMEs) are shutting

down and many migrant workers have had to return to their hometowns. The economic crisis has certainly brought trouble and challenges to the region, yet it could be regarded as a force pushing the local government and the companies to solve the problems and thus to improve the region's competitiveness. This thesis aims to introduce the development of PRD, the challenges it is facing under the current economic downturn, and examine possible solutions.

## 1.2 Literature Review

Tse (2010) focuses on discussing the author's own opinion on the main drivers of China's Economy: "open China", "competitive China", "official China" and "one world". "Open China" is about the open-up of China resulting growth of foreign investment and export, as well as an immense cultural transition from a largely rural country to a nation of cities. In "Competitive China", the author covered the important role of Chinese companies, for example companies in the Special Economic Zones, improved their competitive advantages on the global stage. The shifting direction and role of the central government is referred as the third driving force "official China", while externally, the fourth force "one world", including modern technology development and global integration, cannot be omitted in the process of driving the Chinese economy forward. The second half of this book looks more at how Chinese companies operate in their business and how Western companies could be better prepared in the changing status of China in the supply chain and how to build the capabilities to be big in China - how to develop the China strategy. In the epilogue of the book "The Chinese Renaissance", the author made his prediction that China will be shaping the world and as the world economy recovers, international companies and other countries will need the advantages of China and Chinese companies: the efficiencies provided by global supply chains and the net benefits of international trade. At the same time, China will become more globally oriented in resource management, markets, business style, and even understanding of the world.

Enright, M., Scott, E., Chang, K., (2005) stated that most outsiders do not appreciate Chinese economy is a series of loosely coupled regional economies, some driving China forward. The PRD region is certainly one of the economic engines and the region continues its spectacular development, almost under the radar screen, powered by

foreign investment, trade, firms, and the unique combination of systems. This book stresses the importance of Hong Kong in the development of PRD. As the vanguard of China's reforms, the PRD uses its Special Economic Zone and geographical advantages to closely link with Hong Kong and benefits from Hong Kong's modern technology and management. The vast majority of Hong Kong's trade involves re-exports from or to the PRD, while Hong Kong provides the main inlet and outlet thanks to its long history as an international trading hub. We could conclude that in the corporation of Hong Kong and PRD, Hong Kong is in charge of high-end services, logistics, and access to international capital and markets, at the same time PRD provides land, labour, raw material and other manufacturing resources. More and more policies and agreement have been made to push this close interaction even further in the near future.

This book also gives a prediction on PRD's perspectives: the economy of PRD will be deeper and wider since it is all the time integrating with Hong Kong. Meanwhile, people in the different jurisdictions, who did not see themselves as an integrated economic region, would start to change the old mindset, because of growing joint promotions, governmental policies, joint business activities. If we take a look at the current situation of PRD, the authors did not examine whether it is good or not to have such an export-oriented economy thus the possible challenges and difficulties that might occur were not discussed in the book in detail. In fact, most literature did not discuss so much about limitation and any problems of PRD's economic development model.

A more recent book on Chinese regional economy is *Regional Economic Development in China* edited by Saw, S.H. and Wong, J., (2009). Instead of putting much effort in explaining how successful was PRD's development, chapter 4 "Cost Impact and Industrial Upgrading in Pearl River Delta Region: Case Study on Shenzhen and Dongguan" introduced that PRD region is facing problems with its industrial transitions and upgrading as a result of the Chinese currency RMB appreciation, rising raw materials cost, increasing labour and land cost etc. It suggests that since the cost advantages, the main reason of its success, is diminishing, the region should focus on an industrial upgrading as a long term solution. According to the author, the industrial transition in PRD is a combination of the three main types of industrial upgrading (technological innovation, institutional and cultural evolution, and cost considerations), and PRD's transition could progress towards an ideal state in ten or twenty years. The

local government has implemented various kinds of policies to support transition, in order to relieve the pain of the enterprises and society due to cost impact. However, it has also been noted that the industrial transition resulting from cost impact may be just the beginning in the region, and cost impact will stay in the next a few years. When making relevant policies, the local and even the central governments should not increase the intensity of the "package cost", by controlling rising costs judiciously. In other words, the transition shall be made at a suitable pace.

### 1.3 Research Method

The aim of this thesis is to introduce the background and recent economic development of the PRD, examine the impact of the current global economic downturn on the region, and provide an analysis and discussion of the region's industrial upgrading.

This thesis was mainly carried out with the use of qualitative research. This research method was chosen because of limitations of primary resources and time. Secondary sources used during the research are literatures of relevant topics. These secondary sources were gathered from the school library, on-line library, and other internet resources. These sources were used to build a fundamental understanding of the research topic before any in-depth look into the thesis topic. A further study was carried out by gathering news, articles and journals of this topic while economic theories were applied to such sources. At this stage, many important conclusions were drawn and a clearer thesis structure was formed. A case study on Taiwan's industrial upgrading was done in the thesis because of its proximity to the PRD in geographical location, language, culture and tradition. A lot of useful information was gathered through comparison with Taiwan's industrial upgrading. Thanks to the access to most up-to-date local websites and journals, a relevant trend was observed and used in the discussion of the subject. Finally, the gathered knowledge and data were processed to support the thesis' discussion and argumentation and to provide a conclusion of the research topic.

## **2 The Pearl River Delta's Economic Development and Present**

### 2.1 Regional Development and Economic Performance

Due to the lack of natural resources, the contribution of the PRD region to the national economy was very limited during the 1950s, 1960s and 1970s, since China's five-year development plans focused mainly on heavy industry. However, the PRD region has been the most economically dynamic region since China's Economic Reform<sup>1</sup>. In 1979, Chinese government launched the Special Economic Zones programme to give more economic freedom in the international trade to the cities chosen; three of the PRD's main cities were included. After Deng Xiaoping's visit to the southeast China in 1984, more cities in the PRD were given the status of SEZs and Guangdong province was given the freedom to set its own economic direction as a "comprehensive economic reform area". The PRD took advantage of the greater autonomy and became a leader of China's economic reform process. The process of economic reform has not always been smooth, given policy experiments by the local government, but the PRD's early experience as a reform pioneer has enabled the formation of a relatively free, open, diverse, and market-oriented culture compared to many other places in China.

Different from other famous economic regions such as Yangtse River Region (around Shanghai) and Bohai Rim Region (around Beijing) which are based on heavy industry, high-tech industry and state-owned economy, PRD initially produced and traded low value-added and light-manufacturing goods including toys, packaged goods, garments and appliances. The composition of production and trade of PRD has changed over the years from over 60% being primary and low-added value goods in 1980 to nearly 50% being electronics and electrical goods in 1999 (The Centre for Urban and Regional Studies 2002: 36). In recent years, over half of its economy has consisted of electrical goods and equipment, such as television sets, computer goods and audio-visual apparatus. At first, the PRD region's products were mainly for domestic markets, since the demand for a wide range of consumer goods was enormous due to the preceding long period command economy. The PRD's exportation started its development in the

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<sup>1</sup> This is also known as the Reform and Opening-Up Policy, and refers to the economic program "socialism with Chinese characteristics" which started in 1978 by reformists within the Communist Party led by Deng Xiaoping.

late 1970s in its eastern part and accelerated during the late 1980s after the central government reduced restrictions on FDI.

To better understand the importance of the PRD to the national economy, here we examine some macroeconomic indexes. Within only 30 years, the nominal GDP of the PRD region skyrocketed from around USD8 million in 1980 to about USD5.6 billion in 2010 (HKTDC 2011). The population of the PRD by 2010 The PRD accounted for 4.2% of China's total population. However, the region's contribution to the national nominal GDP is disproportional (HKTDC 2011). The PRD's nominal GDP in 2010 was around USD579.60 billion, around 9.4% of the national nominal GDP (HKTDC 2011). In 1980, the PRD contributed around 3.4% (Enright, Scott & Chang 2005: 42) of the Chinese mainland's export total and 30 years later, the region provided 27.4% (HKTDC 2011) of national exports in 2010. The important role of the PRD is far beyond its economic success. Ever since the beginning of economic reform, it is often chosen as a test bed for new economic policies and programmes and it has provided valuable experience and lessons for other regions in the country.

## 2.2 Factors behind the Rapid Development

Why did the PRD succeed so well in economic development? Probably the most important factor is the economic reform process, which started in 1978. The central government formalised the SEZs in 1980 and preferential policies in the SEZs included a 15% corporate tax rate, free of tax up to 5 years, the ability to repatriate corporate profits, duty-free imports on raw materials and intermediate goods destined for exported products, no export taxes and a limited ability to sell into the domestic market (Greatercn 2008). The SEZs were given greater autonomy on political and economic policy-making. The PRD was given the right to keep a larger share of its output and foreign exchange than other regions in China, to control over local economic planning and foreign investments. Unlike the conventional top-down process, development throughout the PRD region tends to be bottom-up, which means local jurisdictions can develop plans of their own and seek approval from the upper levels. Compared to the government in Beijing, the PRD local government is more supportive of such efforts by often allowing these local-made economic policies. This more decentralized policy-making process has provided measurable, positive results. The

central government also allowed privatisation of a part of the housing stock and developed a land lease system. Shenzhen city became a leader in foreign exchange markets by allowing foreign banks to operate there, and by launching the Shenzhen Stock Exchange. The local governments in the PRD region took great advantage of the autonomy to experiment with a number of changes, which developed a variety of mechanisms in the region to be better prepared for further reform and greater opportunity (Enright, Scott & Chang 2005: 64-65).

