

How Do Special Economic Zones and Industrial Clusters Drive China's Rapid Development?

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Abstract

In the past 30 years, China has achieved phenomenal economic growth, an unprecedented development “miracle” in human history. How did China achieve this rapid growth? What have been its key drivers? And, most important, what can be learned from China’s success? Policy makers, business people, and scholars all over the world continue to debate these topics, but one thing is clear: the numerous special economic zones and industrial clusters that emerged after the country’s reforms are without doubt two important engines of China’s remarkable development.

The special economic zones and industrial clusters have made crucial contributions to China’s economic success. Foremost, the special economic zones (especially the first several) successfully tested the market economy and new institutions and became role models for the rest of the

country to follow. Together with the numerous industrial clusters, the special economic zones have contributed significantly to gross domestic product, employment, exports, and attraction of foreign investment. The special economic zones have also played important roles in bringing new technologies to China and in adopting modern management practices.

This study briefly summarizes the development experiences of China’s special economic zones and industrial clusters (their formation, success factors, challenges, and possible areas or measures for policy intervention), based on case studies, interviews, field visits, and extensive reviews of the existing literature in an attempt to benefit other developing countries as well as the broader development community.

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Key words: *China, Special Economic Zones (SEZ), industrial clusters, success, development, growth, experiences, competitiveness, challenges, policy suggestions*

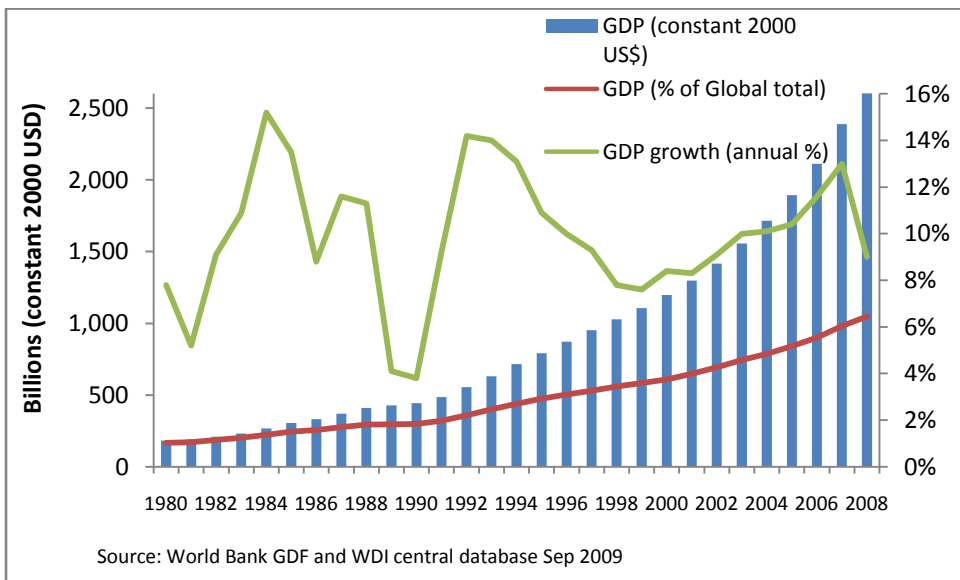
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China's meteoric economic rise over the past three decades is an unprecedented "growth miracle" in human history. Since the Open Door policy and reforms that began in 1978, China's gross domestic product (GDP) has been growing at an average annual rate of more than 9 percent, with its global share increasing from 1 percent in 1980 to almost 6.5 percent in 2008 (see figure 1.1) and its per capita GDP increasing from US\$193 to US\$ 3,263 (see figure 1.2). Total exports have been growing at an average annual rate of 13 percent (21.5 percent from 1998 to 2007), with China's share of total exports increasing from 1.7 percent in 1980 to 9.5 percent in 2008 (see figure 1.3).

Figure 1.1 China's GDP Growth, 1980–2008

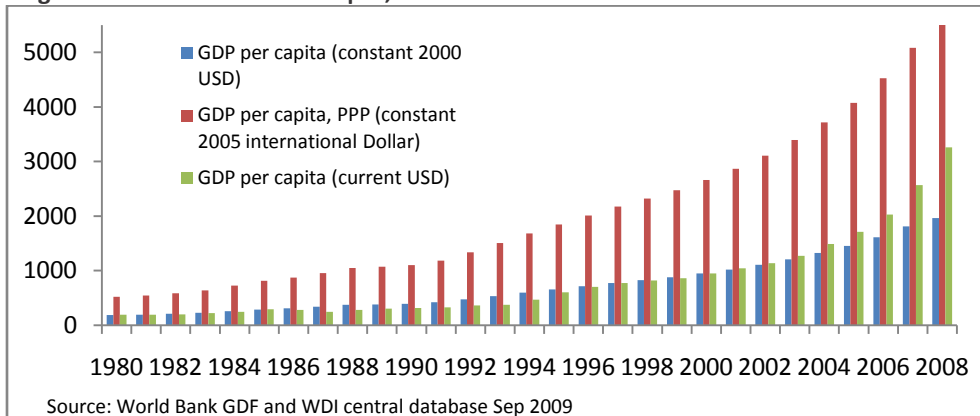


In 2007, China's incremental growth in real GDP actually exceeded its entire real GDP in 1979. In 2010, China outpaced Japan and became the world's second-largest economy. China has indisputably become an important growth engine of the global economy and a leader in international trade and investment. Rapid growth in the past decades has helped lift more than 400 million people out of poverty. These results are truly impressive.

While China's rapid rise has become a hot topic for development debate among policy makers, business people, and scholars all over the world, the

numerous special economic zones (SEZs) and industrial clusters that have sprung up since the reforms are undoubtedly two important engines for driving the country's growth. This study briefly summarizes the development experiences of China's SEZs and industrial clusters, based on case studies, interviews, field visits, and extensive reviews of the existing literature in an attempt to benefit other developing countries as well as the broader development community.

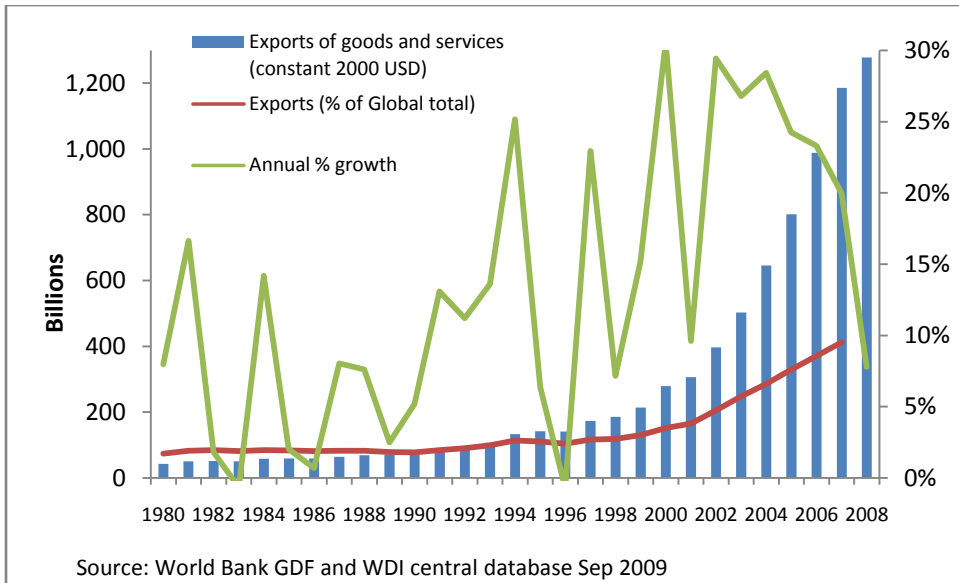
Figure 1.2 China's GDP Per Capita, 1980–2008



The key experiences of China's SEZs and industrial clusters so far can best be summarized as gradualism with an experimental approach; a strong commitment; and the active, pragmatic facilitation of the state. Some of the specific lessons include:

- the importance of strong commitment and pragmatism from the top leadership;
- preferential policies and broad institutional autonomy;
- strong support and proactive participation of governments, especially in the areas of public goods and externalities;
- public-private partnerships;
- foreign direct investment and investment from the Chinese diaspora;
- business value chains and social networks; and
- continuous technology learning and upgrading.

Figure 1.3 China's Exports of Goods and Services, 1980–2008



Terms and Definitions

As we begin our discussion, some clarifications on the terms and definitions would be helpful. In particular, we need to differentiate between the various types of economic zones and industrial clusters.

Special Economic Zones

Special economic zone is a generic term that covers recent variants of the traditional commercial zones. The basic concept of a special economic zone includes several specific characteristics: (a) it is a geographically delimited area, usually physically secured; (b) it has a single management or administration; (c) it offers benefits based on physical location within the zone; and (d) it has a separate customs area (duty-free benefits) and streamlined procedures (World Bank 2009). In addition, an SEZ normally operates under more liberal economic laws than those typically prevailing in the country. SEZs confer two main types of benefit, which explain in part their popularity: “direct” economic benefits such as employment generation and foreign exchange earnings; and the more elusive “indirect” economic benefits, which are summarized in table 1.1.

Table 1.1 Potential Benefits Derived from SEZs

	Direct benefits	Indirect benefits
Foreign Exchange earnings	■	

FDI	■	
Employment generation	■	
Government revenue	■	
Export growth	■	
Skills upgrading		■
Testing field for wider economic reform		■
Technology transfer		■
Demonstration effect		■
Export diversification		■
Enhancing trade efficiency of domestic firms		■

Source: World Bank staff.

The term *SEZ* covers a broad range of zones, such as free trade zones, export-processing zones, industrial parks, free ports, enterprise zones, and others. As used in China, however, the term *SEZ* refers to a complex of related economic activities and services rather than to a uni-functional entity (Wong 1987). As a result, Chinese SEZs are more functionally diverse and cover much larger land areas than other types of economic zones. In China, *SEZ* normally refers to seven specific zones: Shenzhen, Zhuhai, Shantou, Xiamen, Hainan, Shanghai Pudong New Area, and Tianjin Binhai New Area, which will be discussed later. In this book, however, the term is used in a broad sense; that is, it refers not only to the seven special economic zones (hereafter referred to as comprehensive SEZs) but also to China's economic and technological development zones (ETDZs), free trade zones (FTZs), export-processing zones (EPZs), high-tech industrial development zones (HIDZs), and the like.

Industrial Clusters

An industrial cluster is generally defined as a geographic concentration of interconnected firms in a particular field with links to related institutions. Often included in this category are financial providers, educational institutions, and various levels of government. These entities are linked by externalities and complementarities of different types and are usually located near each other (World Bank 2009). Increasingly, both developed and developing countries use cluster initiatives to promote economic development, a concept supported by the development community at large. Popularized through such works as *The Competitive Advantage of Nations* (Porter 1990, 1998) and others (Schmitz 1992, for example), clusters have been viewed as a mechanism for enabling firms to join their efforts and resources and work with government toward greater regional, national, and international competitiveness (World Bank 2010). Do clusters foster innovation? Nadvi's collective efficiency model (1999) highlights four key variables that determine competitiveness in enterprise clusters: market access, labor-market pooling

intermediate input effects, and technological spillovers. Nadvi (1997, 1999) and Meyer-Stamer (1998) recognize that clustering offers unique opportunities for firms to take advantage of a wide array of domestic links between users and producers and between the economy’s knowledge sector and its business sector. Such linkages have the potential for stimulating learning and innovation.

Clusters, however, are not necessarily innovation systems (McCormick and Oyelaran-Oyeyinka 2007), and innovative clusters are not necessarily high-technology clusters. Mytelka (2004) also emphasizes the role of clusters in promoting the kind of interactivity that stimulates innovation but cautions that the geographic proximity of actors does not automatically lead to learning and innovation. However, there is a growing recognition that cluster initiatives could be an effective means for producing an environment conducive to innovation (Andersson et al. 2004). All these arguments can find their roots in different cluster examples.

Although clusters come in several different forms and various scholars have tried different typologies, all clusters share one commonality: each comprises a multitude of firms of different sizes belonging to one branch of industry. Markusen (1996) has classified clusters into four categories: Marshallian, hub and spoke, satellite platform, and state anchored (see table 1.2). Others have described them by development stage, such as agglomeration, emerging, potential, and mature.

SEZs and Clusters: “Top-Down” versus “Bottom-Up”?

While SEZs are normally constructed through a “top-down” approach by government policies, most clusters are formed in an organic way through a “bottom-up” process. Some clusters, however, have emerged from or within industrial parks or export-processing zones over time but rarely in developing countries. A study of 11 African clusters across several countries reveals that most of them formed spontaneously, with the exception of the Mauritian textile cluster, which evolved from an export-processing zone (Zeng 2008).

Table 1.2 Markusen’s Typology of Industry Clusters

Cluster type	Characteristics of member firms	Intra-cluster interdependencies	Prospects for employment
Marshallian	Small and medium-size locally owned firms	Substantial inter-firm trade and collaboration;	Dependent on synergies and economies provided by cluster
Hub and spoke	One or several large firms with numerous smaller supplier and service firms	Cooperation between large firms and smaller suppliers on terms of the large firms (hub firms)	Dependent on growth prospects of large firms
Satellite	Medium-size and large	Minimum inter-firm trade	Dependent on ability to

platform	branch plants	and networking	recruit and retain branch plants
State anchored	Large public or nonprofit entity related supplier and service firms	Restricted to purchase-sale relationships between public entity and suppliers	Dependent on region's ability to expand political support for public facility

Source: Markusen 1996.

