



Active Local Governments and New Chinese Firms in Emerging Industries in Kunshan and Dongguan

Xun Zhang, Gary Gereffi, and Cassandra C. Wang

1 INTRODUCTION

China's remarkable record of economic growth over the past four decades is unparalleled. It has become the largest and most diversified manufacturing export economy in the world and the second largest economy after the United States. As a centrally controlled country with a large state-owned enterprise (SOE) sector, China is very different from any of the advanced capitalist economies with which it competes. In a world of global value chains (GVCs), China has been strikingly successful not only in participating in a highly diverse range of low-tech, mid-tech, and high-tech industries, but in utilizing its extensive ties with multinational enterprises (MNEs) to move up the value chain to relatively high-value activities in virtually all industries. In the current era, China is targeting

X. Zhang · G. Gereffi (✉)
Duke University, Durham, NC, USA
e-mail: ggereffi@duke.edu

C. C. Wang
School of Earth Sciences, Zhejiang University, Hangzhou, China

the cutting-edge industries of advanced manufacturing, artificial intelligence, electric vehicles, and 5G telecommunication networks, at the same time as it is mastering burgeoning fields in the digital economy such as e-commerce, big data analytics, and cloud computing (Wu & Gereffi, 2019).

This chapter will analyze China's involvement in GVCs from the bottom up rather than the top down. We contend that industrial policy in China is not merely a tool of the central government. Local governments are also very important actors in the industrial landscape of China. Using city-level case studies of Kunshan and Dongguan, we highlight different patterns in the evolution of active local governments in China, which reflect both the timing of development and the regional location of these industrial hubs. Kunshan, a county-level city in Jiangsu Province, fostered an evolutionary coalition at the onset of its industrial experience, but later it was able to use local Taiwanese investors to catapult to a world leadership role with a high level of specialization in the laptop computer GVC (Wang, Gereffi & Liu, 2021). Dongguan, a prefecture-level city and industrial cluster in central Guangdong Province, China, started from a more generalized base in the highly manufacturing-oriented Pearl River Delta (PRD). Its upgrading path led to greater diversification in the information and communication technology (ICT) sector and other manufacturing activities and a local government that learned how to play a more active role in nurturing local investors. Currently Dongguan may have the upper hand as China shifts to a more inward-oriented development model that emphasizes industrial upgrading from below as Chinese suppliers bolster local supply chains oriented to the domestic market.

In this chapter, we elaborate this bottom-up upgrading analysis by comparing Kunshan and Dongguan. Both cities launched their industrial development with substantial investments by Taiwanese firms in the 1980s to 2000s focused on the information technology (IT) sector. Dongguan was a world leader in desktop personal computer (PC) production in the PRD in the 1990s while Kunshan and neighboring Suzhou in the Yangtze River Delta (YRD) became the global largest notebook (laptop) PC production center in the 2000s (Yang, 2009). To better understand the industrial growth of Kunshan and Dongguan, we will link the active local government approach used to analyze the Kunshan case (Wang et al., 2021) with the GVC perspective that has been widely utilized to understand the global expansion of the electronics industry (Sturgeon & Kawakami, 2011) and many other sectors since the onset of economic

globalization in the 1960s and 1970s (Cattaneo, Gereffi, & Staritz, 2010; Staritz, Gereffi, & Cattaneo, 2011; Gereffi, 2018).

The GVC framework is an actor-centered approach that focuses on the structure and dynamics of global industries with an emphasis on the strategies pushed by MNE “lead firms” and first-tier suppliers in overseas production centers for these industries, along with upgrading strategies pursued by national or local governments that orchestrate the policies, implement incentives, and foster capabilities needed for economic success (Gereffi & Fernandez-Stark, 2016). In GVC upgrading, local government can play a vital role to attract external capital and interact with MNEs to shape local industrial structures. While MNEs arrange their affiliations worldwide, local governments facilitate the strategic coupling of foreign investors and local assets (e.g., land, physical facilities, government permits, workforce development) to build attractive regional assets that provide local actors with additional bargaining power.