Secondly, the PRD's proximity to Hong Kong and Macau<sup>2</sup> in terms of geographical location, language, culture and tradition has given the region a strategic advantage over mainland regions in regards to international trade. Hong Kong was the earliest proxy of foreign investment and has continued to be the dominant source of Foreign Direct Investment (FDI) in the region. Hong Kong has provided capital, logistical support, access to global markets, management know-how, and technology and marketing skills. Meanwhile, the PRD has provided labour, land, and natural resources. After the long period of the planned and closed economy, China's capacity for modern technology was lagging far behind the world. When Hong Kong brought its investment to the PRD, it also largely transferred modern technology, design, quality standards, quality control, packaging machinery, marketing knowledge and personnel training. The PRD also received a large number of modern facilities to carry out Hong Kong investors' production. In the late 1990s, many firms in the PRD were able to absorb and copy foreign technology. As to the transfer of management know-how, Hong Kong investors mainly allowed managers from Hong Kong to make decisions and take charge of enterprise management in the PRD. Gradually, more and more personnel training was implemented and the number of people in internal management, accounting, technology and quality control recruited from China mainland started to increase. It is not difficult to conclude that the two regions' interaction has allowed the Greater PRD

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<sup>2</sup> The "One country, two systems" policy was first proposed by Deng Xiaoping in 1984 in the negotiation with the then British Prime Minister, Margaret Thatcher, over the future of Hong Kong. This policy allowed Hong Kong and Macau, which were colonies of Britain and Portugal respectively, to maintain their capitalist economic and political systems under a high degree of autonomy for 50 years after the reunification with mainland China. Both Hong Kong and Macau still have their own currencies: the Hong Kong dollar and the Macau dollar. Despite the fact that both regions are undergoing a gradual integration process, investment from these regions to mainland China is still considered as foreign investment under the framework of the "One country, two systems" policy.

region to emerge in a relatively short time as one of the world's most competitive manufacturing workshops.

Thirdly, the huge inflow of Foreign Direct Investment to the region is a strong force. At the early stage of the economic reform foreign firms started to invest in the PRD and the total FDI in the region reached USD20.3 billion in 2010 (HKTDC 2011). The main sources of the PRD's FDI are Hong Kong, Macau, Taiwan, Japan, Korea and United States. Firms from these countries invested in a wide range of sectors, namely farming, forestry, fisheries, construction, manufacturing (toys, electronics, plastics, garments, watches and clocks etc.), transportation, insurance, social services, real estate, education, arts, scientific research, social organizations and so on. The large amount of FDI inflow has greatly improved the infrastructure of PRD and the quality of labour as well as allowing for adaptation of advanced technologies.

As made apparent by the preceding paragraphs, Hong Kong is the largest source of the PRD's FDI and it has a tremendous impact on the economic development in the region. This impact was especially powerful in the early years after Chinese economic reform. In 1985, Hong Kong accounted for over 80% of the PRD's total FDI and stayed above 60% in the 20th century (HKTDC 2011). One cause of the huge amount of capital inflow from Hong Kong is that Hong Kong experienced rapid economic growth in 1970s and its labour and land cost have been rising significantly since then. During the 1980s, labour-intensive industries, which were once prosperous in Hong Kong, lost their competitive advantages. Meanwhile not far across the causeway, the PRD was given the status of SEZ and was encouraged to develop its co-operation with Hong Kong and Macau. Naturally, Hong Kong firms started to look for new factory locations in PRD but the products would still go to export via Hong Kong. Moreover, Hong Kong has served as a platform for international investment for the PRD. In 2003, the Hong Kong Trade Development Council performed a survey of the most important reasons for foreign firms to invest in the PRD. Below is a quoted table of the survey made by Dutch Chamber of Commerce in Guangzhou. From this table, we can understand that proximity to Hong Kong was an important attraction for the foreign firms. Certainly, more and more foreign firms operate in the PRD because of the impressive economic performance of China's mainland and the PRD region in particular, but Hong Kong's

linkage to the PRD in attracting FDI should always be considered, especially in the early years of China's economic reform.

Table 1 Reasons for foreign firms to set up PRD operations, by origin, %. (Fung 2003)

	Japan	Korea	EU	US
Proximity to Hong Kong	40	45	24	22
Lower production costs	36	34	24	24
Better services to PRD clients	34	5	23	31
Opportunities in the PRD	31	37	60	59
Better infrastructure than elsewhere in the mainland	26	16	24	12
Availability of raw materials, parts and components	18	39	21	10
Greater openness than other places in the mainland	17	21	16	14
Presence of countries from the same country	13	3	10	14

Since then, the region has developed from an agricultural economy to a fast-growing manufacturing centre, and it gradually transformed into an export-oriented "world factory". As the main engine of the nation's foreign trade during the last 20 years, the PRD's share of Chinese exports accounted for around an impressive 35% in 2008 (Chen 2007). In 2008, before the global economic downturn, the ratio of exports to Gross Regional Product (GRP) was around 63%; therefore it is not difficult to comprehend that the PRD was hit the hardest by the global economic crisis. As the most open and export-oriented region, the PRD suffered immensely from the plunge in its exports and the measurable slowdown in its economic development.

### **3 Impact of the Current Global Economic Crisis: the Region's Challenges and Problems**

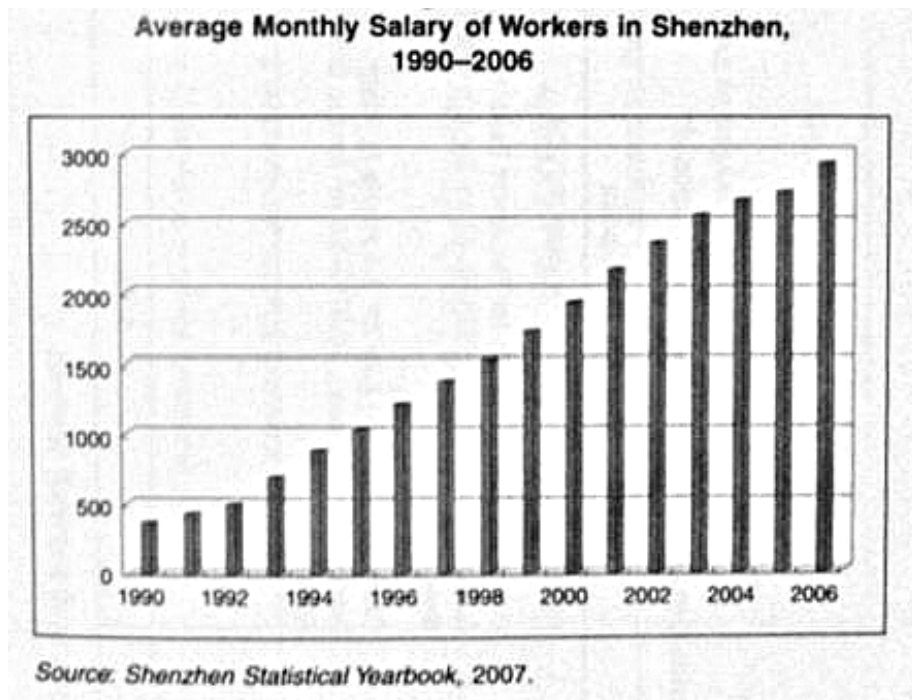
The global economic crisis, triggered by the housing bubble in the US in April 2007, has put the PRD into great trouble. As a result of the global economic crisis and its own industrial structural problems, the PRD is facing a series of problems including a rapid decline in exports, many small and medium size companies shutting down, and lay-offs of migrant workers.

China's double digit annual economic growth came to an end in autumn 2008, not long after the successful and impressive Beijing Olympic Games. The PRD region was probably hit the hardest at that time. The total value of foreign trade in the PRD region decreased 66.7% from USD192.4 billion in the 3rd quarter in 2008, to USD115.4 billion in the first quarter of 2009 (Tong & Zheng 2010: 90-91). In the same quarter, economic growth in the PRD also slowed down measurably: several municipalities in the region, such as Dongguan, Zhuhai and Zhaoqing, even had negative growth of -3.5%, -6.9% and -0.4% respectively (Tong & Zheng 2010: 90-91). The sharp fall in demand caused the earlier-than-usual return of migrant workers to their hometowns. For example, it was reported that in the city of Dongguan, 40% of migrant workers were heading home soon after the beginning of 2009 and long before the Chinese New Year in late January. Because of the lack of orders from foreign business partners, many of the migrant workers were told not to return to the PRD region and they needed instead to find new jobs in their hometowns (Tong & Zheng 2010: 69). Wages were left unpaid and workers who were laid-off often didn't receive any sort of compensation. In one famous example, in 2008 the Smart Union / He Jun toy factory, the largest local toy manufacturer in China at that time, shut its doors due to mounting costs and decreasing foreign orders. Some 7000 workers lost their jobs, the last two months' wages and lay-off compensations (Chinaorgcn 2008). The managerial level seemed to vanish off the face of the Earth and could not be reached. The helpless migrant workers staged large-scale protests for a week until the local government in Dongguan agreed to pay around USD38 million as compensation to the laid-off workers (Hudong Wiki 2009).