Because the formation of clusters takes time and needs an ecosystem based on market forces, the purely top-down approach to cluster creation should be exercised with caution, especially in low-capacity countries, where many such efforts have failed. The challenges, however, should not necessarily prevent governments from facilitating the formation, growth, or scale-up of emerging clusters, especially through improving the business environment and making appropriate interventions in the public-goods or quasi-public-goods areas of clusters. Inevitably, it is easier to devise policies for a functioning cluster and devilishly hard to call a cluster into existence, especially when the essential industrial nuclei are difficult to identify (Yusuf, Nabeshima, and Yamashita 2008). In this sense, a mixture of bottom-up and top-down approaches to cluster development are possible, but initially clusters in developing countries are formed mainly through market forces or for “accidental reasons” (Krugman and Venables 1996). (An exception is those that “naturally” or “accidentally” derive from policy-induced SEZs or industrial parks, along with a few special cases, such as specialized industrial parks in certain countries.) Such a “mixed” approach applies perfectly to the case of China as discussed in this paper.

Despite the fact that government can have more control over SEZ development than over that of industrial clusters, an SEZ is not necessarily easier to develop, and many SEZ initiatives have failed. The success of SEZs requires a very capable government and a well-functioning market system, at least inside the zone or park. To design an SEZ using a purely cluster approach might be possible but can also increase the risk of failure unless the market signals are clear and the government has a perfect understanding of the domestic comparative advantages and market situations (both domestic and international), which is often beyond the government's capacity.

In China, while market forces are usually responsible for initially producing industrial clusters, the government supports or facilitates them in various ways, including setting up an industrial park on the basis of an existing cluster (a process discussed in later sections). Meanwhile, after decades of development, some clusters have begun to grow out of certain SEZs, such as the information and communication technology clusters in Zhongguancun (Beijing) and Shenzhen, the electronics and biotech clusters in Pudong (Shanghai), the software cluster in Dalian, and the opto-electronics cluster in Wuhan. The emergence of these clusters actually

hinges on the success of these SEZs, which serve as their “greenhouse,” and on market forces over time. Furthermore, in recent years, some cities have begun to set up cluster-type industrial parks, or “specialized industrial parks,” such as the liquid crystal display (LCD) high-tech park in Kunshan and the Wuxi Wind Power Science and Technology Park and the Photovoltaic Industry Park in Jiangsu Province. In these examples, two different models are tending to converge. However, despite the fact that in recent years SEZs and clusters in China have overlapped to some extent, in most cases their origins, development trajectories, market segments, industry compositions, level of operations, and success factors are quite different. Because of those differences, we will treat them differently in this paper.

In China, generally speaking, SEZs operate in more technology- and capital-intensive formal sectors and enjoy greater government support, more foreign direct investment (FDI), and stronger links to the global market. Clusters, in contrast—with the exception of the few emerging from the existing SEZs—usually operate in the low-technology and labor-intensive sectors with less government support. Many of them are in informal sectors and consist of numerous small and medium enterprises, although some of them are gradually upgrading and moving up the value chains.

The following sections provide an overview of the formation of the SEZs and industrial clusters, their contributions to the national economy, their success factors, and the challenges they face for sustainability, as well as some possible areas or measures for policy intervention, so that policy makers, development practitioners, and researchers all over the world (especially those in developing countries) can benefit from the unprecedented “China miracle.”

Special Economic Zones in China: A Testing Lab for the Market Economy

China launched its Open Door reforms in 1978 as a social experiment— one that was designed to test the efficacy of market-oriented economic reforms in a controlled environment. Not knowing what to expect from the reforms, Chinese authorities decided not to open the entire economy all at once but just certain segments: in Deng Xiaoping’s words, “crossing the river by touching the stones.” Therefore, besides the usual objectives of an SEZ—such as attracting foreign investment and technologies, promoting exports, and generating employment and spillovers to the local economy—one important mission of the first Chinese SEZs was to test the new policies and new institutions for a market-oriented economy. Such an approach was a sharp departure from the country’s then totally centrally planned economy.

The Establishment of SEZs in China

In the late 1970s—after the decade-long debacle of the Cultural Revolution, which left the economy dormant and the people physically and emotionally drained—China was in dire need of systemic change. To answer this urgent call, Deng Xiaoping, chief architect of China’s Open Door policy, launched economic reform in 1978—a drastic measure at that time. In November 1978, farmers in Xiaogang, a small village in Anhui Province, pioneered the “contract responsibility system,” which was subsequently recognized as the initial impetus for far-reaching and ultimately successful rural reforms in China (*South China Morning Post* 2008). The following month, the central government adopted the Open Door policy, and in July 1979, it decided that Guangdong and Fujian provinces should take the lead in opening up to the outside world and implement “special policies and flexible measures” (Yeung, Lee, and Kee 2009).

By August 1980, Shenzhen, Zhuhai, and Shantou in Guangdong Province were designated as special economic zones, followed by Xiamen in Fujian Province in October 1980. The four SEZs were quite similar in that they comprised large areas within which the objective was to facilitate broadly based, comprehensive economic development, and they all enjoyed special financial, investment, and trade privileges. They were deliberately located far from the center of political power in Beijing to minimize both potential risks and political interference. They were encouraged to pursue pragmatic and open economic policies that would serve as a test for innovative policies that, if proven successful, would be implemented more widely across the country. The four SEZs were located in coastal areas of Guangdong and Fujian, which had a long history of contact with the outside world and were near Hong Kong,¹ Macao,² and Taiwan, China. The choice of Shenzhen was especially strategic because of its location across a narrow river from Hong Kong, the principal area from which China could learn capitalist modes of economic growth and modern management technologies (Yeung, Lee, and Kee 2009).

Because China had just reopened to foreign trade and investment, the SEZs had an almost immediate impact. In 1981, the four zones accounted for 59.8 percent of total FDI in China, with Shenzhen accounting for the lion’s share at 50.6 percent. Three years later, the four SEZs still accounted for 26 percent of China’s total FDI. By the end of 1985, realized FDI in the four zones totaled US\$1.17 billion, about 20 percent of the national total (Wong 1987). The combination of favorable policies and the right mixture of production factors in the SEZs resulted in unprecedented rates of growth in China. Against a national average annual GDP growth of roughly 10 percent from 1980 to 1984, Shenzhen grew at a phenomenal 58 percent annual rate, followed by Zhuhai (32 percent), Xiamen (13 percent), and Shantou (9 percent). By 1986, Shenzhen had already developed

rudimentary markets in capital, labor, land, technology, communication, and other factors of production (Yeung, Lee, and Kee 2009).

The initial opening to trade and investment having proved successful, China resolved to open its economy further. In 1984, the central authorities created a variant of SEZs, which they dubbed economic and technological development zones, informally known as China's national industrial parks. The difference between the comprehensive SEZs and the ETDZs is one of scale. A comprehensive SEZ often consists of a much larger area (sometimes an entire city or province). From 1984 to 1988, 14 ETDZs were established in additional coastal cities³ and in the following years in cities in the Pearl River Delta, the Yangtze River Delta, and the Min Delta in Fujian. Meanwhile, in 1988, the entire province of Hainan was designated as the fifth comprehensive SEZ, and in 1989 and 2006, Shanghai Pudong New Area and Tianjin Binhai New Area were granted such status as well.

Subsequently, in 1992, the State Council created another 35 ETDZs. In doing so, they sought (a) to extend the ETDZs from the coastline to inland regions and (b) to focus less on fundamental industries and more on technology-intensive industries. By the end of 2008, there were 54 state-level ETDZs. By April 2010, this number increased to 69: 18 in the Yangtze River Delta, 10 in the Pearl River Delta, 15 in the central region, 11 in the Bohai Bay region, 2 in the northeast region, and 13 in the western region (see map 1.1). ETDZs are typically located in the suburban regions of a major city. Within the ETDZ, an administrative committee, commonly selected by the local government, oversees the economic and social management of the zone on behalf of the local administration (China Knowledge Online 2009).

In addition to the special economic zones mentioned above, other types of SEZs in China include high-tech industrial development zones (HIDZs), free trade zones (FTZs), export-processing zones (EPZs), and others. Each has a different focus.

High-tech industrial development zones. The establishment of high-tech industrial development zones was to implement the Torch Program initiated by the Ministry of Science and Technology in the late 1980s. The main objective of the program was to use the technological capacity and resources of research institutes, universities, and large and medium enterprises to develop new and high-tech products and to expedite the commercialization of research and development (R&D).

Map 1.1 Economic and Technological Development Zones, 2010



Source: Author's research.

In 1988, the first HIDZ was established in Zhongguancun (Beijing). As of today, there are 54 state-level HIDZs in China—25 in the coastal and 29 in the inland regions (see annex A for a list of the state-level HIDZs). Although these HIDZs have played important roles in promoting China’s high-tech industries overall, their performances differ; some function similarly to ETDZs, and the line between these two types of zones has blurred in these cases (China Knowledge Online 2009). In 2006, the five top performers in terms of value added were Beijing Zhongguancun, Shanghai Zhangjiang, Nanjing, Wuxi, and Shenzhen.

Free trade zones. Free trade zones were set up to experiment with free trade before China’s accession to the World Trade Organization (WTO). FTZs had three targeted functions: export processing, foreign trade, and logistics and bonded warehousing. The first state-level FTZ, Shanghai Waigaoqiao FTZ, was set up in 1990. These FTZs

may be viewed as enclaves within China. Although they are physically inside China's border, they function outside China's customs regulations. Companies in FTZs are eligible for tax refunds on exports, import duty exemption, and concessionary value-added tax.

Currently, there are 15 FTZs in 13 coastal cities (see annex B for a list of the FTZs). Upon China's entry into the WTO, the original unique advantages of FTZs faded. To maintain their competitive edge, China has been linking FTZs with nearby ports since 2004. This process has expanded the size of FTZs and strengthened their logistics and warehousing functions in international trading (China Knowledge Online 2009).

Export-processing zones. Export-processing zones (EPZs) were created to develop export-oriented industries and enhance foreign exchange earnings. The first EPZ was inaugurated in Kunshan in 2000. So far, 61 EPZs have been set up in China; 44 of them are located in the coastal region, while the other 17 are inland. EPZs are similar to FTZs but are solely for the purpose of managing export processing. FTZs are the preferred locations for companies involved in export-trading and processing, while EPZs are more advantageous locations for manufacturing companies that export most, if not all, their goods to locations outside China (ProLogis 2008).

The success of state-level SEZs spurred the speedy development of new ones by different levels of governments. By 2004, there were nearly 7,000 industrial parks in China. To curb the blind expansion of industrial parks, China stepped up its efforts to clean up unqualified industrial parks. By the end of 2006, the number of industrial parks had been reduced to 1,568, among which 222 are state-level zones. The total planned area had been reduced from 38,600 square kilometers to 9,900 square kilometers (74.4 percent less) (China Knowledge Online 2009).

Contributions of SEZs to China's Development

The SEZs have made crucial contributions to China's success. Most of all, they—especially the first ones—successfully tested the market economy and new institutions and established role models for the rest of the country to follow. By 1992, the concept of openness had been extended to the entire coastal region and to all capital cities of provinces and autonomous regions in the interior, and various types of SEZs had begun to spring up throughout the country. Thus, when Deng Xiaoping made his famous southern tour that year, the mission that had started with the creation of the first five SEZs had in many respects been accomplished: the “special” economic zones by that time were no longer so special (Yeung, Lee, and Kee 2009).

Contribution to GDP. Economically, SEZs have contributed significantly to national

GDP, employment, exports, and attraction of foreign investment and new technologies, as well as adoption of modern management practices, among others. In 2006, the five initial SEZs accounted for 5 percent of China's total real GDP, 22 percent of total merchandise exports, and 9 percent of total FDI inflows. At the same time, the 54 national ETDZs accounted for 5 percent of total GDP, 15 percent of exports, and 22 percent of total FDI inflows (see table 1.3).

Table 1.3 Performance of Initial Five Special Economic Zones and National Economic and Technological Development Zones, 2006

<i>National Indicator</i>	<i>SEZs</i>	<i>ETDZs</i>	<i>China</i>
Total employment (millions)	15	4	758
as % of China total	2.0	0.5	100
Real GDP (RMB 100 millions)	9,101	8,195	183,085
as % of China total	5.0	4.5	100
Utilized FDI (US\$100 millions)	55	130	603
as % of China total	9.1	21.6	100
Merchandise exports (US\$100 millions)	1,686	1,138	7,620
as % of China total	22.1	14.9	100
Total population (millions)	25	—	1,308
as % of China total	1.9	—	100

Source: National Statistics Bureau 2006.

Note: — = not available.