This chapter is organized as follows. Section 2 highlights the growing and somewhat overlooked role of active local governments in China’s explosive growth as an export power in the 1990s and 2000s, and especially in the 2010s when the global recession of 2008–2009 led China to re-emphasize the growth potential of its domestic economy. National programs like Made in China 2025 focused attention on advanced manufacturing, indigenous innovation, and high-value services at the local level. Section 3 focuses on similarities and differences in the role of active local governments in Kunshan and Dongguan from the 1990s to the 2010s as China shifted its development strategy from export-oriented industrialization to a greater emphasis on the domestic economy. With “Made in China 2025” in 2015, there was an acceleration in the role played by Chinese domestic suppliers in both cities as they pushed Taiwanese firms out of more traditional manufacturing roles into newer kinds of manufacturing-related services. Section 4 analyzes industrial development in Kunshan and Dongguan from a GVC-oriented perspective, which highlights the specific value-chain segments and activities within the ICT sector carried out in each location. Section 5 draws conclusions from this chapter about the changing role of GVCs and industrial upgrading from below in China, with reflections on the generalizability of local government policies and cities as units of analysis for understanding China’s upgrading trajectories.

2 LOCAL GOVERNMENTS IN CHINA'S INDUSTRIAL DEVELOPMENT

In the context of China's transitional economy, local governments play a significant role in regional development. For instance, Wei (2010) underlines the interactions of the Chinese state, MNEs, and regional assets in shaping the trajectories of regional development, and argues that Kunshan's development is state centered and heavily dependent on global forces. Whereas China's central government is still a dominant force and continues to shape regional economies, the decentralization in recent years and especially the tax-sharing system has given the local state greater autonomy and incentives to intervene to generate "extra-budgetary revenue" (Lin, 2002). The central government has control over personnel, whereas subnational governments run the bulk of the economy by initiating, negotiating, implementing, diverting, and resisting reforms, policies, rules, and laws (Xu, 2011).

The role of the local state has evolved from a complementary one that strictly supported central government projects to a more proactive one that promotes local development strategy (S. He, 2007). Local governments can also get involved in the regional economy as planners, developers, and policymakers. Localities that possess both traded and untraded interdependencies and location-specific formal and informal rules require the local state to coordinate different actors and design locality-tailored developmental schemes (Zhu & He, 2016).

Many studies on regional economies in China have demonstrated the multiple roles that a local state can play through industrial policies (Chien & Ho, 2011; C. He, Yan, & Rigby, 2018). A general and widely adopted form of industrial policy is to privilege targeted industrial sectors in a locality (Dai, Hou, & Li, 2021). China's Five-Year Plans set the key national industries to prioritize for the next five years. Based on this guideline, the central government provides the broad goals and the local city develops policies according to their realities and specific plans. Other industrial policies, such as income tax breaks, rebates of value-added tax and import duties for equipment purchases, low-priced land for firms in special development zones, and cash payments to firms based on exports and innovation performance are further interventions in the local economy (Barbieri, Di Tommaso, & Bonnini, 2012).

Local government can sustain pro-growth coalitions by coordinating local agents to furnish necessary resources such as land, capital, technology, and labor for industrial development. Wang et al. (2021) define a pro-growth coalition as “a formal or informal mechanism and process formed by multi-scalar actors who are participating in and benefiting from local growth (path creation) by mobilizing internal resources and anchoring external (global) resources together.” Taking Kunshan as a case, they illustrate how the pro-growth coalition led by the local state successfully contributed to the emergence and development of new industries from an evolutionary perspective. In particular, Taiwanese capital, together with the local government, formed a trans-border alliance that drove local institutional change and resulted in a dual specialization of Kunshan’s industrial structure: an industrial specialization based on the IT industry; and an ownership specialization of Taiwan-based enterprises (Po & Pun, 2003).

Other cases illustrate the same process. Within the Nanhai district, Guangdong Province, Zhao (2021) documents the role of local government in constructing “innovation platforms” that perform functions of technological R&D, incubation, and pro-actively contributing to science-park transfers by soliciting and combining external resources from key actors. The entrepreneurial Chinese local government plays the role of meso-level organizer equivalent to the innovation project manager in business. This action creates an innovation environment that supports the growth of high-end industries.

Gruss & ten Brink (2016) show that local governments played a dominant role in the emergence of the photovoltaic industry in China. The rise of Chongqing’s notebook computer industry was largely created by local government with central state support of hard and soft infrastructures and externalities that drove down logistical and production costs and permitted constant product innovation (Gao et al., 2017). A case study of Shenzhen highlights the adaptation of the local state in the development of strategic emerging industries such as the light-emitting diode (LED) industry (Yang, 2015).