It is certain that the crisis in the PRD was triggered by the global economic downturn, but a more fundamental problem lies in the PRD's own industrial structure. One main strength of the PRD has been the cheap cost of production due to cheap labour and raw materials; however, as the costs are rising, the region is losing this competitive edge. Even before the global economic crisis, many SMEs in the PRD were struggling with rising production costs. The global price-hike of oil since 2005 has greatly contributed to rising costs, as transportation has become more expensive. In manufacturing, oil-related products and raw materials including coal, minerals, paper, fibre, electricity and plastics have all become more costly. Many SMEs were operating with a narrow profit margin due to the increasing production cost. Moreover, the situation with almost unlimited and cheap labour has changed. During the booming period of the PRD, local companies generally paid very low wages for a large number of migrant workers. These workers were from rural areas of less developed provinces in the inland China, where the average wage was even lower than what they could get in the PRD. Many of these workers came to the PRD with no skills, and after a period of training they started to work in the production line. However, the central government introduced the new labour law in 2008 to improve job safety, working environment and work payment for workers. The new labour law raised the minimum wages and over-time extra payment, made it compulsory to pay compensation for injury at work, required one month's pay for each year worked for dismissed employees, required employers to provide written contracts to their workers and restricted the use of temporary workers. After the new labour law was put into effect, many firms in the PRD experienced a rise of up to 25% in labour costs (Oxford Analytica 2008).

Here we can say that a cost impact has occurred. "Cost impact" in this context does not mean one single cost factor, such as the rising cost of labour, but rather a number of cost factors: rising cost of labour, rising cost of land and property, rising cost of raw materials, cost of protecting the environment, rising value of the Chinese currency RMB (see figure 3), rising cost of bank interest after the monetary policy was tightened by the central government in 2007, and rising company income taxes. Let us take Shenzhen city, the hi-tech export hub of the PRD, and Dongguan city, a center full of migrant workers, as examples. The following are several tables and charts to better illustrate the rising costs.

Figure 2: Average Salary of Workers in Shenzhen (Saw &amp; Wong 2009: 61)



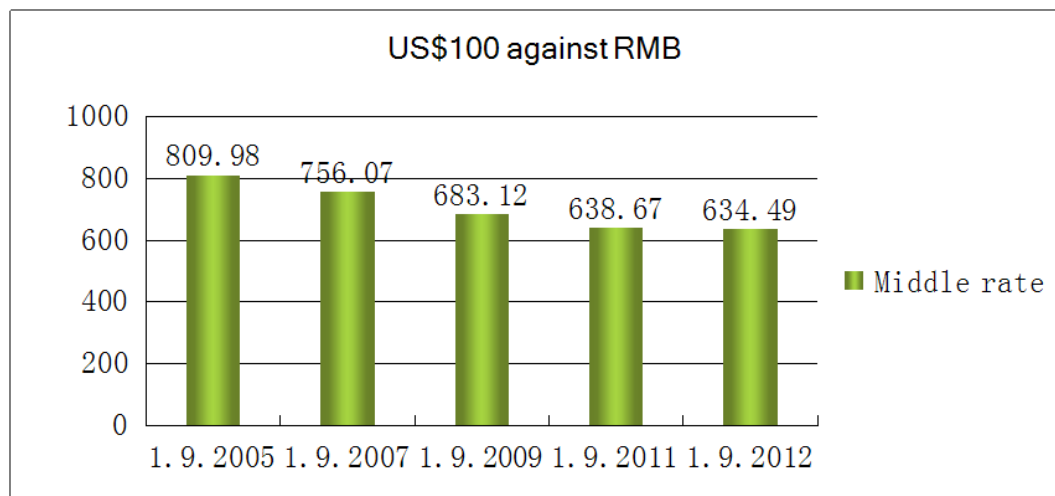
The table below demonstrates the rise of local land price.

Table 2<sup>3</sup> Land Price Change in Dongguan, 2001-2008 (Saw & Wong 2009: 72)

Year	Average Price of Land Deal (RMB/m <sup>2</sup> )	Industrial Land Price (RMB/m <sup>2</sup> )
2001	700	180
2002	800	200
2003	950	220
2004	1,100	240
2005	1,355	265
2006	1,778	301
2007	3,941	375
2008	—	Above 384

<sup>3</sup> Since July 2007, the minimum land price of industrial land in Dongguan has been set as RMB384 per square metre.

Figure 3 Exchange rate between USD and RMB from 2005 (Adapted from Bank of China Exchange Rates 2005-Present)



The PRD's dependence on foreign trade and investment is something of a double-edged sword. On one hand, the export-oriented and low cost manufacturing sector has greatly contributed to the region's fast growth. On the other hand, being dependent on the exports is what led the region into the economic troubles of recent years. The global crisis has exposed that vulnerability of the PRD's current economic structure: The PRD utilised its labour-intensive and low value-added manufacturing structure to boom within such a short period of time but as the region developed, this structure started to face serious constraints. Many economists agreed that even without this global economic crisis, the industrial sector of the PRD needed industrial upgrading, to undergo a series of gradual structural changes, since the current development pattern is not sustainable (Tong & Zheng 2010: 70). Many manufacturing firms in the region are low-positioned in the value chain and some of the production requires a high level of energy consumption and low-skilled labour input. However, these production processes often generate serious energy waste and pollution, with very low value-added output.

The term "industrial upgrading" is defined as "a technical term in industrial economics referring to structural changes in the composition of the industrial sectors in terms of level and type of products, technological intensity and market orientations" by Huang and Chen (Tong & Zheng 2010: 70). For the PRD, it means the transformation of the current highly export-oriented, labour-intensive and low value-added industries into

those that are less dependent on foreign trade, higher value-added and high-tech. In the next chapter, we will take a more in-depth look at the PRD's industrial upgrading, related governmental policies against the impact of the global economic crisis, and the future prospects of the region's development.

## **4 Coping with the Current Economic Crisis: Industrial Upgrading in the PRD region**

### 4.1 "Double Restructuring of Industries and Labour Force"

Faced by the serious problems triggered by the global economic crisis, the PRD local government decided to act promptly. In April 2008, communist party secretary of Guangdong province Wang Yang said: "If you don't adjust the industrial structure today, you will have to be adjusted by the industrial structure tomorrow" (Saw & Wong 2009: 54). As a member of the Political Bureau Committee, Wang Yang has also suggested that all the government officials should be more open-minded towards industrial upgrading. He introduced the idea of industrial upgrading in whole Guangdong province using a Chinese idiom "emptying the cage and changing the bird", which means double restructuring of industries and labour force. This idea aimed to upgrade the value-added and high-technological level of local industries while gradually relocating the traditional low value-added and labour-intensive industrial sectors to regions outside the PRD. Later in the spring of 2009, President Hu Jintao gave his approval of this idea during the National People's Congress of that year (People's Daily 2009).

The "emptying the cage and changing the bird" policy targeted to "move away" the traditional industries from the region, "move in" the high-technological and advanced industries, in order to achieve the industrial upgrading and restructuring. The local government is relocating those labour-intensive industries from the PRD region to eastern and western regions in Guangdong province and the mountainous regions in north Guangdong province, at the same time moving the labour force from the above regions to local secondary and tertiary sectors. Some of the more skillful workers are relocated to the PRD region.

At first, this policy did not receive a warm welcome by the central government. On 14th February 2009, Guangdong provincial vice governor Wan Qingliang explained that industrial upgrading was imperative but its goal was not to get rid of the enterprises. In any case, those low-value-added and uncompetitive enterprises would shut down when the market showed even the slightest sign of crisis. The provincial

government of Guangdong wanted to try to help companies to cope with the crisis, but the government would not save the ones with low productivity, and irrespective of this the nature of the market was difficult to avoid. According to the local government, the policy of "emptying the cage and changing the bird" was indeed correct since the labour cost keeps rising, demonstrating that the labour-intensive model had lost its competitive edge. After 30 years of the economic reform, the PRD region had accumulated a certain amount of capital, technology and talents from the traditional labour-intensive industries. Moreover, Guangzhou and Shenzhen were equipped with a large number of universities and research institutes to support the new development model. The PRD region was entirely ready for the development of the financial sector, service industries and high value-added manufacturing (People's Daily 2009).

Not long before Wang Qingliang's comment, on 25th December 2008, People's Daily, an organ of the Central Committee of the Communist Party of China, criticised Guangdong's "emptying cage and changing the bird" policy in a rare and high-profile way: SMEs, especially labour-intensive ones, were facing troubles from own operations and pressure from the local government. The word SME was made synonymous with "high energy consumption, high pollution and low efficiency, thus SMEs were regarded as barriers for industrial upgrading. Such a perspective was rather biased. We should not ignore the contribution of such companies to the economic development, and if there were such SMEs that should be adjusted or even eliminated, the government could not simply compress their living space. The government needed to provide financial support and prepare enough time for such companies in transforming, upgrading or relocating. At the moment, large number of companies shutting-down put the rural workers into big trouble. During the 30 years after the beginning of the economic reform, the rural population's income composition experienced an impressive change: working in the urban factories had become the main income source. For example, there were 141 million new members of the rural labour force in the country between 1980 to 1997, out of which only 25.27 million were completely engaged in primary industry (Zhang & Wang 2004). The remaining 116 million rural labourers left the farmlands and their hometowns to work in urban areas as cheap labour (Zhang & Wang 2004). A survey by the National Bureau of Statistics and the Ministry of Labor showed that in 1999, the rural labour force working outside the rural areas reached 52.03 million people (a 2.68 million increase over 1998); in 2000, the sum of rural

labour working in urban areas was up to 61.34 million and by 2001 it was over 90 million (Zhang & Wang 2004). If the labour-intensive enterprises had all closed, where should the rural workers go? The society would not be stable without stable employment. Chinese society was experiencing a rapid development in industrialisation and urbanisation, and a large number of the labour force had been freed from the farmland. It was indeed necessary to keep a certain proportion of labour-intensive industries for a relatively long period of time (Cui 2008).