Because of the large number of SEZs of various types and the difficulty of obtaining recent data (especially from those at the subnational level), it is hard to paint an overall picture of the contributions of the SEZs, but some estimated aggregations could be obtained based on available data for 2006 and 2007. In 2006, the 54 state-level ETDZs, 53 state-level HIDZs,⁴ and 15 FTZs accounted for a combined **11.1** percent of China's total GDP and 29.8 percent of exports (China Knowledge Online 2009). The same year, the total GDP for Shanghai Pudong and Tianjin Binhai was RMB 236.53 billion and RMB 196.05 billion, respectively; and their exports were US\$44.5 billion and US\$18.5 billion (Shanghai Statistics Bureau 2008; Tianjin Statistics Bureau 2008). If the figures cited in table 1.3 are added, then the total GDP of the majority of the state-level SEZs (including the seven comprehensive SEZs, ETDZs, HIDZs, and FTZs) would account for about 18.5 percent of China's total GDP and about 60 percent of total exports. In 2007, the five initial SEZs produced a total GDP of RMB **1,110.7** billion, and Shanghai Pudong and Tianjin Binhai

produced a total GDP of RMB 511.5 billion (Zhong et al. 2009). The total GDP of the state-level ETDZs was RMB 1,269.6 billion (Hefei ETDZ 2009). The contribution of HIDZs to the national GDP was 7.1 percent (Qian 2008). The total value added for the 15 FTZs was RMB 180.1 billion (Zhong et al. 2009), and the total industrial value added of 38 EPZs was RMB 562.6 billion (MOFCOM 2008a). Based on these figures, we can estimate that in 2007 the total GDP of the major state-level SEZs accounted for roughly 21.8 percent of national GDP. If other subnational-level SEZs were added, the figure could be higher.

Contribution to foreign investment. The SEZs are also a major platform for attracting foreign investment. In 2007, the actual utilized FDI of the five initial SEZs was about US\$7.3 billion.⁵ The number for Shanghai Pudong and Tianjin Binhai was about US\$7.2 billion (Zhong et al. 2009), for the ETDZs about US\$17.3 billion (MOFCOM 2008b), and for the FTZs about US\$2.6 billion (Zhong et al. 2009). The total FDI figures for the HIDZs were not available. In 2007, China's total utilized FDI was US\$74.8 billion. Based on these figures, we can estimate that the total utilized FDI from the major national-level SEZs (excluding HIDZs) accounted for about 46 percent of the national total in 2007.

Contribution to employment. The contribution of SEZs to national employment is also very significant. In 2006, the total employment of the initial five SEZs was about 15 million, accounting for 2 percent of national employment (see table 1.3). In 2007–08, total employment was about 1.47 million in the Shanghai Pudon area (Shanghai Pudong Government 2008), accounting for about 17 percent of the total employment of the municipality of Shanghai. In 2007, the figure for Tianjin Binhai was about 0.33 million, accounting for about 5.4 percent of the total Tianjin municipality employment.⁶ In 2007, total employment of the 54 ETDZs and the 54 HIDZs was about 5.35 million and 6.5 million, respectively (MOST 2009). Added together, the total employment of the seven SEZs, the ETDZs, and the HIDZs accounted for about 4 percent of total national employment (770 million). Of course, this picture is still incomplete, because many subnational SEZs were not included, and if we account for only the share of SEZs in urban employment, that number should be more than 10 percent. Currently, about half of China's laborers are still employed in rural areas. SEZs absorbed mostly the high-end, skilled workers in China.

Contribution to high technology. The SEZs are also the hotbed of China's new and high-technology firms. In 2007, the 54 HIDZs hosted about half the national high-tech firms and science and technology incubators. They registered some 50,000 invention patents in total, more than 70 percent of which were registered by domestic firms (Zhong et al. 2009). They also hosted 1.2 million R&D personnel (18.5

percent of HIDZ employees) and accounted for 33 percent of the national high-tech output (Qian 2008). Over the 15 years since the formation of HIDZs, they have accounted for half of China's high-tech gross industrial output and one-third of China's high-tech exports. In addition, the ETDZs are also responsible for another one-third of China's high-tech industrial output and exports (rising from 31.3 percent in 2004 to 35.5 percent in 2005). HIDZs are also quite R&D intensive: their expenditure on R&D in 2002 was RMB 31.4 billion and accounted for 24.4 percent of China's total R&D expenditure. Within the following four years, their R&D expenditure tripled to RMB 105.4 billion, and the share rose to 35.1 in 2006 (Fu and Gao 2007).

Although figures are not available, the seven comprehensive SEZs have also undoubtedly contributed to the development of China's technology-intensive sectors. For example, by 1998 with high-tech industries accounting for almost 40 percent of industrial output, the Shenzhen SEZ set the pace for moving toward a more technology-intensive, higher-value-added stage of development, a goal since the late 1980s. Many Chinese-patented products have a large share of the international market, for example, Huawei, ZTE, and Great Wall computers. In 2008, Shenzhen ranked first among all Chinese cities, registering 2,480 new patents (Yeung, Lee, and Kee 2009). As this evidence shows, the various types of SEZs, especially the HIDZs and ETDZs, are in fact the engines of China's high-tech industries and contribute greatly to its technology upgrade.

By every account, most of the SEZs in China, though differing in performance and speed, are quite successful. Together, they have formed a powerful engine to drive China's reform process and economic growth. Let us now examine how these SEZs grew out of a then severely constraining regime and succeeded beyond the most optimistic expectations.

Major Factors for Success and Lessons Learned

Many factors contributed to the success of China's SEZs, and in every case, the situations and factors might be different. However, their success draws on some common key elements and points to some common lessons.

Strong commitment to reform and pragmatism from top leadership. Despite the high uncertainty at the beginning, the top leaders were determined to make changes, through a gradualist approach. Such a determination ensured a stable and supportive macro-environment for reform and for the new Open Door policies to prevent political opposition and temporary setbacks from undermining the economic experiment with the special economic zones. Deng's southern tour in 1992 clearly demonstrated his determination to reassert the government's

commitment to market-oriented reforms in the face of much opposition.

Meanwhile, China did not simply copy ready-made models for reform but instead explored its own way toward a market economy, incorporating characteristics that fit China's unique situation as a country with a civilization more than five thousand years old. At a time when the ideological wars were prevalent, China decisively abandoned such debates and embraced a practical path toward development. This sentiment is vividly captured in Deng's famous saying: "No matter if it is a white cat or a black cat, as long as it can catch mice, it is a good cat." Such pragmatism is crucial for achieving any successful reform.

Preferential policies and institutional autonomy. To encourage firms to invest in the zones, the SEZs had in place various preferential policies, including inexpensive land, tax breaks, rapid customs clearance, the ability to repatriate profits and capital investments, duty-free imports of raw materials and intermediate goods destined for incorporation into exported products, export tax exemption, and a limited license to sell into the domestic market, among others (Enright, Scott, and Chung 2005). Favorable policies were also in place to attract skilled labor, including the overseas diaspora, such as the provision of housing, research funding, subsidies for children's education, and assistance in "Hukou"⁷ transfer, among others.⁸

In addition, the SEZs (especially the comprehensive SEZs and ETDZs) were given greater political and economic autonomy. They had the legislative authority to develop municipal laws and regulations along the basic lines of national laws and regulations, including local tax rates and structures, and to govern and administer these zones. At that time, in addition to the National People's Congress and its Standing Committee, only the provincial-level People's Congress and its Standing Committee had such legislative power.⁹ That discretion allowed them more freedom in pursuing the new policies and the development measures deemed necessary to vitalize the economy. For instance, SEZs were the first to establish a labor market. Companies operating inside the zones could enter into enforceable labor contracts with specific term limits, could dismiss unqualified or underperforming employees, and could adjust wage and compensation rates to reflect the market situation (ProLogis 2008). These factors were critical to attracting the right talent.

In Shenzhen, the government was very pragmatic, and its policy innovations were especially successful. In 1981, the Guangdong Province granted Shenzhen the same political status as Guangzhou, the provincial capital; in 1988, Shenzhen was upgraded to the level of a province; and in 1992, the central government granted legislative power.¹⁰ With that autonomy, Shenzhen carried out many institutional innovations that played a very important role in its remarkable success. For example, Shenzhen was the first to adopt wage reform, in which compensation was based on three elements: base pay, occupational pay, and a

variable allowance. It also adopted a minimum wage and a social insurance package superior to anything previously available in China (Sklair 1991). Such a “free” labor market attracted many skilled workers. Shenzhen was also the first city to establish the system of government approval within 24 hours, which greatly improved administrative efficiency.¹¹ In the Tianjin Economic–Technological Development Area (TEDA), an ETDZ, the government also had the legislative power to experiment with various pioneering reforms. One of the innovations of TEDA was to invite renowned universities to establish campuses in the zone to conduct vocational education and industry-related research.¹² This was an effective way to build university-industry links.

Strong support and proactive participation of governments. The central government had tried to decentralize its power and help create an open and conducive legal and policy environment for the SEZs. At the same time, the local governments made a great effort to build a sound business environment. They not only put in place an efficient regulatory and administrative system but also good infrastructure, such as roads, water, electricity, gas, sewerage, telephone, and ports, which in most cases involve heavy government direct investments, especially in the initial stages. In the case of Kunshan, before it was approved as a state-level ETDZ in 1992, all infrastructures in the park had been built by the local government on a self-financing basis.¹³

Beyond the basic infrastructure, local governments also provide various business services to many SEZs, especially to the HIDZs and ETDZs; these include, among others, accounting, legal, business planning, marketing, import-export assistance, skills training, and management consulting. For example, in Suzhou Technology Park, the government offers seed money, information services, laboratories, product testing centers, technology trading rooms, and the like for start-ups (Zeng 2001).

In addition, the SEZ governments are able to make timely adjustments to relevant policies and regulations based on business needs and market conditions, as well as on development stage. For example, after the zones were successful, the governments began to put more emphasis on the technology-intensive or high–value-added sectors and to adjust their FDI policies to create a level playing field for both foreign and domestic firms. In 2007, China established a common effective tax rate of 25 percent for both foreign and domestic companies.

Foreign Direct Investment and the Chinese diaspora. FDI and the Chinese diaspora have played important roles in the success of the SEZs by attracting capital investment, technologies, and management skills; generating learning and spillovers; and ultimately helping to build local manufacturing capacity. At the same time that the SEZs were opening up in the 1980s, Hong Kong, Macao, and Taiwan, China, were also beginning to upgrade their industrial structure and transfer out their

labor-intensive manufacturing sectors. The cheap labor and good infrastructure in the SEZs, as well as the Open Door policies coupled with generous incentives, provided a great opportunity for FDI to flow into China from the diaspora. Given the culture, language, and location advantages, such investments were dominant in the beginning stage, especially for the early SEZs (see table 1.4 for the FDI inflows to these SEZs).

The measures for attracting FDI included streamlined administrative control; concessionary tax rates, breaks, and exemptions; preferential fees for land or facility use; reduced duties on imports; free or low-rent business accommodation; flexibility in hiring and firing workers; depreciation allowances; and favorable arrangements pertaining to project duration, size, location and ownership (Ge 1999). For FDI, the corporate tax rate was especially generous—15 percent as opposed to 30 percent for domestic firms—plus exemption from local income tax.¹⁴

Table 1.4 FDI Inflows in Five Comprehensive Special Economic Zones, 1978–2008

<i>Year</i>	<i>Shenzhen</i>	<i>Zhuhai</i>	<i>Shantou</i>	<i>Xiamen</i>	<i>Hainan</i>
<i>Exports (billion current US\$)</i>					
1978	0.009 ^a	0.009 ^a	0.251 ^b	0.082	—
1990	8.152	0.489	0.84	0.781	0.471
2000	34.564	3.646	2.595	5.880	0.803
2006	135.959	14.843	3.484	20.508	1.376
2007	168.542	18.477	3.912	25.555 ^c	1.838 ^c
2008 ^d	163.780	19.730	3.278 ^e	26.970	—
<i>Utilized FDI (million current US\$)</i>					
1978	5.48 ^a	n.a.	1.61 ^b	—	0.10 ^b
1990	389.94	69.1	98.09	72.37	100.55
2000	1961.45	815.18	165.61	1031.50	430.8
2006	3268.47	824.22	139.60	954.61	748.78
2007	3662.17	1028.83	171.62	1272 ^c	1120 ^c
2008 ^d	3929.58	1138.49	—	1955.63	—

Sources: Yeung et al. 2008; Yeung, Lee, and Kee 2009.

Note: — = not available. a. 1979.

b. 1980.

c. Preliminary figures.

d. January–November. e. January–September.

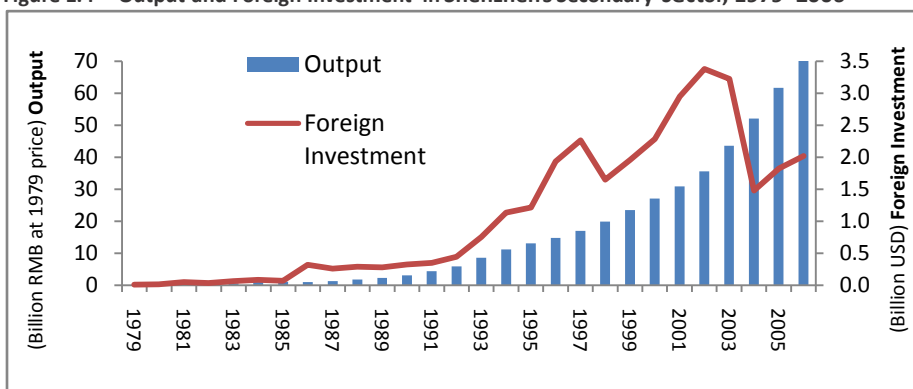
Empirical evidence shows that FDI inflow is indeed positively linked with the expansion of output, employment, and labor productivity in the SEZs. Several figures based on the Shenzhen case illustrate this relationship. Figures 1.4 and 1.5 show that the trend of foreign investment in the secondary and tertiary sectors (where most of the FDI goes) appears to be closely correlated to the changing pattern of production, with some time lags.