In summary, industrial development in China relies on the active role of local governments that create a pro-business environment, guide industrial upgrading, form pro-growth coalitions to acquire resources for new industries, and even act as a meso-level organizer to orchestrate diverse actors for a common industrial purpose. However, the outcomes of active local government interventions are varied across regions due to

geographical and historical factors as well as the adaptive capability of local government to external opportunities and challenges, as we will see in the following section.

3 HOW ACTIVE LOCAL GOVERNMENTS IN KUNSHAN AND DONGGUAN SHAPED INDUSTRIAL UPGRADING

The role of the local state has been underestimated in the literature on China's industrial development in relation to GVCs. In this chapter, we address this oversight by linking three distinct levels of analysis:

China's evolving national development strategy: This has shifted from the initial opening of the economy to international trade and foreign capital after 1978 to a more extensive participation of foreign direct investment (FDI) and export-oriented industrialization in China in the 1990s and 2000s based on the growth of China's Special Economic Zones (SEZs) in the coastal provinces. After the global recession of 2008–2009, there was a turn inward with a growing emphasis on the domestic market as export growth slowed, and after 2015 the “Made in China 2025” program focused on advanced manufacturing and indigenous innovation to capture trends associated with the Fourth Industrial Revolution and the emergence of the digital economy. An important feature of China's domestically oriented development model was the emergence of local suppliers that increased their technological capabilities under the export-oriented model and began to climb existing value chains in China by “upgrading from below.”

China's changing role and uneven value capture in GVCs: As China became the “factory of the world” in terms of its burgeoning export production in the 1990s and especially after its entry into the World Trade Organization in 2001, its opportunities to diversify and improve its position in GVCs expanded dramatically. Whereas initially China was primarily involved in assembling imported inputs into finished products in its SEZs and thousands of export factories located across the country, China soon upgraded into higher value-added stages of GVCs such as original equipment manufacturer (OEM), original brand manufacturer (OBM), and original design manufacturer (ODM) forms of production (Gereffi, 2019). However, challenges remained in this upgrading trajectory because the export-oriented GVC model still allowed MNEs that controlled global brands and marketing to capture the lion's share of profits and high-value activities in the chain.

This is well illustrated by the case of Apple Inc., the world's largest IT firm by revenue and the top company in terms of its market capitalization—over US\$ 3 trillion in 2022 (CNBC, 2022). Virtually all of Apple's products are made overseas by a diverse network of suppliers. In 2015, Apple's list of global suppliers included 198 companies and 759 subsidiaries, of which 336 (44.2%) were in China (Grimes & Sun, 2016). Even though most of Apple's production in the IT sector was concentrated in China, Apple captured 91% of global profits in the smartphone market, while the leading Chinese brands (Huawei, Oppo and Vivo) together accounted for less than 5% of global profits (Grimes & Yang, 2018).

Local active governments in China's upgrading efforts: Although the central government and the influence of the Chinese Communist Party have received a great deal of attention in China's unique brand of market socialism, the role of active local governments has been an underappreciated factor in China's extraordinarily rapid industrial transformation since the 1980s and 1990s. Local governments in China are responsible for attracting FDI as well as implementing local institutional reforms and workforce training programs that created the pattern of dynamism visible throughout China. The active involvement of local governments has drawbacks as well, such as potential duplication of efforts in pursuing the multiple technologies encompassed by national initiatives like "Made in China 2025" or the environmental degradation from lax enforcement of national anti-pollution standards to maintain high levels of FDI and local job growth.

In analyzing active local states in Kunshan and Dongguan, we utilize both evolutionary and comparative perspectives in this chapter. In the case of Kunshan, the impact of the local state on industrial development has followed a series of distinct stages:

Stage 1: 1980–1990—A risk-taking local state

The creation of industrial parks became the cornerstone of Kunshan's industrial economy. There was no target industry at the time and Kunshan attracted whatever investment they could find. There were many factories producing electronic components, which laid a foundation for the future growth of the IT industry.

Stage 2: 1991–2000—An institution-building learning local state

To complement its agglomeration of Taiwan-based firms, Kunshan started to help them to grow local networks and selected the IT industry as their target industry at this time. Policy mobility allowed Kunshan's government to build up a friendly environment to form a strategic coupling between Kunshan and GVCs.

Stage 3: 2001–2010—An institution-building collaborative local state

During the previous stage, the local state focused on institution-building. In this period, the local state begins to lead programs in collaboration with local firms and FDI to further develop the economy. It also exercises the ability to select key firms to establish the industry. This helps explain the rapid growth of Kunshan's IT industry during the 2001–2010 period when Kunshan became the main production base for laptops in China and the world.