On the same day, NF Daily (Southern Daily), which is affiliated to Guangdong provincial government, published an article to "fire back" at People's Daily. The article pointed out that ever since the global crisis, it appeared that SMEs had become the least popular figure in the PRD. This sort of opinion confused the long-term development strategy with the difficulties brought by the current crisis, and it caused many people to misunderstand the reformers of Guangdong. The policy of "emptying the cage and changing the bird" was not equal to "burning down the bridge", but it consisted of replanning the industrial layout, helping companies to achieve industrial upgrading and eventually making the whole PRD region ready for future challenges equipped with modern technology and an appropriate industry structure. It was hard to deny that some SMEs were bound to be eliminated due to their lagging development performance. However, that was the nature of market and also the nature of the development process. Since China had chosen to develop a market economy, it should fearlessly face the pain of market cyclical changes. Every penny invested by Guangdong province would be used for scientific and technology development, not for returning to the old path (Phoenix Finance 2012).

After more than 3 years of implementing the "emptying the cage and changing the bird" policy, Guangdong has proven the central government wrong to some degree. Despite problems with SMEs shutting-down and the large number of laid-off workers, Guangdong province has successfully freed up more space for the PRD's further development. Since 2008 until December 2011, 5983 enterprises have been moved out from the PRD region, 72,489 enterprises have been shut down due to low production capacity, and 18,769 more modern and advanced enterprises have been "moved in" to the region (Xinhua 2011). Many low value-added, labor-intensive enterprises have quietly left the PRD region to some other regions in mainland China. In addition, many

heavy industries such as electroplatings, paper mills, chemical plants, cement plants have also moved out from the PRD. According to Guangdong Statistical Yearbook 2010, the PRD region's GDP in 2008 and 2009 had high-speed double-digit growth, while the annual electricity consumption increased by only 2.49% and 2.03%, far lower than the previous rates: between 2003-2007, the annual electricity consumption increased 21.27%, 16.82%, 11.65%, 11.82% and 12.97% respectively (Li 2011).

#### 4.2 Infrastructure Improvement

Breakthroughs were made in infrastructure construction just within a few years. New power generating units with a capacity of 30.8 million kW were put on line, and 7.7 billion cubic meters of natural gas was supplied. A 2,372 kilometer provincial-level greenway network now covers the whole Pearl River Delta region (Newsgd 2011). By 2011 from 2006, Guangdong provincial expressway system has been expanded by 1,695 km and its railway system by 777 km, including 298 km of high-speed intercity railways (Newsgd 2011). Nowadays, the rail way trip between the two major cities in the PRD, Guangzhou and Shenzhen, only takes 30 minutes, which would take about 2 hours 3 years ago. These newly built roads and high-speed railways have upgraded the connectivity among the PRD cities, which is becoming more important in the industrial restructuring process. Many companies have moved their production to less-developed PRD cities away from cities like Guangzhou and Shenzhen, while the products still go through customs in Guangzhou and Shenzhen for export. Faster domestic logistics has certainly improved the operational efficiency for such companies.

The provincial government in Guangdong launched an infrastructure project to invest 2000 billion RMB (approximately €250 billion) during the next 10 years to improve the integration of the PRD (Bernersconsulting 2010). This project also includes the Hong Kong – Zhuhai – Macau ocean bridges (HZMB) to deepen the cooperation in the Greater PRD. The governments of the Guangdong Province, Hong Kong SAR and Macao SAR have agreed to adopt the "separate locations of Border Crossing Facilities mode" for HZMB. The HZMB construction was commenced on 30th November 2011 and is scheduled to be open for public traffic around the end of 2016 (HZMB Project 2011). The whole construction plan consists of the main bridge in China mainland waters, the boundary crossing facilities and link roads in the three regions. The

functions of the HZMB are to meet the demand of passenger and freight land transport among Hong Kong, China Mainland (especially the PRD) and Macao, to establish a new land transport link between the east and west banks of the Pearl River, and to enhance the synergy and corporation in the Greater PRD region. Figure 4 demonstrates the strategic location of the bridge.

Figure 4 Hong Kong – Zhuhai – Macao Bridge Map (Tunneltalk 2010)



A more recent step by the local government is the Pearl River Delta Intercity Railway Station Development Plan. The first phase of this plan was approved in March 2012, covering the high speed railway development in 5 PRD cities: Guangzhou, Foshan, Zhaoqing, Huizhou, Zhuhai and Dongguan (Guangdong Government 2012). In August 2012, provincial governor of Guangdong province Zhu Xiaodan visited the ongoing project in Dongguan, stressing that all the relevant local departments should continue the effort on regional integration development with a positive spirit. He praised the progress of this project but at the same time admitted existing challenges. Project contractors were demanded to pay closer attention to land reserve, earning estimates, station development planning and other issues in the project. Supporting funds should always be in the right place at the right time. All the constructions in the project must match the safety and quality standard. Zhu also pointed out that this plan would make

the region's intercity railway network the biggest in the whole world. He demanded better leadership from the local government, more effective teamwork and stronger control in quality standards throughout the implementation of this plan. The provincial government hoped to see the network open to traffic around the end of 2014 (Guangdong Government 2012).

#### 4.3 Technology and Human Resource Upgrading

The local government acted proactively to make several programmes to support technology and human resource upgrading in the PRD. For example, the local government put a large amount of fund to support R&D to develop more advanced manufacturing industries. In the Reform and Development Plan 2008-2020, unveiled in January 2009, outlined main policies to face the current crisis and to solve the problems that exist in the current industrial structure. To better support the technology upgrading, the local government decided to build several R&D centres in the PRD region, such as Guangzhou Science City and Shenzhen High-tech Industrial Zone. Guangzhou Science City was designed to be a centre for IT R&D and outsourcing in whole China, while Shenzhen High-tech Industrial Zone focuses on high-tech industry, logistics, finance and information services under a close collaboration with Hong Kong.

Guangzhou is building an international talent center that serves the country and connects the whole world, based on the Medium-and Long-term Planning Outline for Talent Development in Guangzhou (2010-2020). This programme aims to speed up the introduction and training of high-tech innovative skills, to develop the talents most needed in major fields of social economic construction, to strengthen the globalisation of talent development thus to accelerate the integration of talent development in Pearl River Delta by strengthening talent sourcing within the region. To support the talent development, Guangzhou will carry out 11 major talent projects such as the "Plan of 100 Leading Talents of Creative Entrepreneurship", the "Plan of Specially Recruited 'Yangcheng Scholars' ", the "Cultivation of High-quality Talents", the "Project of Masters in Culture and Arts", the "Promotion of Young Talents" and the "Supporting Program for University Students' Business Start-up" (Invest Guangdong 2011).

Hong Kong is also actively involved in the PRD's personnel training. In recent years, Hong Kong's educational and professional institutions have been vigorous in providing training services to China mainland enterprises in Hong Kong and employees working in the PRD. For example, PEAK Institute of Professional Education and Knowledge has been serving thousands of Hong Kong companies and their employees located in the PRD for over 20 years. It can work with companies to develop customised in-house programmes, provide professional workshops to improve employee skills, and more advanced trainings including leadership, influencing skills, negotiation skills, customer services, change management, decision making and team building (PEAK 2010). The Lingnan Institute for Further Education, established by Lingnan University in 2001, is another locally well-known training centre that offers courses and programmes to secondary school leavers and young adults to help them prepare for employment and career development. It actively collaborates with overseas and Chinese Mainland institutions to help students obtain recognized degrees and professional qualifications (Lingnan Institute of Further Education 2005).

#### 4.4 Sustainability

The PRD has been one of the top energy-consuming regions in China and several plans were designed to make the production process greener and to protect the environment. Guangzhou International Biological Island, which was built based on the decisions in the Reform and Development Plan 2008-2020, is located on an island near Guangzhou city centre. Guangzhou city government carried out a systematic project of waste water treatment and river integrated restoration in late 2008 to save the Pearl River, the mother river of the region. It was reported that some part of the river in Guangzhou was seriously polluted: the water was black and smelly and the river bank was covered by black soil with wastes on top. The following photo was taken in Guangzhou in 2008, demonstrating how badly polluted was the river.

Figure 5 River Pollution in Guangzhou (Xinhuanet 2008)



The result of the project is significant: the capacity of water treatment and flood control has noticeably increased while river water quality has largely improved. At present, the attainment ratio of centralised portable water source is 100%; the rate of urban sewage treatment has increased to 85%, while the rate in the downtown area is even up to 90%, and the overall decreasing amount of directly discharged sewage into the regions' mother river, the Pearl River, is up to 0.8 million tons per day (Guangzhou News Centre 2010). Guangzhou city has built 38 sewage treatment plants and 48 sewage pumping stations since 2008. The sewage network increased from 1,813 km in 2008 to 2,907 km in 2010 and city's sewage treatment capacity increased to 46.5 million tons per day in 2010 from 22.86 million tons per day in 2008 (Guangzhou News Centre 2010). The development of water treatment in rural areas has improved both health status and the living environment of the rural population: over 6 million people benefit from better water treatment (Guangzhou News Centre 2010).