Figure 1.6 shows that the rapid expansion in labor employment, especially in the

nonstate sector, where the foreign enterprises account for an overwhelmingly large proportion, is closely associated with the upward trend of foreign investment in Shenzhen.

Also a study based on the 1993 data indicates that, in the Shenzhen SEZ, foreign firms, as well as those Hong Kong, Macao, and Taiwan, China invested firms, are generally more efficient than their domestic counterparts (Ge 1999). The data on sector output after 1993 were no longer segregated by type of enterprise ownership, so it is difficult to conduct a similar type of analysis; but a comparison of productivity growth between two sectors—the primary sector with very little FDI and the transportation, postal, and telecom sector where FDI is very heavy—shows that FDI is still very positively linked to the sectoral productivity improvement after 1993 (see figure 1.7).

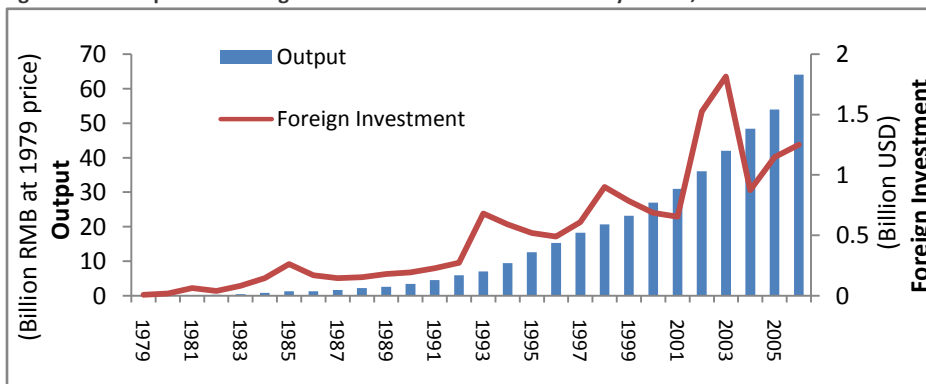
Figure 1.4 Output and Foreign Investment in Shenzhen's Secondary Sector, 1979–2006



Source: Shenzhen Statistics Bureau, various years.

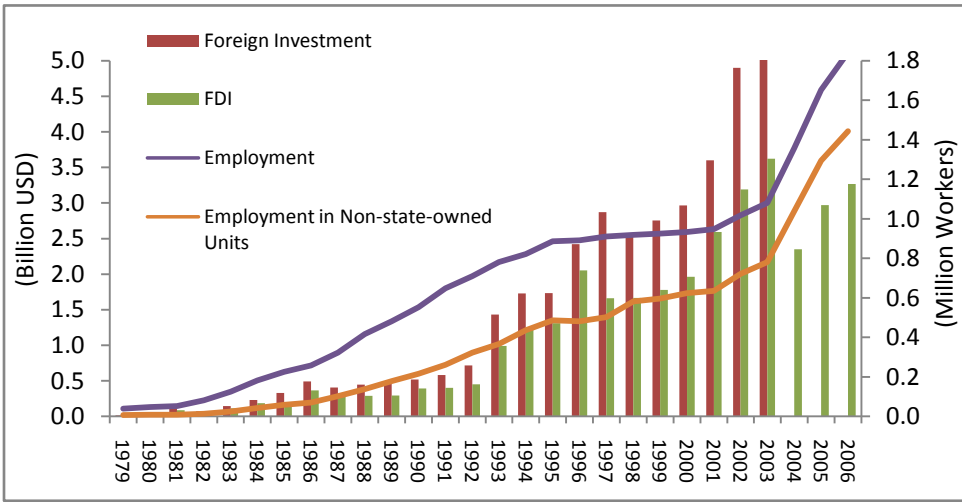
Note: FDI= foreign direct investment.

Figure 1.5 Output and Foreign Investment in Shenzhen's Tertiary Sector, 1979–2006



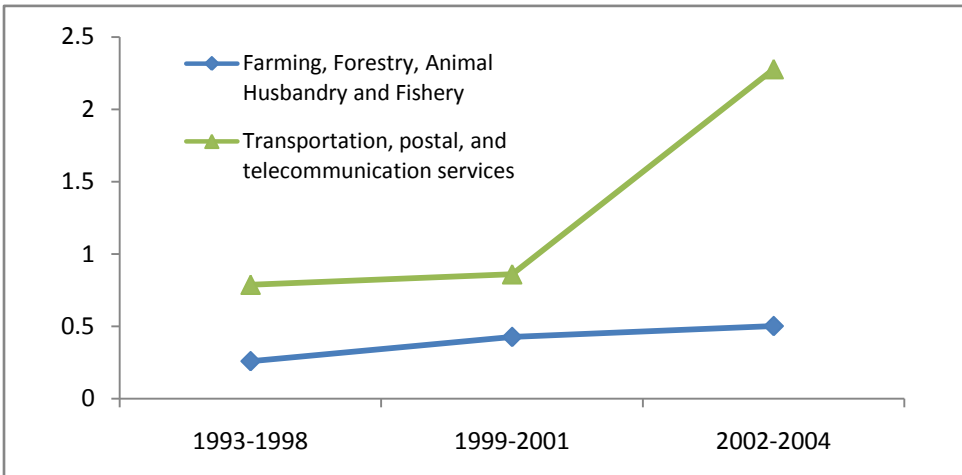
Source: Shenzhen Statistics Bureau, various years.

Figure 1.6 Employment and Foreign Investment in Shenzhen, 1979–2006



Source: Shenzhen Statistics Bureau, various years.

Figure 1.7 Productivity of Selected Sectors in Shenzhen (output per worker), 1993–2004



Source: Author's calculations based on data from the Shenzhen Statistics Bureau, 1994, 1999, 2002, 2005, 2006, 2007.

Technology learning, innovation, upgrading, and strong links with the domestic economy.

One of the key strengths of the SEZs is that they have a high concentration of very skilled people, including many R&D personnel, especially in the HIDZs and ETDZs. As a result, they have become centers of knowledge and technology generation, adaptation, diffusion, and innovation. The abundance of FDI provides a good opportunity for technology learning. Governments also put strong emphasis on technology learning and innovation, as well as on technology-intensive industries. For

example, the Shenzhen government set up an intellectual property office and issued a number of policies and regulations to protect intellectual property rights. It also implemented many preferential tax policies and financial incentives to encourage high-tech industries, such as the software and integrated circuits (IC) industries, R&D spending, and venture capital investment and to attract technology talents.¹⁵ By 2010, R&D spending is expected to reach 4 percent of Shenzhen's GDP, and the high-tech sector is expected to grow at an average rate of 20 percent over the next few years (Asian Development Bank 2007). In the Tianjin Economic–Technological Development Area, great emphasis has also been placed on technology innovation. Within the zone, the government has built major technology innovation platforms, such as an innovation park, an R&D center, and industrialization bases.¹⁶

In addition, the SEZs are closely linked to domestic enterprises and industrial clusters through supply chains or value chains. This connection not only helps achieve economies of scale and business efficiency, but also stimulates synergistic learning and enhances industrial competitiveness.

Innovative cultures. In addition to institutional flexibility, the composition of people in the SEZs also helped nurture innovation and entrepreneurship. Because most SEZs were built in new areas or suburbs of cities and were open to all qualified workers, they have attracted a large number of immigrants from across the country and, recently, from overseas, who hope for better jobs and new opportunities. Such a strongly motivated migrant community tends to generate an innovative and entrepreneurial culture. For example, in Shenzhen, migrants account for 83 percent of the total population. Among its permanent citizens, 21 percent are under 16, and 62 percent are between the ages of 17 and 44 (Asian Development Bank 2007). Such a young and innovative culture makes Shenzhen one of the most dynamic SEZs in China. Besides the many innovative policies mentioned above, Shenzhen was the first city in China to set up a center to monitor currency exchange rates, to privatize a portion of its state-owned enterprises through stock-sharing plans, to permit the entry of foreign banks, and, in 1990, to establish a stock exchange (Asian Development Bank 2007).

Clear objectives, benchmarks, and intense competition. In China, SEZs were normally set up in batches—initially four—and then the number increased rapidly. Despite the large number of these zones, they all have clear goals and targets in GDP growth, exports, employment, revenues, FDI generation, and the like. These expectations put a great deal of pressure and responsibility on the shoulders of the government. Meanwhile, the hundreds of SEZs are highly competitive among themselves. Each SEZ strives to distinguish itself in service, quality of infrastructure, and appearance to attract new enterprises and reach the targeted development goals. Such competition helps make them more efficient and competitive.

Location advantages. Most SEZs in China are located in the coastal region or near major cities with a history or tradition of foreign trading or business and thus are better linked to the international market. They also have good access to major infrastructure, such as ports, airports, and railways. The location advantage is especially obvious for the SEZs in the Pearl River Delta region (close to Hong Kong, China) and the Min Delta region (close to Taiwan, China). Hong Kong, China has provided capital, logistical support, access to world markets, management know-how, technology, and management skills. The Pearl River Delta region has provided labor, land, and natural resources. It is this interaction that has allowed the Greater Pearl River Delta region to emerge relatively quickly as one of the world's major manufacturing bases (Enright, Scott, and Chung 2005).

It is worth noting that, despite the overall success of China's SEZs, they have great disparities in performance and speed of growth. Given the numerous SEZs, a broad assessment is difficult, but a preliminary comparison among the three initial SEZs in Guangdong Province could yield some interesting lessons. Although all three were given the same privileged status at almost the same time, Shenzhen has been growing much faster and is much more innovative than the other two. This superiority could be attributed to many factors, but one could be the capacity of an SEZ to identify its comparative advantages and bottlenecks accurately and implement the right strategy to remove problems as well as to build a conducive business environment.

While Shenzhen was quick in identifying its industrial position and to build a good enabling environment, Zhuhai and Shantou seemed a step behind. With the intense competition for FDI, the first-mover advantage is always important. Zhuhai actually overbuilt its infrastructure beyond sustainable demand, and the symbolic relationship with Macao, China has not blossomed (Yeung, Lee, and Kee 2009). Its over-sized airport exhausted its initial capital and became a drag on its economy (Zhong et al. 2009). Shantou has reached average rates of economic growth, but at various times that growth has been stalled by scandals traced to corruption, customs irregularities, smuggling, and the like. It also suffers from poor social credit and trust. In addition, the urban and zone management is not well planned, and there have been some institutional conflicts (Zhong et al. 2009).

In addition, although all SEZs enjoy a flexible policy environment, Shenzhen seems to be more innovative in designing many probusiness policies and institutions, perhaps because of its immigrant culture, where investors feel more accepted and have a sense of ownership. In comparison, Zhuhai and Shantou are historic cities with strong local customs and culture, as well as their own languages. Such an environment might sometimes deter foreign investors and innovative approaches. This could be an exogenous factor for the performance gap among them,

although it is hard to prove.

Industrial Clusters in China: A Competitive Engine for the Local Economy

The advantages of industrial clusters have been well documented in different literatures. Since the seminal work of Alfred Marshall (*Principles of Economics* 1920), three major advantages of industrial clusters have conventionally been recognized: information spillovers, the specialization and division of labor among enterprises, and the development of skilled labor markets. Sonobe and Otsuka (2006) further defined them into two: first, the development of markets, which facilitates the transactions of parts, final goods, and skilled workers among parts suppliers, assemblers, and merchants; and second, the promotion of innovation through attracting useful human resources.

In general, the co-location of numerous firms can generate substantial employment and achieve significant benefits through economies of scale. Clusters also enhance industrial competitiveness through product specialization and improve the collective efficiency through business value chains and lowered transaction costs. In addition, clustered firms also foster a high degree of networking and interconnections that encourage knowledge and technology spillovers, thus stimulating productivity and innovation. Such enterprises can acquire a self-sustaining dynamic arising from a resilient comparative advantage in a specific range of products and services. Furthermore, innovative clusters are able to diversify and transition to a fresh line of products if demand for the existing product mix declines (Yusuf, Nabeshima, and Yamashita 2008).

Without a doubt, one of the reasons for China's spectacular industrial dynamics in the past decades is the agglomeration of specialized enterprises that sprang up since the reforms in extremely varied forms and deeply affected the development of certain regions (Ganne and Lecler 2009). These agglomerations of enterprises make up an important part of the competitive power of the country, especially in the traditional industries, although some of them are also operating or are gradually upgrading into technology-intensive sectors. They are an important driver of China's rapid export-led growth.

Given the large magnitude of industrial clusters in China, it is virtually impossible to examine all of them. Here we intend to give a brief overview of their formation, success factors, challenges, and lessons learned through several case studies.

A Brief Overview of China's Industrial Clusters

As in many other countries, most of the industrial clusters in China have emerged spontaneously, but government (especially local governments) has given all kinds of

support to their development process.¹⁷ These clusters operate mainly in the labor-intensive manufacturing sectors, that is, at the lower end of the global value chain. In recent years, some high-end clusters have also grown out of SEZs, such as those in Beijing, Shanghai, and Shenzhen, whose success is inseparable from the success of the SEZs studied above. Such clusters, however, are not within the scope of this paper.