Similar water projects have been in process in other areas in the PRD. For example, Shenzhen city is starting a project to change the water pipes across the whole city to improve local drinking water quality. In 2010, the Shenzhen Municipal Water Affairs Bureau pointed out that more than 60% of the water supply pipes were corroded, causing poor tap water quality that could affect 1.4 million households (Shenzhen Daily 2012). It was also realised that Shenzhen's drinking water resource, despite meeting the national standards, when passing through such pipelines could be affected by

contaminants. Based on the bureau's statistics in 2010, 63.2% of the city's underground pipelines, 68.8% of its outdoor pipelines and 43.5% of its indoor pipelines were made of galvanised steel or cast iron, which could corrode over time thus generate constraints such as rust and calcium (Shenzhen Daily 2012). Shenzhen city is determined to invest 3 billion RMB (about 480 million USD) in the first phase of replacing the old pipes. This project will be carried out in two phases and the first phase would take up to five years (Shenzhen Daily 2012).

In 2006, Shenzhen port became the 4th biggest port in the world with its container throughput volume reaching 18.47 million TEU (China Ports 2007). Since then Shenzhen port has been growing so rapidly and its continuous expansion of scale has brought challenges on sustainability of the port and even the city. Shenzhen municipality has been putting much effort into port environmental protection and sustainable development during the recent years. In June 2007, Yantian International Container Terminal of Shenzhen and the Long Beach Port of the USA signed the Memoir on the Proposing Agreement of Environmental Protection in Shenzhen, which was regarded as an important move for Shenzhen in port environmental protection. Shenzhen port has set up new measurements to raise its sustainability level. For instance, the shore crane will turn off its power automatically once without operation for over 15 minutes to save electricity (China Ports 2007). In order to save oil, the waveform rectifier is used to improve the gantry crane, and electricity takes the place of oil to provide power to gantry crane. This new method has effectively reduced the pollution of exhaust gas and noises brought along by the diesel engines, and reduced the operating cost. Sustainability was considered weak in the PRD region due to its traditional labour-intensive and high energy-consuming industries, but with a number of sustainability development projects in hand, the local government has certainly been taking the "greener production" seriously in recent years, not only to facilitate the industrial upgrading, but also to improve the living quality of its population.

#### 4.5 Taiwan's Industrial Upgrading: Comparison and Lessons

The PRD region's neighbour across the sea, Taiwan, experienced its industrial upgrading much earlier. Due to the similarity in language, culture and tradition and the large amount of FDI from Taiwan, the PRD could draw some lessons from Taiwan's

industrial upgrading and adopt some successful policies in accordance with its own needs. Taiwan's industrial development began in the 1950s. The main objective of this period was the development of Taiwan's lagged industrial products, especially textile industrial products, to meet the needs of the internal market. Non-durable consumer goods and agricultural production necessities which were once supplied by pre-war Japan started be produced inside the island. After the export-oriented policy was implemented in the late 1950s, the Taiwan authorities adopted a series of policies and measures to effectively enhance international competitiveness. The first move was to reduce import tariffs of non-durable consumer goods, force enterprises to participate in international competition to enter the international market. The government abolished the multiple exchange rate system and devalued the Taiwan dollar to promote exports. In addition, it also adopted a series of specific policies to better support exports. Light industries in Taiwan quickly opened the overseas market thanks to the comparative advantage of low wages. This was Taiwan's economic take-off stage where the average annual GNP growth rate of 10.1% (Luo 2011).

After the first oil crisis in 1973, some structural drawbacks were exposed in Taiwan's economy. In external factors, energy and raw material prices had been steadily rising. Meanwhile internally, along with rising wage costs, the benefits of the original competitive advantage began to disappear. Between 1971 and 73, Taiwan's average annual rates of real gross national product growth all surpassed 12%, but suddenly dropped to 1.1% in 1974. The rate in 1975 only reached 4.2% (Luo 2011). Faced with this pressure, the Taiwan authorities put forward the concept of industrial upgrading. However, Taiwan was trying to vigorously develop heavy industries such as steel, shipbuilding and petrochemicals to achieve industrial upgrading and economic transformation. The second oil crisis in 1979 had a strong impact on heavy industries in Taiwan. At the same time, Taiwan was facing a worsening external environment due to the rise of trade protection measures in Europe and the United States. This situation left the Taiwan authorities no choice but to return to the "industrial upgrading" direction by focusing on information and industrial machinery. The target was to gradually develop a high value-added and technology-intensive industry structure, build strong industry associations to support the industrial upgrading, and effectively reduce pollution and energy consumption. Meanwhile, the government established strategic industrial development standards, and adopted a variety of measures to

encourage the enterprises to change, in order to finally achieve industrial upgrading and economic structural transformation.

Since the 1990s, Taiwan became even more active in promoting industrial upgrading. The government launched the "Industrial Upgrading Regulation" to promote the upgrading of traditional industries and the Ten Emerging Industries (Luo 2011), namely communications, information, consumer electronics, semiconductor, precision machinery and automation, aerospace, advanced materials, specialty chemicals and pharmaceuticals, health care and pollution prevention industries. Here we can apply Michael Porter's theory on a country's competitive advantage and, specifically, industrial clustering to provide more explanation of Taiwan's industrial upgrading. He claimed that in modern times, the traditional concept of a nation's comparative advantage had become less decisive: factors such as land, natural resources, quantity and quality of labour do not guarantee a country's advantages in international trade. Competitive advantage, which can be achieved by high productivity and innovation, has become more relevant in helping a regional economic base to survive in the face of globalisation and technical change.

The concept of industrial clustering was first introduced and popularized by Porter in his book *The Competitive Advantage of Nations* (1990). Clusters are geographic concentrations of interconnected companies or institutions in a particular field or industry. Clusters typically include companies in the same industry that share infrastructure, suppliers, and distribution networks. Components suppliers, distributors and manufacturers can gather together in related industries to develop joint solutions and combine resources to take advantage of market opportunities. According to Porter, industrial clusters can affect competitiveness in the following three ways: by improving the productivity of companies in the clusters, by promoting innovation in the field, and by encouraging new businesses (Porter 1998: 77). After the mid-1990s, Taiwan began to build "technology islands" as the centers of the high-tech industry, to largely improve Taiwan's industrial clustering (Industrial Development Bureau of Taiwan 2003). Hsinchu Science and Industrial Park is an industrial park established by Taiwanese government on December 15, 1980 (HSP 2012). Inspired by Silicon Valley in the United States, Hsinchu Science and Industrial Park is now one of the world's most significant areas for semiconductor manufacturing. Taiwan's science and engineering

powerhouses, National Chiao Tung University and National Tsing Hua University, are located right next to Hsinchu Park. Many global, well-known enterprises have their operations in the park, such as Taiwanese brand Acer, a hardware and electronics giant. In the World Economic Forum's 2007-2008 Global Competitiveness Report, Taiwan was ranked No.1 in the world in the "State of Cluster Development" index. In recent years, the industrial strategies of "Two Innovations" (technological innovation and brand innovation) and "Two Highs" (high-tech intensive and high value-added) have largely strengthened the competitive advantage of Taiwan's industrial clusters. Taiwan's score for the "State of Cluster Development" index in this report increased from 5.52 points (7 points being the highest) to 5.7 points, making the region an example of industrial cluster development for the whole world (Council for Economic Planning and Development 2008). More information about the ranking can be found in the following table.

Table 3 WEF Ranking of the Competitiveness of Industrial Clusters (Council for Economic Planning and Development 2008)

	2007-2008		2006-2007		2005-2006	
	Score	Global Ranking	Score	Global Ranking	Score	Global Ranking
<b>Taiwan</b>	<b>5.7</b>	<b>1</b>	<b>5.52</b>	<b>1</b>	<b>5.39</b>	<b>2</b>
United States	5.3	2	5.22	2	5.19	4
South Korea	5.1	3	4.19	31	4.38	21
Singapore	5.1	4	4.92	7	5.15	6
England	4.8	9	5.06	4	4.63	14
Germany	4.8	10	4.90	8	4.45	17
Finland	4.8	11	5.07	3	5.33	3
Japan	4.7	12	4.33	27	5.46	1
Switzerland	4.7	13	4.67	15	4.31	23
Hong Kong	4.7	14	4.75	12	4.68	11
Italy	4.5	21	3.19	85	5.16	5

The industrial upgrading of Taiwan has produced impressive results. Firstly, the region witnessed the booming development of its tertiary industry. Finance, insurance and other service industries have noticeably developed during the upgrading process. From 1982 to 2002, the proportion of agriculture in GDP declined from 7.7% to 1.9%, the manufacturing sector dropped to 25.6% from 35.2%, while the service sector increased to 67.1% from 48% (Wuhan Library 2005). In the structure of consumer

demand, the export share of GDP stayed at the same level in some years, but the proportion of domestic consumption grew 10% in just two decades (Wuhan Library 2005). Such changes in demand structure had great significance in the rise of emerging industries.

Secondly, the export industry structure of Taiwan was further optimised during the industrial upgrading. Accompanied by substantial investment on the mainland, Taiwan's export has undergone changes. To some extent, Taiwan's investment on the mainland enterprises is a new driving force of the economic growth of Taiwan itself. The proportion of exports to the mainland from Taiwan increased from 0.88% in 1982 to nearly 20% in 2002 (Wuhan Library 2005). Thirdly, capital-intensive and high-tech-intensive industries grew rapidly within a short period of time. Taiwan's petrochemical, electronic and mechanical together accounted for around 57% of the whole manufacturing sector in 1986, but the rate increased to 63% in 1996 (Wuhan Library 2005). Among these three industries, the relative importance of the petrochemical manufacturing decreased, while electronics and machinery industries started to play more significant roles. The proportions of these three industries among total manufacturing output in 1986 were 35%, 12% and 11% in 1996 to 23%, 22% and 18%, respectively. Compared to manufacturing output's 1986-1996 average growth rate of 7.7%, petrochemicals, electronics and machinery grew by 3.4%, 14.6% and 13.2%, respectively (Wuhan Library 2005). The electronics industry became the main focus of Taiwan investment in the mainland, and it has shown gradual growth in recent years. Clearly, Taiwan's investment on the mainland did not lead to panicking caused by an "industrial hollowing-out" phenomenon, but on the contrary promoted the development of these industries. Witnessing the rapid economic and social changes caused by the transfer of industries, the Taiwan authorities seek leaders in current industrial development and have determined the latest top ten emerging industries such as nanotechnology applications industrial and semiconductor precision equipment industries.

Fourthly, Taiwan has built a new global manufacturing network as a result of its industrial upgrading. Taiwan's direct investment on the China mainland formed a favorable cross-border industrial network: Taiwan placed orders, mainland China took the responsibility in manufacturing, Hong Kong re-exported the products (or Taiwan

reprocessed the products), and the finished products were ready to be sold in the developed countries. Around the early 2000s, Taiwanese foreign investment by SMEs switched from a low-cost model to the large, capital-intensive level of investment or vertical integration, towards an increasingly active and specialized production global layout, divided by region.

The industrial development of Taiwan was closely related to the economies of the United States and Japan. For the optoelectronic industry and information technology industry in Taiwan, vendors and OEM customers from the United States and Japan were the main transnational sources of knowledge: the former provided key components, specifications and high standards, while the latter provided the technology and market demand. In 2000, Taiwan formed a global production network consisting of the United States, Japan, Europe - Taiwan - Mainland China (including Hong Kong) and Southeast Asia. Through foreign investment, the electronics industry could move the production of matured products to mainland China and Southeast Asia, at the same time as transferring itself to upstream or new technology industries. Taiwan's high-tech manufacturers put great effort in exploring a set of the desirable technology transfer specification, to prevent improper technical output loss and to guard the dominance of the leading technology. In addition, Taiwan has recently increased its budget for R&D and technology innovation in order to strengthen the long-term competitiveness of its industries and enterprises.

To examine the reasons behind Taiwan's successful industrial upgrading and draw some valuable lessons for the PRD, we must understand that Taiwan's industrial transformation and upgrading process had unique conditions and opportunities. From Taiwan's example, we found that government forces cannot be ignored in the industrial transformation and upgrading, and should play an important adaptive role, especially in anticipation of the resulting trouble and pain caused by these changes. The Taiwan government provided strong policy support for high-tech development. Science-based industrial parks were given special preferential policies, such as tax relief and rent reduction. The government also provides tax incentives and financing concessions policy, as well as large amounts of financial support for the high-tech industry. According to statistics, in 1995, the budget for R&D accounted for 1.92% of Taiwan's annual GDP (Deng & Ding 2001: 99-100). Such abundant financial support

has injected great vitality to the development of Taiwan's high-tech industry. At the same time, the government provided strong legal protection for industrial upgrading. The Science and Technology Act was introduced and enacted in 1999 to establish standards of science and technology research and development and to promote the integration of scientific research and production in practice. The Taiwan government has also paid much attention to developing the skills of its workforce. The government provided preferential treatment and a superior work environment to attract talent from outside Taiwan, while it tried to lure back talent that had left Taiwan. Many Taiwanese who were working in America's top high-tech companies returned to Taiwan as investors or managers (Deng & Ding 2001: 99-100).

Secondly, the Taiwanese authorities made great efforts to support SMEs during the industrial upgrading. In 1982, Taiwan's Ministry of Economic Affairs developed the SME Development Ordinance to focus on the implementation of a modern management system to strengthen financial intermediation and improve production technology to enable SMEs to become an important force of the pillars of economic development and economic restructuring. In 1997, Taiwan authorities incorporated the SMEs Protection Clause into the Constitution and began to attach greater importance to the survival and development of SMEs. SMEs in Taiwan progressively elevated themselves so that they became more knowledge-intensive, technology-intensive and innovation-intensive. Despite the limits of scale, SMEs are more flexible and faster in response to changing environments, decision-making and adapting themselves to new consumer needs, due to their relatively simple and low hierarchical management structure. In order to help SMEs to enhance competitiveness, Taiwan's Ministry of Economic Affairs founded the Small and Medium Enterprises Administration, to support SMEs to upgrade and transform their businesses and encourage SMEs to actively engage themselves in technology innovation and R&D. Taiwanese SMEs were required to raise technical standards, improve quality control and operational efficiency, and create higher added value. The government has also arranged consultation and diagnostic services through financial service teams for SMEs. Apart from helping SMEs to upgrade and transform their businesses, the Taiwan authorities also started to pay more attention to startups. In 2012, the Start-Up Taiwan Project was launched to support startup businesses. Under this project, many workshops were established to gather creative ideas, combine regional industrial resources and thus ultimately shape the innovation-based

core of SMEs. The Taiwan government has also promised to vigorously participate in international conferences to boost international cooperation for SMEs through the international trade organizations, such as the World Trade Organisation (WTO), Organisation for Economic Co-operation and Development (OECD), and Asia-Pacific Economic Cooperation (APEC), and create more bilateral cooperation opportunities with China Mainland (Yun 2012).

Thirdly, the PRD region should vigorously promote independent innovation, increase funding for R&D activities and technological innovation. Taiwan's economic development has had long-term dependence on external technology and external markets. Most SMEs cannot afford the high-risk nature of such activity, independent research and development of new technologies is very limited. When we take a look at the industrial upgrading process of the PRD, structural adjustment in the manufacturing sector was mainly through the expansion of technology-intensive industries. Industrial transformation and upgrading must vigorously promote independent innovation, accelerate the industry public platform for innovation and regional innovation system, thus the PRD should increase funding for technology innovation, R&D and other sectors, and encourage enterprises to conduct independent innovation. Recently the culture of making counterfeit products became more popular in the PRD region. It was estimated that workers in the PRD who directly or indirectly engaged in the fake product sector reached 100 million in 2010 (Chen 2010). The counterfeit product sector, also known as "Shanzhai Industry" in Chinese, originated in the 1960s when a number of small-scale, low-cost factories emerged in Hong Kong. After China's reform and opening up, the fake product sector has gradually transferred to the PRD region from Hong Kong. In 2010, before the genuine products hit the shelves, counterfeited Apple iPhone 4's and iPad were widely available in malls in major Chinese cities with extra features such as a dual SIM cards slot and removable batteries. These phones have touch screens and applications just like the real iPhones and have the iPhone logo but the prices are only about a fifth of the original iPhone. In 2007, 1.15 billion cell phones were sold worldwide and 150 million counterfeited cell phones were sold in the same year, thus making up more than 10% of the total amount (Yin 2009). For many SMEs, the journey of innovation is full of thorns and risk. For example, the cost of developing a new mold is so high that the enterprise may need to sell over 50,000 thousands of the new products to recover the mold cost.

There is the risk that the new products would not be accepted by consumers so many manufacturers are afraid to make new molds. It is difficult to predict the cost of innovation thus many SMEs find plagiarism the most economical choice; On the other hand, China's intellectual property protection is still in its infancy. At the same time, the high cost of copyrights application makes many companies rather give up the rights. If the government does not effectively control the fake product sector, the living environment for innovative enterprises will get only worse. Innovative enterprises on the one hand have to face the risk and challenges in innovation and R&D. On the other hand, once the technology is copied, the huge R&D cost and effort would go down the drain. The Chinese government should support efforts to increase intellectual property rights, especially in terms of law and policy, to encourage and motivate corporate intellectual property construction and at the same time cultivate social awareness of intellectual property rights. Sufficient refinement should be applied to copycat businesses. In case of serious violations of copyrights, such enterprises could be punished by high fines or even have their business licenses revoked.

Fourthly, the PRD region should increase the introduction of foreign investment and advanced technology. One important force that shaped Taiwan's industrial upgrading was R&D alliances with foreign enterprises. The Taiwan R&D alliances were formed in 1980s but began to flourish in the 1990s when many local enterprises entered the international market. Most alliances happened in the IT industry but also emerged in other industries such as automotive engines, vehicle and services. A number of public R&D institutes such as Taiwan's Industrial Technology Research Institute (ITRI), played an influential role during the development of R&D alliances. The ITRI acted as a prime vehicle for the leveraging of leading technologies from developed countries, and rapidly diffused such technologies to local enterprises. Taiwanese firms could take advantage of contract manufacturing to leverage new levels of technologies. The fundamental form of such R&D alliances is sharing R&D costs, reducing risks and collaborating SMEs. The benefits of successful R&D alliances may include acceleration of technology acquisition, lower cost and risks in R&D, fast product development, improvement in production processes and equipment, and access to new resources and new markets. Many R&D alliances have been done already among enterprises from the PRD region, Hong Kong and Taiwan, but the provincial government could further promote such alliances with supporting policies.

## **5 Conclusion**

The current global economic crisis has had a direct impact on the exports of the PRD. As a result, strategic adjustment of the region's economic structure must be made.

From the government perspective, more effective macro-control policies shall be implemented. To better respond to the impact of the international financial crisis, both central and the local governments should improve the macro-control policies in order to create a more favorable environment for economic growth and business development, and reduce economic volatility in the present context of financial crisis. At the same time, due to the high dependence on foreign trade, many export-oriented companies in the PRD have collapsed due to increasing operating difficulties. The decline in exports has caused overcapacity, bankruptcy and increasing unemployment, which could ultimately affect society's stability. To avoid instability resulting from the current crisis, the main goal of the government's macro-control in the future should be to focus on maintaining steady economic growth and stable employment.