The majority of the industrial clusters in China are concentrated in the coastal region, especially in Zhejiang, Guangdong, Fujian, and Jiangsu provinces. At the beginning of the 21st century, a quarter of the 404 administrative towns in the Pearl River Delta in Guangdong made up some 100 clusters of specialized activity. The province of Zhejiang, for example, possesses more than 300 clusters, which, in terms of production capacity, might have entered the world's top 10 in their sectors, respectively, with more than 100 others in second position (Ganne and Lecler 2009); these clusters exist in parallel with the hundreds of SEZs. Many reports have commented on China's export-oriented clusters:

Buyers from New York to Tokyo want to be able to buy 500,000 pairs of socks all at once, or 300,000 neckties, 100,000 children's jackets, or 50,000 size 36B bras. Increasingly, the places that best accommodate orders are China's giant new specialty cities. . . . Each was built to specialize in making just one thing, including some of the most pedestrian of goods: cigarette lighters, badges, neckties, and fasteners. The clusters are one reason China's shipments of socks to the U.S. have soared from 6 million pairs in 2000 to 670 million pairs last year [2004]. (Wang 2009)

Because of the difficulty in obtaining data, it is hard to quantify the overall contributions of industrial clusters to China's economic development, but some examples could provide us a bird's-eye view. In 2003, more than 20,000 companies in the footwear clusters in China produced some 6 billion pairs of shoes of various kinds, of which more than 3.87 billion pairs with a total value of US\$9.47 billion were exported. Sixty percent of the shoes made in China entered the international market, accounting for 25 percent of the total turnover of the shoe industry in the world. Currently, only Wenzhou's footwear products account for one-quarter of China's and one-eighth of the world's total, with more than 300,000 employees.¹⁸ In the Dalang apparel cluster in Guangdong Province, nearly 2,000 woolen firms with more than 100,000 workers produce some 200 million sets of sweaters, which account for 30 percent of the domestic market. In the Datang socks cluster in Zhejiang Province, nearly 5,000 firms plus 1,600 shops employ about 90 percent of the residents of the town. Hangji, a town of 120 square kilometers and a population of 35,000 people in Jiangsu Province, produce 30 percent of the world's toothbrushes and 80 percent of China's (Wang 2009). In 2007, 228 clusters in Guangdong, with a GDP of RMB 765 billion, accounted for 25 percent of the total provincial GDP and

about 8 percent of the total employment (see table 1.5); these clusters have become the main economic driver of the provincial economy. In the town of Xiqiao (Guangdong), the textile cluster accounted for 60 percent of Xiqiao’s total GDP, 30 percent of the textile fabrics market of Guangdong Province, 11 percent of the domestic market, and 6 percent of the global market, employing about 43 percent of Xiqiao’s population.¹⁹

Table 1.5 Cluster Employment as a Share of Total Employment in Guangdong Province, 2001–07

2001	2002	2003	2004	2005	2006	2007	
Cluster employees	52.95	182.29	241.74	266.74	370.71	—	431.48
Total employees	4,058.63	4,134.37	4,395.93	4,681.89	5,022.97	5,250.09	5,402.65
Cluster employment (%)	1.30	4.41	5.50	5.70	7.38	—	7.99

Sources: Chapter 6 of this volume and Guangdong Statistical Yearbook 2009.

Note: — = no data available.

Although the total employment in the clusters in China as a whole is hard to gauge, employment is likely to be much higher in cluster than in the SEZs, because most of the clusters are in labor-intensive sectors.

Cluster Formation

Each cluster has its own development trajectory and was formed in a different way. By examining many of them, however, we may be able to identify some common elements that led, in varying degrees, to their formation:

- *The Open Door policy and reform.* Almost all the clusters were formed after China’s opening up. The reforms and Open Door policies provided a macro-environment that allowed the private sector to flourish and foreign investment to enter China. Before the reforms, all private businesses were officially forbidden.
- *Long history of production or business activities in a particular sector.* Business activity in a given sector preceded many Chinese clusters. For example, the Wenzhou footwear cluster in Zhejiang Province has a long history of shoemaking, dating back to 422 AD, and has built up local production capacity over time;²⁰ the textile industry in Xiqiao, in Guangdong Province, first prospered during the Tang Dynasty (618–907 AD) and peaked in the Ming Dynasty (1368–1644 AD) and thus had accumulated strong capacity in silk and yarn production before the reform;²¹ and the toothbrush industry in Hangji, Jiangsu Province, dates back to the Qing Dynasty (1644–1911 AD) (Wang 2009).
- *Proximity to major local markets and infrastructure.* In general, most of these

clusters are located in the coastal region, close to international markets. In addition, they are also generally based in a town or major city and are thus close to main roads, railways, highways, and ports. This location advantage is especially important for export-oriented clusters.

- *Entrepreneurs with tacit knowledge and skills in production and trading.* The long tradition and knowledge passed down from generation to generation through family and kinship ties have played important roles in cluster formation. For example, in the Wenzhou shoemaking cluster, it was those families with specialties in shoemaking that first started the low-end business after the reforms and the economic opening up.²² In Xiqiao, almost no one from the first generation of entrepreneurs had graduated from any textile university or college, but most of them had had some processing experience in the past and had acquired some professional knowledge and skills.²³
- *Foreign direct investment and the diaspora.* Clusters benefiting from FDI and the diaspora are concentrated mostly on the eastern side of the Pearl River Delta region, in the Dongguan, Huizhou, and Shenzhen areas. The economies of these clusters are driven mainly by overseas Chinese and foreign firms because of the region's proximity to Hong Kong, China and the preferential development policies in 1980s.²⁴
- *Natural and human endowments.* Such factors are especially important for natural resource-based clusters, such as those in seafood processing, fruits, stone carving, aquaculture, ceramics, and furniture, among others, in Guangdong Province. The abundant low-cost but relatively educated labor force is also an important resource that the clusters can leverage.
- *Market pull.* When China was first opened up, there was a huge shortage of almost everything as a result of the centrally planned economy. These desperate market needs provided a powerful reason for the existence of the numerous clusters that sprang up in a short period of time.
- *Government facilitation and industrial transfer.* In recent years, because of rising costs, limited land, and tough environmental requirements, many coastal clusters have begun to move inland; some clusters in the middle and western regions were formed through such transfer. In some cases, the moves were highly influenced by deliberate government policies; however, such transfers are still based largely on market choice, where government plays mainly a facilitating role. An example is the footwear manufacturing cluster in Chengdu, in Sichuan Province, which was a result of cluster diffusion. By the end of 2005, this region had agglomerated more than 1,200 footwear firms and more than 3,000 related firms that produced more than 10 million pairs of leather shoes per year, accounting for more than 50 percent of the leather shoe exports in western China.²⁵

Many of these factors can be found in the industrial clusters in other developing countries, including some African countries as well (Zeng 2008), but some factors appear to be unique to China, such as the long history of production in many small towns, industrial transfer, and the like.

How the Clusters Succeeded and Took Off

Clusters survive and succeed mainly because they are able to increase the diversity and sophistication of their business activities to achieve greater productivity and efficiency. In an export-led growth model, this ability is especially important. Besides the well-known low-cost labor factor, many other elements have contributed to the success of Chinese industrial clusters. These include, among others, efficiency gains and lowered entry barriers through business value chains, production specialization, and division of labor; effective local government support; knowledge, technology, and skill spillovers through inter-firm links, including those with state-owned enterprises (SOEs) and foreign firms; entrepreneurial spirit and social networks; innovation and technology support from knowledge and public institutions; and support from industrial associations.

Efficiency gains and lowered entry barriers. In most Chinese clusters, many firms operate in different manufacturing segments as well as in related services, thus forming well-functioning value chains and production networks with efficient division of labor. For example, the Datang socks cluster in Zhejiang Province comprises 2,453 socks firms, 550 raw material firms, 400 raw material dealers, 312 hemstitching factories, 5 printing and dyeing plants, 305 packing factories, 208 mechanical fittings suppliers, 635 sock dealers, and 103 shipment service firms. In addition, Datang Light Fabric and Sock City has 1,600 shops (Wang 2009). In the Wenzhou footwear case, more than 4,000 firms operate in supply, production, sales, and service networks. Because the production process is technically divisible, each small and medium enterprise (SME) tends to cover an individual phase of production and is connected by specialized transaction networks to coordinate inter-firm cooperation.²⁶ Such value chains and production specialization reduce operating costs and greatly enhance the productivity and efficiency of all the business activities in the clusters.

In addition, research on the Wenzhou cases also reveals that clustering deepens the division of labor and specialization and helps lower the technological and capital barriers for new entrants, allowing a large number of small entrepreneurial firms to enter the industry by focusing on a narrowly defined stage of production. Such specialization requires much less fixed investment. Meanwhile, small firms in clusters

are able to obtain trade credits from upstream enterprises (Huang, Zhang, and Zhu 2008). All these factors greatly enhance the survivability of small firms.

Effective local government support. The success of Chinese industrial clusters is inseparable from local governments' strong support and nurturing. These supports often come during the middle or later stages when the clusters have demonstrated their potential. Although the support is multifaceted, it tends to focus primarily on building a good business environment and on the "market failure" or "externality" areas:

- *Infrastructure building.* Besides basic infrastructure such as roads, water, electricity, and telephone lines, to which the Chinese government has given high priority, local governments have tried to build a specialized market or industrial park to facilitate business activities. Such a market brings suppliers, producers, sellers, and buyers together and helps build the forward and backward linkages, thus greatly facilitating the scaling-up of the clusters. In Xiqiao, to regulate the local market and stimulate mass production and sales, the city government set up the South Textile Market in 1985 to replace the original informal market.²⁷ In Wenzhou, the municipal government invested RMB 557 million to build an industrial zone—the "Chinese Shoe Capital"—in Shuangyu Town Lu Cheng City, a large industrial complex integrating technological training, trading, testing, production, information services, and shoe-related cultural exhibitions.²⁸ In the Puyuan cashmere sweater cluster in Zhejiang Province, the township government raised RMB 580,000 from different sources and built a "cashmere sweater marketplace" (comprising more than 4,300 square meters of building space and more than 50 rooms). Meanwhile, it formed a shareholding company and invested RMB 40 million in building a logistics business center, loading dock, warehouse, and parking lot. All these greatly enhanced the cluster's business activities (Ruan, Jianqing, and Zhang 2008). Such examples can be found in many Chinese clusters.
- *Regulations, quality assurance, and standards setting.* To facilitate business generation and help clusters operate normally and maintain dynamic growth, local governments often try to improve services and the regulatory environment. In addition, they enact specific regulations, especially those related to investment type, product quality, and standards, to ensure that the products made in the clusters have a market future. This practice is especially common in the Wenzhou shoe cluster. In the 1980s, Wenzhou shoes experienced a rapid expansion of quantity without quality; as a result, they offered low prices but suffered from a bad reputation. To correct this problem, the municipal government issued strict regulations and quality standards for Wenzhou shoes and helped firms develop branded products.²⁹ Such a measure actually saved the cluster. In Guangdong in recent years, some cities set

standards for investment quality to ensure efficiency, including better use of land and less pollution, for example.³⁰ In the Puyuan textile cluster in Zhejiang Province, when market competition forced firms to use cheap materials at the expense of quality in the late 1990s, the Puyuan township government issued two decrees: the Quality Control and Inspection System in the Cashmere Marketplace in Puyuan, Tongxiang, and the Product Quality Guarantee Stipulation in Cashmere Sweater Marketplaces. These regulations were strictly enforced by the Administrative Committee of Puyuan Marketplace and ensured the quality of the products.

- *Technology, skills, and innovation support.* Given the importance of innovation and technology learning for a cluster's survival, local governments are increasingly emphasizing technology innovation and upgrading. Because imitation within a cluster is easy, firms hesitate to invest in innovation and technology upgrading, and thus government intervention can be justified. In Guangdong since 2000, the provincial government has invested RMB 300,000 in each specialized town, with matching funds from local governments, to build a public technology innovation center (TIC) to support the clusters' innovation and technology activities. In the case of Xiqiao, the township government first set up the Fabrics Sample Manufacturing Corporation in 1998 to develop new fabrics, new dyeing processes, and new printing formulas. After initial success, and with the support of provincial and municipal governments, in 2000 the town of Xiqiao established the Southern Technology Innovation Center to provide technology and innovation services to enterprises at below-market prices. With the support of the Textile Industry Association of China and R&D institutes, the Xiqiao TIC was able to provide new products and innovation services, such as information and technology consulting; intellectual property rights (IPR) protection; and professional training, testing, and certification. It has since become a platform for cooperation among government, industry, and research institutes and a facilitator for enterprise innovation.³¹ A comparison of the economic performance of the Xiqiao cluster before and after the establishment of the TIC reveals quite positive results (see table 1.6). In Wenzhou, the local government encourages entrepreneurs to set up learning institutions; meanwhile, it invited the shoe manufacturing businesses in Italy to set up a footwear design center in Wenzhou to help the cluster gain innovation capacity. In addition, it has set up or introduced professional shoe leather majors in local colleges and schools to foster professional talent for the footwear industry.³²

Table 1.6 Performance of the Xiqiao Cluster Before and After the Establishment of the Technology Innovation Center, 1998 and 2003

# of employees	1998					2003				
	Number of firm	Employees	Output (million USD)	R&D (1000 USD)	Patents	Number of firm	Employees	Output (million USD)	R&D (1000 USD)	Patents
<10	795	7,055	44.6	0	0	465	3,715	31.9	0	0
10-50	583	26,235	130.1	0	0	534	25,299	94.5	0	0
51-100	205	19,475	106.1	0	0	359	33,387	323.2	2,256.7	22
>100	7	1,094	61.5	230	0	22	6,445	339.2	3,648.2	166
Total	1590	53,859	342.2	230	0	1380	68,846	788.8	5,904.9	188
Firm average		32.28	0.21	0.14	0		49.86	0.58	4.28	0.14

Source: Jun Wang, 2009

- *Preferential policies and financial support.* To attract qualified enterprises to the clusters, local governments often offer certain incentives, including desirable land, tax reduction or exemption, and access to credits and loans. A series of preferential policies from Foshan and Nanhai (Guangdong Province) include tax exemption for the first two years and a lower tax rate of 15 percent in the following three years for high-tech firms. The town of Xiqiao has also set up an award to encourage individuals to bring qualified enterprises into the cluster. Meanwhile, to help SMEs update their equipment, the local government provides a financing guarantee to assist them in gaining bank loans.³³ In the Puyuan sweater cluster, the local government set up an industrial park and granted preferential land, tax, and credit policies to attract enterprises with famous brands to locate in the cluster (Ruan and Zhang 2008).

Knowledge, technology, and skill spillovers through inter-firm linkages. In clusters, the co-location of numerous firms provides good opportunities for firms to build knowledge networks and forward and backward linkages, which are crucial for technology learning and collective efficiency. Many firms obtained help from their upstream enterprises. In China, many clusters also benefited from state-owned enterprises (SOEs) and FDI, which provided important initial technology and a crucial impetus for the clusters' development. For example, during the 1980s, with the market-oriented economic reforms, many SOEs were privatized or closed down. Many skilled laborers from the original SOEs were laid off, and they either set up their own businesses or provided their know-how to private enterprises. They also helped diffuse technologies and skills to more workers through training or coaching, as was certainly the case in the Xiqiao textile cluster. In the Wenzhou footwear cluster, the original SOE—Dongfanghong Leather Footwear Factory—gave rise to

three major enterprises: Jierde Footwear Co., Ltd.; China Aolun Shoes Co., Ltd., and Wenzhou Dashun Footwear Machinery Manufacturing Co., Ltd., as well as many smaller enterprises. Later on, there were many spin-offs from these enterprises as well, such as the famous Aokang and Hongqingting groups (Huang, Zhang, and Zhu 2008).

In addition, many clusters in the coastal region, especially those in the Pearl River Delta, were driven by FDI, especially from the diaspora in Hong Kong, China; Macao, China; and Taiwan, China. Such examples include clusters in Huizhou and in Dongguan, which was regarded as a major base. Among these clusters, many foreign and domestic personal computer-related companies such as Acer, Compaq, Founder, IBM, Legend, and many other diaspora-invested firms have established plants or parts processing.³⁴ The Kunshan IT cluster in Jiangsu Province was supported mainly by investors from Taiwan, China. The volume of investment from Taiwan, China in Kunshan accounts for nearly one-quarter of its investment in Jiangsu Province and one-tenth of its investment in the whole country (Lai, Chiu, and Leu 2005). These foreign and diaspora investments have become important sources of technology and skills.

Entrepreneurial spirit and the social network. Many of the regions or cities that host clusters had a long history of business and industry pre-dating the formation of the clusters. Although the planned economy interrupted the industrialization process of China, the spirit of entrepreneurship had lived on in the regions. Once the macro-environment opened up, these hidden entrepreneurial talents were rapidly released. Such a spirit was coupled with a great drive for wealth after decades of deprivation. The Wenzhou people are especially well known for their willingness to take risks and to learn through trial and error, which provided an essential ingredient to their success.

In addition, as in many other countries, the clusters in China depend heavily on information networks and social capital for their operation. Because many transactions involve a number of different parties in a cluster, the use of formal contracts for each transaction could lead to prohibitive transaction costs, especially where a formal judicial system is incomplete or lacking. As a result, most SMEs prefer oral agreements (Ruan and Zhang 2008). Although the agreements are not legally binding, SMEs tend not to break them because of fierce market competition and informal enforcement mechanisms, such as community ties, reputation, opportunity cost of losing business, and so forth. This social trust has significantly reduced transaction costs, and many firms actually operate on funds borrowed from friends and relatives or on trade credits provided by upstream or downstream enterprises. Such a model is quite prevalent in many Chinese clusters, especially in Wenzhou.

Innovation and technology support from knowledge and public institutions. In addition to government support, institutions such as universities and research institutes also provide support for innovation and technology upgrading in clusters. In the case of Wenzhou, Wenzhou University has played an important role in supporting technology innovation in the footwear and other clusters. In the shoemaking sector, it has put a great effort into R&D and innovations in leather production and cooperated with several firms in setting up the Leather Production Technology Research Center of Wenzhou in 2004. The center has focused on “green” product development, clean leather production technology, and other high-tech research on leather production. In 2006, the center became the Key Leather Project Laboratory of Zhejiang Province and established the Service Platform for Leather Production Innovation of Zhejiang. In cooperation with Wenzhou University, the laboratory has made significant contributions to producing and testing leather chemicals and to genuine-leather processing technology and performance tests, as well as to environmental management and pollutant treatment.³⁵ The Dongguan IT cluster has also significantly benefited from its association with Shanghai Jiaotong University, Hong Kong Polytechnic University, and Northeast University, which have established research institutes in Dongguan (Lai, Chiu, and Leu 2005).

Support from industrial associations and other intermediary organizations. The industrial associations and other intermediary service organizations are relatively recent phenomena in China; however, many of them, especially those in industrial clusters, have begun to play important roles. In Wenzhou, the shoemaking firms founded the Wenzhou Lucheng Association of the Shoe Industry in 1991—the first shoemakers’ association in China. It currently has 1,138 members and 26 branches. It has made important contributions to the cluster through a number of activities: connecting the local authority and the firms, introducing new technologies and helping improve shoe quality, helping firms enter and expand in the domestic and overseas markets through marketing and branding services, providing information services, promoting trade, and providing training in partnership with national footwear institutions and Beijing Leather College. Such activities have provided considerable assistance to the shoe industry in its effort to upgrade.³⁶ In the Yunhe wood toy cluster in Zhejiang, the Toy Industry Association has played an important role in providing various services, and helped set up the Yunhe Wood Toy Productivity Center, Testing Center, Information Center, and Research Institute, which have been in operation since 1995 (Zheng and Sheng 2006). These institutions are crucial for the cluster’s technology innovation and learning. Such examples can be found in many other clusters as well.

Reflections on the Experiences of China's SEZs and Industrial Clusters

So far, we have examined the success factors behind China's special economic zones and industrial clusters. Those factors are not necessarily all that have contributed to their success, but they do capture some of the key elements that might be useful to other developing countries that wish to learn from China's industrial experiences. Among the various possibilities, we will highlight several essential points:

- *Strong commitment from the top leadership, and high-level pragmatism, flexibility, and autonomy.* The unswerving determination of the top leaders provided the solid assurance and policy stability needed for the initial SEZs, which then served as the cradle of China's economic reforms and Open Door policy. Such assurance was a key factor for investors, especially for foreign investors, in an otherwise very rigid political, legal, and regulatory environment (Zheng 2009). The unprecedented autonomy and pragmatism enjoyed by the SEZs created a dynamic entrepreneurial and innovative business climate.
- *A gradualist approach toward reform.* Economic liberalization is a means of promoting economic development, not an end in itself. How to proceed effectively with economic liberalization is a question that depends heavily on the situation in a particular economy. The Chinese experience so far seems to suggest, among other things, that a pragmatic, step-by-step approach works better than an attempt to change everything overnight. The key is to minimize avoidable economic, social, and political costs. Using SEZs as laboratories, policy makers have been able to identify problems, sort out issues, develop measures, and test and evaluate results (Ge 1999).
- *Proper role of the government.* As Bhagwati (2004, 54) put it in discussing growth, "Growth was not a passive, trickle-down strategy for helping the poor. It was an active, pull-up strategy instead. It required a government that would energetically take steps to accelerate growth through a variety of policies including building infrastructure such as roads and ports and attracting foreign funds." In the success of the Chinese SEZs and clusters, government at various levels has played a very important role but one limited mostly to addressing market failures and externalities, that is, the public goods and quasi-public goods areas. These range from building better infrastructure—roads, water, electricity, gas, telephone, and so forth—to establishing special marketplaces, technology innovation platforms, R&D centers, and the like. In addition, the government has tried to use the special powers given to the SEZs to create an efficient regulatory system and a conducive business environment, which make

the SEZs attractive to investors. Such interventions are quite necessary and also very appropriate. As Justin Lin says, “In addition to an effective market mechanism, the government should play an active, facilitating role in the industrial diversification and upgrading process and in the improvement of infrastructure” (2010, 3). Of course, these SEZs still have more to do in improving the business environment to maintain their competitive edge.

- *FDIs and the diaspora.* Given the severe lack of capital and technologies during the initial stages of China’s opening, FDI and assistance from the diaspora were desperately needed. China successfully attracted FDI through its SEZs and clusters, especially those in the coastal region, and they became important sources of capital, skills, technologies, and modern management techniques. FDI also fostered many spinoffs in China. Of course, some have argued that the incentives China gave to foreign investors—such as lower tax rates—were too generous. While that question is still debatable, one thing is certain: FDI policies need to be adjusted according to the stage of development.
- *Public-private partnership approach.* In developing the SEZs and supporting industrial clusters, the government does not necessarily finance everything with its own resources, even in public infrastructure. Instead, government at all levels has adopted many innovative approaches, such as public-private partnerships (PPPs), to address capital constraints. For example, in the early stage of Shenzhen, joint ventures and private developers from Hong Kong, helped develop some basic infrastructure (Yeung, Lee, and Kee 2009). In the Puyuan sweater cluster in Zhejiang, the local government formed a shareholding company with 27 private logistics and transport firms to build the cluster’s logistics center (Ruan and Zhang 2008). In the technology innovation center in Guangdong, public institutions and private firms joined forces to conduct R&D.
- *Technology innovation, adaptation, and learning.* Realizing the importance of technology and innovation for the success and competitiveness of the SEZs, the government has increasingly emphasized R&D and innovation by increasing investment, building R&D infrastructure, and offering special incentives to attract high-tech firms. The government has also set up venture financing mechanisms such as the OTC (over-the-counter) in Zhongguncun (Beijing) and ChiNext in Shenzhen—a Nasdaq-style stock exchange for new ventures that opened in 2009. In addition, the government has also designed policies to attract high-quality scientists and engineers. In many clusters, the local government or industrial associations offer all kinds of technical and

managerial training to enhance workers' skills. One issue linked with R&D spending is the evaluation and monitoring system, which appears weak in China. Policy makers need to pay close attention to this area; otherwise, huge government-driven efforts might not yield the expected results. To become a truly innovative nation, China needs to build stronger indigenous innovation capacity for the long run.

- *Clear goals and vigorous benchmarking, monitoring, and competition.* Despite the large number of SEZs in China, they all have clear goals and development plans that stipulate the expected targets for GDP growth, employment, exports, and FDI, as well as tax revenues and the like. The central government checks these targets almost every year. In addition, SEZs compete fiercely on performance. Such a competition puts great responsibility and accountability on the government officials in charge of SEZs. Although the clusters do not normally have such clear development plans, the competition over GDP growth is also quite intense, and local governments are pressed to be diligent. Moreover, with the rapid economic growth and increasing environmental challenges of recent years, greater emphasis is now placed on "green" and social development.

The world development community should pay close attention to the lessons provided by China's experience. It offers many useful ideas and approaches for other developing countries, which can learn from them or even replicate them. However, there is "no one size fits all" approach. All the experiences and lessons need to be adapted to local situations. That is how China learned from Western countries and succeeded, and the same should be true for every other country as well.

Challenges to the Sustainable Development of China's SEZs and Industrial Clusters

Despite the great success of China's special economic zones and industrial clusters, they also face many challenges to sustaining their success, especially given the current global crisis. Although challenges to the various SEZs and clusters might differ in degree, those discussed below pose the major threat to their continued success.

Moving up the Global Value Chain

Although some high-tech sectors have begun to emerge in SEZs and clusters, in general China still competes mainly on low-cost manufacturing, based on cheap labor and low-tech labor-intensive sectors, that is, at the low end of the global value chain. That position is especially true for the hundreds of clusters. Due to the low

technology capacity and the difficulty in protecting intellectual property rights in clusters, thousands of firms compete fiercely on price—a so-called “racing to the bottom” (Wang 2009); such cut-throat competition sometimes pushes firms to resort to illegal means, such as using fake or cheap materials, pirating, and so forth. In the long run, such a situation will adversely affect the future development of these clusters and could even cause them to simply wither away. Although in the special economic zones, the situation in general is better, many SEZs and firms are also seriously constrained by limited innovation capacity and a shortage of skills. Because economic competitiveness increasingly hinges on knowledge, technology, and innovation, how to move China’s industries to the high value-added sectors (including services) is a real challenge.

The Sustainability of Export-Led Growth

China’s industrialization is driven mainly by an extraordinary ability to export. In 2009, China replaced the United States as the largest trading nation. The heavy export orientation of China’s economy, however, also increases its vulnerability to global market shocks. During the current crisis, the clusters in the Pearl River Delta region, for example, which rely mostly on exports, were particularly hit hard (Yeung, Lee, and Kee 2009). In the first nine months of 2008, some 50,000 out of 1 million industrial enterprises in Guangdong Province had collapsed, and its 30 million migrant workers were inevitably affected (*Straits Times* 2008). Meanwhile, such a growth model often makes China a target of antidumping and trade lawsuits. Global trade frictions will definitely increase in the future, with the increasing global protectionism induced by the economic crisis. All these issues raise questions about the sustainability of the export-led strategy.