From the industry perspective, transfer of industries and industrial upgrading should be steadily promoted. The urgent need for the PRD region to transfer and upgrade its industrial base was obvious, but if the upgrading is implemented too quickly through government policies, economic development would be harmed. For example, the transfer of industries could affect the industry cluster and industry chain, because sometimes after the migration of upstream industry, its downstream industries will decline; processing trade generally needs convenient port transportation, so when the factories are moved to inland locations, production costs for international orders will increase due to domestic logistics' extra cost. Therefore, although the expectation of industrial transfer is very strong, such transfer should be undertaken with caution in the context of the financial crisis.

From the enterprise perspective, enterprises should transfer from general manufacturing to "soft manufacturing". The past manufacturing industry mainly focused on physical product design, manufacturing, and quality management, but too little attention was paid to the "soft" elements such as resource management, service, talent training and process innovation. At present, such factors play crucial roles in

today's knowledge-oriented era. The so-called "soft" manufacturing is to increase the added value from services and solutions, as well as generating product ideas and mechanisms that are usually invisible. The manufacturing industry has entered an era of unprecedented competition in the supply chain, which put an end to Chinese dominance based on cheap manufacturing. The world factory is only placed at the weakest level of international supply chain. If a manufacturing industry chain includes manufacturing, product design and development, procurement, warehousing, order processing, wholesale and retail, China has mostly developed in manufacturing, leaving lots of room for improvement in other aspects of the industrial chain. The global competitive environment has undergone a fundamental change. With the maturity of manufacturing industry and the upgrade of consumer demand, China's place in the global economy has been gradually shifting from a product economy to a service economy. In the supply chain, Chinese enterprises must improve the research and design of the upstream, at the same time as encouraging innovation in downstream marketing and services innovation. Gradually, Chinese enterprises would transform themselves from being product and market-oriented to consumer and environmental-oriented. Without such transformation and innovation, China's manufacturing industry would not be able to achieve the necessary industrial upgrading.

From the region's perspective, stronger regional economic integration in the Greater PRD region is essential. Economic cooperation between the PRD, Hong Kong and Macau should have been more successful after the handover of Hong Kong and Macau. However, the impact of the Asian financial crisis, "911" terrorist attacks and the global economic downturn affected the progress of these developments and thereby the Greater PRD economic integration. In addition, the differences between the PRD, Hong Kong and Macao in industrial structure and economic system bring difficulties to efforts aimed at a real integration of the Greater PRD economy. Rising trade protectionism from the developed nations also has an inevitable impact on the region's export-oriented economy. In the region's internal environment, some people in Hong Kong are concerned that a too close relationship with the mainland will affect Hong Kong's international economic relations. The impact of high integration under the "one country, two systems" may weaken the status of Hong Kong and eventually there would be only "one country, one system". Hong Kong's fear of "mainlandisation" becomes stronger than ever. The Hong Kong media remain far freer, Hong Kong courts are far more

impartial and Hong Kong's financial world much more transparent than anything found in Mainland China. Still, Hong Kong people complain that the region is turning "red", and the younger generation starts to act more vocally, even vociferously, in defending Hong Kong rights and identity. For example, a recent mass protest against China's national education happened in Hong Kong on 29th July 2012, causing more anti-mainland sentiment. About 90,000 people gathered in Hong Kong to protest against the local government's plan to introduce Chinese national education in schools (Hong Kong Digital Photovision 2012). Hong Kong parents were afraid that their children to be subjected to indoctrination, while teachers considered this move to be political interference from Beijing. Local government denied the accusation and assured the aim was to build pride and a sense of belonging in the nation. Hong Kong's Chief Executive Leung Chunying announced a call-off of the plan later and Hong Kong returned to peace, but certainly the anti-mainland sentiment still exists, if not even deepening.

Despite existing significant differences in the financial systems, the Greater PRD region should still promote further economic integration by working complementarily with Hong Kong for mutual benefit, making better use of its own advantages and gradually developing a globally competitive regional economy. A better regional integration is likely to be driven more by economic factors, rather than political factors: despite the economic bubble in Hong Kong, investment from Hong Kong represents about 75% of Guangdong's FDI and Hong Kong is the region's biggest trading partner (China Daily 2012). The PRD and China Mainland are becoming more irreplaceable for Hong Kong as regards economic growth. As mentioned in the previous chapter, local governments are improving infrastructure to further the regional integration within the Greater PRD. For example, the Hong Kong-Zhuhai-Macao Bridge will be able to reduce transportation time by 60% to 80% for travelers and goods, thus facilitating the economic integration and regional development of the Mainland, Hong Kong and Macao (China Daily 2012). All in all, closer linkages within and around the Greater PRD region are essential and beneficial, and they should be supported, not hindered, by the "One Country, Two System" policy.

To sum up the whole discussion, the Pearl River Delta region of China seized the opportunity of China's economic reform led by Deng Xiaoping, which was launched in

1978, and became a world-class manufacturing centre. During its development, the region gained modern technology, international market access, a logistics platform, management know-how and abundant investment inflow from Hong Kong. The large amount of inward investment from other parts of the world is also considered as an important force in shaping the region's modern economy. With China's entry to the WTO in 2001, the PRD's export sector achieved greater development thanks to reduced international trade barriers. Within a short period of only 20 years, the region became a global manufacturing centre and gradually transformed into an export-oriented "world factory".

The region has suffered immensely from the global economic crisis triggered by the bursting of the housing bubble in the US in April 2007: it is facing a series of problems including a rapid decline in exports, many small and medium size companies shutting down, and lay-offs of migrant workers. The PRD's own industrial structure, based on cheap labour manufacturing, is losing its competitive edge since the cost of raw materials, land and worker wages have risen significantly during recent years. Many manufacturers are low-positioned in the value chain and only generate very low value-added output. The region's over-dependence on exports became vulnerable to the sharp fall of international demand.

The way to save the PRD is industrial upgrading. It was first introduced by communist party secretary of Guangdong province Wang Yang in April 2008, and in the case of the PRD, the goal of industrial upgrading is to transform from the current highly export-oriented, labour-intensive and low value-added industries into those that are less dependent on foreign trade, higher value-added and high-technology. The local government has already implemented a series of policies to promote the industrial upgrading, such as improving local infrastructure, upgrading technology and human resource quality, and developing sustainability in manufacturing and related activities. The idea of industrial upgrading by the local government was questioned in the beginning, but the results have been positive and the upgrading is still in process. A comparison between industrial upgrading of Taiwan and that of the PRD was included and there are several things that the PRD should learn from Taiwan's experience, namely a more effective governmental role, more support to SMEs during industrial upgrading, R&D with foreign enterprises and technological innovation.

There was an important moment for China in 2010, when China's GDP of that year (valued at \$5.87 trillion) surpassed Japan's \$5.47 trillion thus becoming the world's second largest economy after the U.S (CNN Money 2012). Another upcoming special time is in November 2012, when the 18th Communist party congress will formally select the next general secretary and other members of China's top political body. Xi Jinping will almost certainly become the general secretary of the party, then the new president of China. Xi's career in reforming Yangtse River Delta's economy has showed his ability and willingness to make changes. Will the new political body be a status quo leadership or one ready to take more daring decisions? How will this once-in-a-decade political change affect local policies in the PRD region?

The year 2012 is the year of the dragon in the Chinese zodiac. In the Chinese culture, the dragon is a symbol of power and control, and it also represents change and mobility. The country and the Pearl River Delta region will experience changes in political and economic aspects. We might not be able to fully predict the precise influence of such changes on the PRD region's economy, but one thing is certain: that the road of reform and upgrading is never entirely smooth. The industrial upgrading in the PRD region will take time and effort, from the central government, local governments, institutions, enterprises, labour and all the other parts of the value chain. The industrial upgrading might bring challenges and problems, but it is the way to save the PRD and transform its industries into high value-added and high-tech industries.

## References

Deng, Z.H and Ding Y., (2001). *Research on the Governmental Role in Taiwan's High-Tech Industry Development. Science & Technology Progress and Policy.* 3 (3), p99-p100.

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

Oxford Analytica. (2008). China: Guangdong faces restructuring test. *International Herald Tribune.*

Porter, M. E. 1998, *Clusters and the new economics of competition*, Harvard Business Review, Nov/Dec98, Vol. 76 Issue 6, p77.

Saw, S.H. and Wong, J., (2009). *Regional Economic Development in China.* Singapore: ISEAS Publishing.

The Centre for Urban and Regional Studies, Sun Yat-sen University, '*Zhujiang sanjiao zhou fazhan licheng yanjiu*' ('A study of the Development Trajectory of the Pearl River Delta'), *Xianggang yu zhujiang sanjiao zhou jingji hudong yanjiu* (A study of the Hong Kong - Pearl River Delta Economic Interaction), April 2002, p.36.

Tong, S.Y. and Zheng, Y.N., (2010). *China and the Global Economic Crisis.* River Edge, NJ, USA : World Scientific Publishing Co.

Tse Edward (2010). *The China Strategy: Harnessing the Power of the World's Fastest-Growing Economy.* Hong Kong: Basic.

Bernersconsulting. (2010). *Guangdong Province (South China) announces massive infrastructure program.* Available: <http://bernersconsulting.net/site/english/bernersconsulting/newsletter/newsletter-q4-20102/guangdong-massive-infrastructure-program.html>. Last accessed 1st Oct 2012.