Environmental and Resource Constraints

Related to China’s growth model based on low technology and labor- and resource-intensive manufacturing, many SEZs and clusters face serious environmental and resource challenges. With the increasing emphasis on climate change problems, two aspects related to environmental challenges call for particular attention: one is the serious water, air, and land pollution and the huge amount of industrial waste; the other is the increasingly tough eco-standards set by industrial countries for products exported from developing countries. These include RoHS (Restriction of the Use of Certain Hazardous Substances), WEEE (Waste Electrical and Electronic Equipment), and EuP (energy-using products). These challenges are even more severe for clusters, where the technology capacity is much weaker, than for most SEZs.

In addition, with the rapid industrial expansion, land, skilled labor, and energy resources such as oil, water, and electricity have all become more expensive and limited. In some cities, virtually no more land is available for heavily resource-based

manufacturing activities, which require a lot of physical space. In many SEZs, the land cost now is several times higher than it was when they were established. These problems have forced some firms to move inland or abroad; however, that is only a short-term solution. In the long run, the SEZs and clusters will need to focus more on growth quality than on quantity.

Institutional Challenges

China's success began with institutional reforms within the comprehensive SEZs, but now, with the market economy well established across the country, further development will require even better and more efficient institutions demanded by a well-functioning market economy. Such institutions include, among others, a sound regulatory and legal system, including a well-functioning IPR regime; a participatory monitoring and supervisory system; a good evaluation mechanism, especially for public spending; and a sound social safety net. Meanwhile, under the balanced national development strategy, linking the further development of SEZs more closely to the non-SEZ part of a city and the rural area will be an important but difficult task.

Lagging Social Development

While the special economic zones and clusters have achieved obvious economic success, they are somewhat lagging behind in providing the commensurate social services. Although some SEZs and clusters enjoy a good living environment, many of them do not have sufficient health and education services or public transportation to accommodate their increasing population. Some SEZs are at a distance from their host cities, like an "isolated island" with few cultural and leisure activities,³⁷ and they worry that once they lose more of their "special" status and preferential treatment, they might not be able to attract more talent and investment.

Challenges specific to SEZs or clusters. In addition to the challenges common to special economic zones and industrial clusters, some are specific to one or the other.

For SEZs, such challenges include

- *The diminishing of the preferential policies and privileged status.* Whereas the SEZs were "special" by virtue of the exclusive policies and other privileges extended to them in the early years, later on those preferential policies had spread to many other parts of China. After China's WTO accession in 1992, these advantages were further diluted. How they can continue to attract investment, especially FDI, in an environment of enhanced competition could be a challenge for them.

- *The homogeneity problem.* Many of the SEZs or industrial parks now competing in the same or similar sectors lack conspicuous sector or product differentiation. While a reasonable level of competition is good for innovation and growth, too much competition across the country might lead to a waste of public resources, because almost all the zones or parks are government sponsored. It would be more desirable to concentrate the same, similar, or closely related sectors in a few locations where they have the best comparative advantages.

For clusters, some specific challenges include

- *Fragmentation and lack of horizontal linkages.* Many of the Chinese clusters were developed on the model of “one product per village and one sector per town.” This approach was very useful in the initial stages for fully mobilizing a village’s or town’s resources based on their comparative advantages. Once they were successful, however, they found themselves lacking further competitive strength because of small scale, limited human and technology resources, and high-level fragmentation. Towns were actually competing with other towns in the same province or other provinces.³⁸ How to integrate these similar sectors throughout a city, a province, or a region into a larger value chain so that they can achieve greater economies of scale and have a deeper capacity for innovation is a real question. In addition, research has found that in a cluster, the vertical links are strong, but the horizontal links among similar firms are weak (Shi and Ganne 2009). This weakness will adversely affect their collective efficiency and innovation ability in the long run.
- *Lack of skilled technical and managerial personnel.* In most clusters, the percentage of employees with a college degree or graduate experience is quite low, with the majority having only a senior secondary education or below. Because of the low-end nature of these clusters (many of them are family based), they have difficulty attracting skilled talent and are thus in a disadvantageous position compared to the SEZs (although they too have certain shortages of high-end R&D personnel). This shortcoming constrains their future growth and ability to upgrade.

Policy Implications

Given these major challenges, China will need to adjust its current development strategy and move toward a more competitive and sustainable development paradigm.

How to achieve this goal is a very complex issue, and detailed policy recommendations are not given here, but some general policy directions that might be useful in overcoming the challenges that China's special economic zones and industrial clusters face are provided.

Gradually Moving toward a More Knowledge- and Technology-Based Development Model

As knowledge and technology are increasingly becoming the drivers for growth and competitiveness and because the cost of resources and labor is rising, along with trade protectionism, China cannot continue the old low-cost labor and factor-based growth model in the long run. Meanwhile, the challenges of climate change and tough eco-standards make such a strategy shift even more necessary. To maintain their competitive edge, China's special economic zones and industrial clusters need to be more innovative and technology intensive. Of course, given the vast pool of labor, such a shift will take time and cannot be completed hastily.

Putting More Emphasis on Domestic Markets and Consumption as a Source of Growth

While the export-led growth has been very successful for China, the economic crisis and increasing trade friction might make China consider whether it should continue to rely on exports as the main engine for growth. After decades of growth, the domestic market is becoming bigger and more sophisticated, with a middle class rapidly emerging. Under such circumstances, China might be able to gradually increase the share of domestic consumption as a source of growth. This strategy will need a comprehensive approach. Enterprises will need to make more products that cater to domestic consumers, for example, and the government will need to strengthen social security and the social safety net. Meanwhile, opening up and strengthening the service sectors—such as education, health, and rural services—will stimulate consumption significantly. This idea is consistent with China's current balanced national development strategy and will also help move the country toward a more service-based economy.

Upgrading the SEZs and Industrial Clusters through Technology Innovation and Learning

While China is gradually losing its low-cost labor advantages to other countries such as Bangladesh and Vietnam, it needs to upgrade the current SEZs and clusters through technology innovation, adaptation, and diffusion as well as through skills training. For China to achieve such an ambitious goal, it will have to take a comprehensive approach that will involve but not be limited to the following:

- *Strengthening intellectual property rights protection.* Such protection is important for spurring innovation and attracting high-end FDI, especially in R&D centers. Today, China has good regulations and laws related to IPR protection but suffers from weak enforcement.
- *Providing the right incentives or pressures for enterprise-led innovation.* In addition to fiscal incentives, certain instruments such as government procurement and standards, as well as SOE governance reform and reduction of government ownership through dividend collection and secondary share offerings and the like, could be used (Zhang et al. 2009).
- *Improving SME innovation capacity.* This improvement could be achieved through modernizing human resources management, providing more skills training and vocational education, and establishing certain SME-specific programs such as innovation vouchers³⁹ and innovation brokerages.⁴⁰ In clusters, because of the frequency of imitation and low entry barriers, the core technologies and skills training have the characteristics of public goods and strong externality. Governments, therefore, need to support such activities, ideally through professional services organizations such as industrial associations. This effort again requires further reform of the intermediary sectors (such as associations and chambers of commerce) to encourage more private and public-private partnership types of providers. In addition, to overcome the fragmentation problem, government-supported technology innovation centers could be designed as *sector-based* in a province to encourage cooperation among firms, instead of *township-based* as is now the case.
- *Strengthening university-industry linkages.* Reinforcing these connections will require policy instruments that encourage joint R&D between universities and industry as well as better staff mobility between these two sectors. Meanwhile, the higher education system should be further reformed to be more responsive to market needs (Dahlman, Zeng, and Wang 2007).
- *Strengthening the financial sector, especially the ecosystem of the venture capital industry.* Building up the financial sector would entail improving the corporate governance of venture capital firms, encouraging institutional investors, and expanding the exit avenues for venture capital investors, among other things (Zhang et al. 2009).

Implementing Strict Environmental Standards

Enforcing stronger standards will not only improve the environment and increase the

focus on quality of growth rather than on quantity, but also force firms to invest more in environmental and energy-related innovations. This measure, however, also needs to be implemented with public assistance. Because many firms in the Chinese clusters or even in the SEZs are operating in the low-tech and environment-polluting sectors, they are unable to comply with certain standards due to lack of innovation capacity, but simply closing them down or moving them away may be not the best solution. Because certain “green” technologies have characteristics of public goods, government and public institutions may need to provide R&D and technological support to enable these firms to upgrade.

We can see, however, that some SEZs and industrial parks have already begun to incorporate green facilities as part of the zone design, such as in the Tianjin Binhai New Area, where a Sino-Singapore Tianjin Eco-City is being developed. The eco-city is envisioned as an “economically sustainable, socially harmonious, environmentally friendly and resource-conserving” city, which will become a “model eco and low carbon city replicable by other cities in China.”⁴¹

Further Deepening Institutional Reforms

Because the SEZs are gradually losing their privileged status, it is important for them to explore new ways of cooperation and integration within a wider territorial and regional context. Meanwhile, they need to deepen institutional reforms and create a better legal environment, a more effective monitoring and supervisory system, a more efficient administrative and regulatory system, and a more conducive business environment overall. In addition, the government will need to withdraw from many functions and let the market and the public-private partnerships play a bigger role. Such a system will be more attractive and more sustainable and will allow the SEZs to stay competitive.

Conclusion

China has come a long way in a short time, and its rise is the most compelling economic story of the 21st century. Although it still faces many challenges and difficulties in sustaining its rapid growth, it has launched itself on an irreversible growth path and is poised to become a global economic powerhouse and a key economic and financial player. And in today’s global crisis, China has become an important engine to drive the world out of the downturn.

While the “China model” offers very useful experiences and lessons for other developing countries, everything has to be put into a local context; there is no panacea for development. I hope this paper on China’s two most important growth engines—special economic zones and industrial clusters—will be useful to policy makers, development practitioners, and researchers who are interested in learning

from China's experiences.

Annex A: China's State-Level High-Tech Industrial Development Zones (HIDZs)

Eastern Region		Inland China	
Province	HIDZ (25)	Province	HIDZ (29)
Beijing	<ul style="list-style-type: none"> • Zhongguancun 	Anhui	<ul style="list-style-type: none"> • Hefei
Fujian	<ul style="list-style-type: none"> • Fuzhou • Xiamen Torch 	Chongqing	<ul style="list-style-type: none"> • Chongqing
Guangdong	<ul style="list-style-type: none"> • Foshan • Guangzhou • Huizhou Zhongkai • Shenzhen • Zhongshan Torch • Zhuhai 	Gansu	<ul style="list-style-type: none"> • Lanzhou
Hainan	<ul style="list-style-type: none"> • Hainan International (in Haikou) 	Guangxi	<ul style="list-style-type: none"> • Guilin • Nanning
Hebei	<ul style="list-style-type: none"> • Baoding • Shijiazhuang 	Guizhou	<ul style="list-style-type: none"> • Guiyang
Jiangsu	<ul style="list-style-type: none"> • Changzhou • Nanning • Wuxi • Suzhou 	Heilongjiang	<ul style="list-style-type: none"> • Daqing • Harbin
Shandong	<ul style="list-style-type: none"> • Ji'nan • Qingdao • Weifang • Weihai • Zibo 	Henan	<ul style="list-style-type: none"> • Luoyang • Zhengzhou
Shanghai	<ul style="list-style-type: none"> • Shanghai Zhangjiang 	Hubei	<ul style="list-style-type: none"> • Wuhan East Lake • Xiangfan
Tianjin	<ul style="list-style-type: none"> • Tianjin 	Hunan	<ul style="list-style-type: none"> • Changsha • Zhuzhou
Zhejiang	<ul style="list-style-type: none"> • Hangzhou • Ningbo 	Inner Mongolia	<ul style="list-style-type: none"> • Baotou Rare-earth
		Jiangxi	<ul style="list-style-type: none"> • Nanchang
		Jilin	<ul style="list-style-type: none"> • Changchun • Jilin
		Liaoning	<ul style="list-style-type: none"> • Anshan • Dalian • Shenyang
		Ningxia	-
		Qinghai	-
		Shaanxi	<ul style="list-style-type: none"> • Baoji • Xi'an • Yangling Agriculture (in Xi'an)
		Shanxi	<ul style="list-style-type: none"> • Taiyuan
		Sichuan	<ul style="list-style-type: none"> • Chengdu • Mianyang

	Tibet	-
	Xinjiang	• Urumqi
	Yunnan	• Kunming

Source: China Knowledge Online (2009).

Annex B: China's 15 Free Trade Zones

Province	FTZ (15)
Fujian	Fuzhou Xiangyu (in Xiamen)
Guangdong	Futian (in Shenzhen) Guangzhou Shantou Shatoujiao (in Shenzhen) Yantian (in Shenzhen) Zhuhai
Hainan	Haikou
Liaoning	Dalian
Jiangsu	Zhangjiagang
Shandong	Qingdao
Shanghai	Waigaoqiao
Tianjin	Tianjin
Zhejiang	Ningbo

Source: China Knowledge Online (2009) and Annual Report on the Development of China's Special Economic Zones (2009).

Notes

1. The historical name *Hong Kong* refers to the period before July 1, 1997, when the former British colony was restored to China; *Hong Kong, China* refers to any time after that date.
2. The historical name *Macao* refers to the period before December 20, 1999, when the former Portuguese colony was restored to China; *Macao, China* refers to any time after that date.
3. The selection of the 14 coastal cities reflected the central government's determination to expose a much greater area to change. From north to south, they include Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang, and Beihai.
4. There is a total of 54 HIDZs, but the Ningbo HIDZ was approved only in January 2007.
5. Figures for Xiamen and Hainan are only for the first three quarters (see Yeung, Lee, and Kee, 2009).
6. See Li, Xiaoxi, R. Duan, and H. Zhang, 2009.
7. "Hukou" is China's residential registration system.
8. See Li, Xiaoxi, R. Duan, and H. Zhang, 2009.
9. See Yuan, Yiming, et al., 2009.
10. See Yuan, Yiming, et al., 2009.
11. See Yuan, Yiming, et al., 2009.
12. See Li Xiaoxi, R. Duan, and H. Zhang, 2009.
13. See Hu, Ming, and Jianming Wang, 2009.
14. See Yuan, Yiming, et al., 2009.
15. See Yuan, Yiming, et al., 2009.
16. See Li Xiaoxi, R. Duan, and H. Zhang, 2009.
17. In recent years, due to the success of clusters and pressures for cluster transfer, local governments are using cluster policies more and more deliberately.
18. See Wang, Jici, 2009.
19. See Wang, Jun, and Fangmin Yue, 2009.
20. See Wang, Jici, 2009.
21. See Wang, Jun, and Fangmin Yue, 2009.
22. See Wang, Jici, 2009.
23. See Wang, Jun, and Fangmin Yue, 2009.
24. See Wang, Jun, and Fangmin Yue, 2009.
25. See Wang, Jun, and Fangmin Yue, 2009.
26. See Wang, Jici, 2009.
27. See Wang, Jun, and Fangmin Yue, 2009.
28. See Wang, Jici, 2009.

29. See Wang, Jici, 2009.
30. See Wang, Jun, and Fangmin Yue, 2009.
31. See Wang, Jun, and Fangmin Yue, 2009.
32. See Wang, Jici, 2009.
33. See Wang, Jun, and Fangmin Yue, 2009.
34. See Wang, Jun, and Fangmin Yue, 2009.
35. See Wang, Jici, 2009.
36. See Wang, Jici, 2009.
37. See Li Xiaoxi, R. Duan, and H. Zhang, 2009.
38. Findings from a field visit to Guangdong by the author in December 2010.
39. The government provides a small number of grants to SMEs that need technology assistance; then SMEs find the relevant universities or research institutes to help solve their technology difficulties. Such a program was implemented in the Netherlands.
40. The government sponsors qualified experts as brokers or agents to help link the SMEs with relevant universities or research institutes to help diffuse technologies from the research community to SMEs, such as the TEFT (Technology Diffusion from Research Institutes to SMEs) program in Norway.
41. It aims to achieve this vision by taking an integrated approach to planning a new urban area in an environmentally sustainable manner. According to the master plan, Sino-Singapore Tianjin Eco-City (SSTEC) promotes integrating land use and urban transport and balancing employment and housing supply. SSTEC promotes the “use of clean/renewable energy and reuse/recycle of resources through innovative technologies and environmentally friendly policies and investments across various sectors,” including water, energy, land, and transport, among others. Global climate change and social equity issues are also incorporated into the master plan by explicitly including greenhouse gas reduction and affordable housing targets. The development work of phase one of the project has begun and is expected to be completed between 2011 and 2013 (see Baumler et al. 2009).

Bibliography

- Andersson, Thomas, Sylvia Schwagg Serger, Jens Sörvik, and Emily Wise Hansson. 2004. *The Cluster Policies Whitebook*. Malmö, Sweden: International Organization for Knowledge Economy and Enterprise Development.
- Asian Development Bank. 2007. "Special Economic Zones and Competitiveness: A Case Study of Shenzhen, China." PRM (Pakistan Resident Mission) Policy Note, Islamabad.
- Baeumler, Axel, et al. 2009. *Sino-Singapore Tianjin Eco-City: A Case Study of an Emerging Eco-City in China*. Technical Assistance Report, Washington, DC, World Bank.
- Bhagwati, Jagdish. 2004. *In Defense of Globalization*. New York: Oxford University Press.
- China Knowledge Online. 2009. "China Special Report: Industrial Parks—China's Vehicles for Manufacturing." <http://www.chinaknowledge.com>.
- Dahlman, Carl, Douglas Zhihua Zeng, and Shuilin Wang. 2007. *Enhancing China's Competitiveness through Lifelong Learning*. Washington, DC: World Bank.
- Enright, Michael J., Edith Scott, and Ka-mun Chung. 2005. *Regional Powerhouse: The Greater Pearl River Delta and the Rise of China*. Singapore: John Wiley & Sons (Asia).
- FIAS. 2008. *Special Economic Zones: Performance, Lessons Learned, and Implications for Zone Development*. Washington, DC: World Bank.
- Fu, Xiaolan, and Yuning Gao. 2007. *Export Processing Zones in China: A Survey*. Geneva: International Labour Organization.
- Ganne, Bernard, and Y. Lecler, eds. 2009. *Asian Industrial Clusters, Global Competitiveness and New Policy Initiatives*. Singapore: World Scientific Publishing Co. Pte. Ltd.
- Ge, Wei. 1999. "Special Economic Zones and the Opening of the Chinese Economy: Some Lessons for Economic Liberalization." *World Development* 27 (7): 1267–85.
- Guandong Statistical Yearbook*. 2009. Beijing: China Statistics Press.
- Hefei ETDZ. 2009. *China State-Level Economic and Technological Development Zone Report (2)*. Hefei: Hefei Economic and Technological Development Zone.
- Hu, Ming, and Jianming Wang. 2009. "From County-Level to State-Level Special Economic Zone: The Case of the Kunshan Economic and Technological Development Zone". A background study for the World Bank.
- Huang, Zuhui, Xiaobo Zhang, and Yunwei Zhu. 2008. "The Role of Clustering in Rural Industrialization: A Case Study of the Footwear Industry in Wenzhou." *China Economic Review* 19: 409–20.
- Krugman, Paul, and A. Venables. 1996. "Integration, Specialization, and Adjustment." *European Economic Review* 40: 959–67.
- Lai, H. C., Y. C. Chiu, and H. D. Leu. 2005. "Innovation Capacity Comparison of China's Information Technology Industrial Clusters: The Case of Shanghai, Kunshan, Shenzhen and Dongguan." *Technology Analysis & Strategic Management* 17 (3): 293–315.

- Li, Xiaoxi, R. Duan, and H. Zhang, 2009. "A Case Study of Tianjin Economic-Technological Development Area." A background study for the World Bank.
- Lin, Justin Yifu. 2010. "New Structural Economics: A Framework for Rethinking Development." Policy Research Working Paper 5197, World Bank, Washington, DC.
- Markusen, Ann R. 1996. "Sticky Places in Slippery Space: A Typology of Industrial Districts." *Economic Geography* 72 (3): 293–313.
- Marshall, A. 1920. *Principles of Economics*. London: Macmillan.
- McCormick, D., and B. Oyelaran-Oyeyinka, eds. 2007. *Industrial Clusters and Innovation Systems in Africa*. Tokyo: UNU Press.
- Meyer-Stamer, Jorg. 1998. "Path Dependence in Regional Development: Persistence and Change in Three Industrial Clusters in Santa Catarina, Brazil." *World Development* 26 (8):1495–511.
- Ministry of Commerce (MOFCOM). 2008a. *China Free Trade Zones and Export Processing Zones Yearbook 2008*. Beijing: China Finance and Economics Press.
- . 2008b. *National NTDZ Major Economic Indicators (Chinese)*. <http://www.fdi.gov.cn>.
- MOST (Ministry of Science and Technology). 2009. *China Torch Statistical Yearbook 2009*. Beijing: China Statistics Press.
- Mytelka, L. 2004. "From Clusters to Innovation Systems in Traditional Industries." In *Innovation Systems and Innovative Clusters in Africa*, ed. B. L. M. Mwamila et al. Proceedings of a conference in Bagamoyo, Tanzania.
- Nadvi, K. 1997. "The Cutting Edge: Collective Efficiency and International Competitiveness in Pakistan." IDS Discussion Paper 360, Institute of Development Studies, Brighton, United Kingdom.
- . 1999. "Collective Efficiency and Collective Failure: The Response of the Sialkot Surgical Instruments Cluster to Global Quality Pressures." *World Development* 27 (9): 1605–26.
- National Statistics Bureau. 2006. *China Statistical Yearbook*. Beijing: China Statistics Press.
- Porter, Michael. 1990. *The Competitive Advantage of Nations*. New York: Free Press.
- . 1998. "Clusters and the New Economics of Competition." *Harvard Business Review* 76 (6): 77–91.
- ProLogis. 2008. "China's Special Economic Zones and National Industrial Parks— Door Openers to Economic Reform." *ProLogis Research Bulletin* (Spring).
- Qian, Jinqiu. 2008. "National High-Tech Industry Development Zones." Presentation to the EU Science and Technology Counselors Meeting, Beijing, December.
- Ruan, Jianqing, and Xiaobo Zhang. 2008. "Finance and Cluster-based Industrial Development in China." Discussion Paper 768, International Food Policy Research Institute, Washington, DC.
- Schmitz, H. 1992. "On the Clustering of Small Firms." *IDS (Institute of Development Studies) Bulletin* 23 (3): 64–69.

- Shanghai Pudong Government. 2008. <http://www.pudong.gov.cn>.
- Shanghai Statistics Bureau. 2008. *Shanghai Statistical Yearbook*. Shanghai: Shanghai Statistics Press.
- Shenzhen Statistics Bureau. Various years. *Shenzhen Statistical Yearbook*. Beijing: China Statistics Press.
- Shi, Lu, and Bernard Ganne. 2009. "Understanding the Zhejiang Industrial Clusters: Questions and Re-evaluations." In *Asian Industrial Clusters, Global Competitiveness and New Policy Initiatives*, ed. Bernard Ganne and Yveline Lecler, 239–66.
- Sklair, Leslie. 1991. "Problems of Socialist Development—The Significance of Shenzhen Special Economic Zone for China Open-Door Development Strategy." *International Journal of Urban and Regional Research* 15 (2): 197–215.
- Sonobe, Tetushi, and Keijiro Otsuka. 2006. *Cluster-Based Industrial Development: An East Asian Model*. New York: Palgrave Macmillan.
- South China Morning Post*. 2008. November 17, A8.
- Straits Times* (Singapore). 2008. November 15.
- Tianjin Statistics Bureau. 2008. *Tianjin Statistical Yearbook*. Tianjin: Tianjin Statistics Press
- Wang, Jici. 2009. "New Phenomena and Challenges of Clusters in China in the New Era of Globalization." In *Asian Industrial Clusters, Global Competitiveness and New Policy Initiatives*, ed. Bernard Ganne and Yveline Lecler, 195–212.
- Wang, Jun, and Fangmin Yue. 2009. "Cluster Development and the Role of Government: The Case of Xiqiao Textile Cluster in Guangdong." A background study for the World Bank.
- Wong, Kwan-yiu. 1987. "China's Special Economic Zone Experiment: An Appraisal." *Geografiska Annaler Serices B, Human Geography* 69 (1): 27–40.
- World Bank. 2009. "Clusters for Competitiveness: A Practical Guide and Policy Implications for Developing Cluster Initiatives." International Trade Department, PREM Network, Report, World Bank, Washington, DC.
- . 2010. *Innovation Policy: A Guide for Developing Countries*. Washington, DC: World Bank Institute.
- Yeung, Yue-man, J. Lee, and G. Kee. 2009. "China's Special Economic Zones at 30." *Eurasian Geography and Economics* 50 (2): 222–40.
- Yeung et al. 2008. "China's Special Economic Zones at 30." *Eurasian Geography and Economics* 2009 50 (2).
- Yuan, Yiming, et al. 2009. "China's First Special Economic Zones: The Case of Shenzhen". A background study for the World Bank.
- Yusuf, Shahid, K. Nabeshima, and S. Yamashita, eds. 2008. *Growing Industrial Clusters in Asia: Serendipity and Science*. Washington, DC: World Bank.
- Zeng, Douglas Zhihua. 2001. "Suzhou Technology Park." Research note for WBI Development Series. *China and the Knowledge Economy: Seizing the 21st Century*, Washington, DC: World Bank.

- . 2008. *Knowledge, Technology and Cluster-based Growth in Africa*. Washington, DC: World Bank.
- Zhang, Chunlin, Douglas Zihua Zeng, William Mako, and James Seward. 2009. *Promoting Enterprise-led Innovation in China*. Washington, DC: World Bank.
- Zheng, Yu. 2009. "Incentives and Commitment: The Political Economy of Special Zones in China." Unpublished. University of Connecticut, Storrs, CT.
- Zheng, Y., and S. Sheng. 2006. "Learning in a Local Cluster in the Context of the Global Value Chain: A Case Study of the Yunhe Wood Toy Cluster in Zhejiang, China." *Innovation: Management, Policy & Practice* 8 (1–2): 120–27.
- Zhong, Jian, et al., eds. 2009. *Annual Report on the Development of China's Special Economic Zones*. Beijing: Social Sciences Academy Press.