Chen, C. (2010). Pearl River Delta "World Factory" Green Upgrade. Available: <http://www.cww.net.cn/cwwMag/html/2010/1/4/201014142428316.htm>. Last accessed 17th Oct 2012.

Chen, X.M. (2007). *Economic Glocalizing, Regional Embedding, and State Scaling*. Available: [www.uic.edu/depts/soci/xmchen/WSF-Chen\\_new%5B1%5D.pdf](http://www.uic.edu/depts/soci/xmchen/WSF-Chen_new%5B1%5D.pdf). Last accessed 11th Nov 2012.

China Daily. (2012). HK Propels Pearl River Delta Integration. Available: [http://www.chinadaily.com.cn/china/HK15th/2012-06/19/content\\_15511409.htm](http://www.chinadaily.com.cn/china/HK15th/2012-06/19/content_15511409.htm). Last accessed 6th Nov 2012.

China.org.cn. (2008). A cold winter for laid-off toy factory workers. Available: [http://www.china.org.cn/business/financial-crisis/2008-11/14/content\\_16765835.htm](http://www.china.org.cn/business/financial-crisis/2008-11/14/content_16765835.htm). Last accessed 22nd Sep 2012.

China Ports. (2007). *Shenzhen Port is Dedicated to Build a 'Green Port'*. Available: <http://english.chinaports.org/info/200710/000031.html>. Last accessed 1st Oct 2012.

CNN Money. (2012). World's Largest Economies . Available: [http://money.cnn.com/news/economy/world\\_economies\\_gdp/](http://money.cnn.com/news/economy/world_economies_gdp/). Last accessed 6th Nov 2012.

Council for Economic Planning and Development. (2008). Taiwan Tops World in Industry Cluster Development. Available: <http://www.cepd.gov.tw/encontent/m1.aspx?sNo=0009789>. Last accessed 30th Oct 2012.

Cui, P. (2008). Increase employment and treat SMEs better. Available: <http://opinion.people.com.cn/GB/8575822.html>. Last accessed 9th Oct 2012.

Fung, V.K. (2003). The 2022 Foundation Report. Available: [www.2022foundation.com/reports/000001.pdf](http://www.2022foundation.com/reports/000001.pdf). Last accessed 11th Nov 2012.

Guangdong Government Official Website. (2012). Guangdong Governor Zhu Xiaodan Checked the Progress of Construction of the Pearl River Delta Intercity Railway. Available: [http://www.gov.cn/gzdt/2012-08/08/content\\_2200333.htm](http://www.gov.cn/gzdt/2012-08/08/content_2200333.htm). Last accessed 15th Oct 2012.

Guangzhou News Center. (2010). Guangzhou Water Environment Improvement. Available: [http://special.gznews.gov.cn/2010/node\\_910/node\\_1007/2010/12/14/12923142307881.shtml](http://special.gznews.gov.cn/2010/node_910/node_1007/2010/12/14/12923142307881.shtml). Last accessed 15th Oct 2012.

Guangzhou News Centre. (2010). Guangzhou Water Environment Restoration Project. Available: [http://special.gznews.gov.cn/2010/node\\_910/node\\_1015/2010/12/14/12923142657882.shtml](http://special.gznews.gov.cn/2010/node_910/node_1015/2010/12/14/12923142657882.shtml). Last accessed 1st Oct 2012.

HKTDC. (2011). PRD Economic Profile. Available: <http://china-trade-research.hktdc.com/business-news/article/Fast-Facts/PRD-Economic-Profile/ff/en/1/1X000000/1X06BW84.htm>. Last accessed 18th Sep 2012.

Hong Kong Digital Photovision. (2012). Hong Kong 729 Protest Against China National Education. Available: <http://www.hkdigit.net/2012/09/729-protest-national-education/>. Last accessed 30th Oct 2012.

HSP. (2012). An Introduction to the Hsinchu Science Park. Available: [http://www.sipa.gov.tw/english/home.jsp?serno=201003210015&mserno=201003210003&menudata=EnglishMenu&contlink=content/introduction\\_2\\_1.jsp&level3=Y&serno3=201003210021](http://www.sipa.gov.tw/english/home.jsp?serno=201003210015&mserno=201003210003&menudata=EnglishMenu&contlink=content/introduction_2_1.jsp&level3=Y&serno3=201003210021). Last accessed 30th Oct 2012.

Hudong Wiki. (2009). He Jun Toy Factory. Available: <http://www.hudong.com/wiki/%E5%90%88%E4%BF%8A%E7%8E%A9%E5%85%B7%E5%8E%82>. Last accessed 22nd Sep 2012.

HZMB Project. (2011). *Project Introduction*. Available: <http://hzmb.hk/eng/index.html>. Last accessed 1st Oct 2012.

Industrial Development Bureau of Taiwan. (2003). History of Industrial Development. Available: <http://www.moeaidb.gov.tw/external/ctrl?lang=1&PRO=pda.About04>. Last accessed 16th Oct 2012.

Invest Guangdong. (2011). Guangzhou to Initiate Medium- and Long- term Plan for Talent Development. Available: [http://www.investguangzhou.gov.cn/web/eng/jsp/content/content\\_detail.jsp?catEncode=001006001001&contentId=28312](http://www.investguangzhou.gov.cn/web/eng/jsp/content/content_detail.jsp?catEncode=001006001001&contentId=28312). Last accessed 1st Oct 2012.

Li Yuequn. (2011). Emptying the Cage and Changing the Bird" for Industrial Upgrading in Guangdong Province. Available: <http://www.dfdaily.com/html/113/2011/1/20/560888.shtml>. Last accessed 8th Oct 2012.

Lingnan Institute of Further Education. (2005). About LIFE. Available: [http://www.ln.edu.hk/life/show\\_content2.php?id=1](http://www.ln.edu.hk/life/show_content2.php?id=1). Last accessed 1st Oct 2012.

Luo, B.H. (2011). Lessons from Taiwan's Industrial Upgrading to China Mainland Machinery Industry. Available: <http://www.chinavalue.net/Biz/Blog/2011-9-18/835448.aspx>. Last accessed 16th Oct 2012.

NewsGd. (2011). *Guangdong's Performance in the Past Five Years*. Available: [http://www.newsgd.com/specials/12thFive-Year/news/content/2011-06/07/content\\_25121554.htm](http://www.newsgd.com/specials/12thFive-Year/news/content/2011-06/07/content_25121554.htm). Last accessed 1st Oct 2012.

PEAK - Institute of Professional Education and Knowledge. (2010). Corporate Services. Available: <http://www.peak.vtc.edu.hk/Peak/en/html/page/4/41.html>. Last accessed 1st Oct 2012.

People's Daily. (2009). *Chinese leaders: Crisis also means opportunity*. Available: <http://english.peopledaily.com.cn/90001/90776/90785/6608809.html>. Last accessed 30th Sep 2012.

Phoenix Finance. (2012). The Controversial "Emptying the Cage and Changing the Bird" Policy of Guangdong. Available: <http://finance.ifeng.com/opinion/zjgc/20120324/5800249.shtml>. Last accessed 9th Oct 2012.

ScienceDirect. (2008). *Environmental Pollution*. Available: <http://www.sciencedirect.com/science/article/pii/S0269749107004599>. Last accessed 11th Nov 2012.

Shenzhen Daily. (2012). City to Spend RMB3b on Water Pipes. Available: [http://english.sz.gov.cn/In/201209/t20120913\\_2017483.htm](http://english.sz.gov.cn/In/201209/t20120913_2017483.htm). Last accessed 15th Oct 2012.

The Economist. (2011). China's Economy and the WTO: All change. Available: <http://www.economist.com/hk/node/21541448>. Last accessed 6th Nov 2012.

Wuhan Library. (2005). How the Transform of Industry Promotes Industrial Upgrading - Taiwan's Experience. Available: <http://www.whlib.gov.cn/html/2011/0408/10932430.shtml>. Last accessed 17th Oct 2012.

Xinhua. (2011). Emptying the Cage and Changing the Bird" for Industrial Upgrading: Industrial Transfer Output Value Exceeding 200 Billion RMB. Available: [http://news.xinhuanet.com/fortune/2011-12/05/c\\_111218483.htm](http://news.xinhuanet.com/fortune/2011-12/05/c_111218483.htm). Last accessed 8th Oct 2012.

Xinhua Net. (2008). Xinhua survey: Guangzhou Sewage treatment & Creek Remediation Investigation. Available: [http://news.xinhuanet.com/newscenter/2008-12/10/content\\_10480499.htm](http://news.xinhuanet.com/newscenter/2008-12/10/content_10480499.htm). Last accessed 15th Oct 2012

Yin, S. (2009). Subversion of Copycats. Available: <http://tech.163.com/09/0420/10/57BBE6EL0009388P.html>. Last accessed 17th Oct 2012.

Yun, L.Y. (2012). Greeting from SMEA Director-General. Available: <http://www.moeasmea.gov.tw/ct.asp?xItem=67&CtNode=302&mp=2>. Last accessed 17th Oct 2012.

Zhang, C.W. and Wang, D.W. (2004). Fundamental Change in the Nature of Farmers' Income. Available: <http://www.usc.cuhk.edu.hk/PaperCollection/Details.aspx?id=3462>. Last accessed 15th Oct 2012.

**Appendix 1. List of Abbreviations**

APEC	Asia-Pacific Economic Cooperation
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GRP	Gross Regional Product
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
PRD	Pearl River Delta
SEZ	Special Economic Zones
SME	Small and Medium Enterprises
WTO	World Trade Organisation