Stage 4: 2011–present—Local state focusing on upgrading via regulation/selection

After 2010, there was not enough land to bring more enterprises into the city, so Kunshan's government had to “vacate the cage to change the birds” (*tenglong huanniao*). To make room for more advanced and sustainable firms, the Kunshan government needed to persuade low-end firms to leave or to more strictly enforce tough environmental and social regulations that would require local firms to gradually upgrade or to relocate so that resources could be released for new businesses. After 2016 when the concept of “new economy” was raised by the central government, Kunshan expanded its efforts with respect to industrial upgrading.

We can compare the roles of the local state in Kunshan versus Dongguan from the 1990s to the present, which to a certain extent mirrors larger regional dynamics in the YRD and PRD, respectively (Yang, 2009). The main styles of local state governance are outlined in Table 1.

In the 1990s, Kunshan's local government is **entrepreneurial**. They took the bold move to initiate the Kunshan Economic and Technological Development Zone and actively build a “business-friendly style” investment environment to attract Taiwanese firms (top-down approach). At this time, Dongguan's government assumed a largely **passive** role in the

Table 1 Styles of local state governance in Kunshan and Dongguan, 1990s–2010s

	<i>Kunshan</i>	<i>Dongguan</i>
1990s	Entrepreneurial	Passive
2000s	Collaborative	Learning
2010s	Active, but weaker FDI and failure to adapt to GVC shift (rise of smartphones)	Active to promote diversified upgrading by local firms

Source Authors

city’s industrial development process. Moreover, Dongguan’s investment environment is characterized by a heavy emphasis on “*guanxi*” without sufficient transparency and efficiency (Murphree & Breznitz, 2020).

In the 2000s, Kunshan’s local government **collaborates** with Taiwanese investors in pursuing a specialization strategy in the highly export-oriented laptop computer industry. Dongguan, on the other hand, realized the importance of industrial policies in the early 2000s and initiated the Songshan Lake Industrial and Technology Park in 2001 to attract large scale MNEs (**learning**), with only limited effects in the 2000s.

In the 2010s, responding to China’s national directives (13th Five-Year Plan and programs like “Made in China 2025”) to enhance domestic capabilities and innovation, both governments are **actively** formulating and implementing industrial policies to encourage upgrading and innovation. Dongguan’s passive bottom-up approach in the 1990s benefitted from the inflow of Hong Kong and Taiwanese investors, but a shift to more active involvement and support of local suppliers facilitated investor and technological diversification oriented to the domestic market. In the case of Kunshan, Taiwanese investors that specialized in laptop computers in the earlier period and largely missed the GVC shift in the ICT sector to smartphones are now bifurcated: those focusing on low costs are relocating to cheaper regions within China as well as Southeast Asia, while a smaller group of Taiwanese firms and a growing number of Chinese suppliers are diversifying to new higher-value activities within the ICT sector (such as digital services).

4 SECTORAL DIVERSIFICATION AND LOCAL FIRMS IN INDUSTRIAL UPGRADING: COMPARISON OF KUNSHAN AND DONGGUAN

As noted in previous sections, Kunshan and Dongguan have both engaged in rapid industrial upgrading in the ICT sector, but from very different starting points. Dongguan began its industrial trajectory in the 1980s and early 1990s led by Hong Kong and Taiwanese investors who focused on light consumer goods industries, including desktop PCs and computer peripherals (Murphree & Breznitz, 2020; Murphree, 2022), while Kunshan developed as an industrial hub for laptop PCs in the late 1990s and 2000s led by Taiwanese investors, many of whom relocated from Dongguan (Wang et al., 2021).

A closer look at the upgrading process of both cities sheds light on the interplay between local government policies and the strategies of firms in Kunshan and Dongguan's economic development in the 2000s and 2010s. Firm-level analysis underscores a sharp contrast between Kunshan and Dongguan's industrial development strategies in the 2000s: Kunshan pursued a path of continuous specialization in computer manufacturing, while Dongguan's development is more diversified with less dependence on the ICT industry. Responding to domestic-oriented national directives in the 2010s, local governments in both cities have been active in guiding their industrial development and reducing foreign dependency through participation in China's new emerging industries, forming pro-growth coalitions, and building innovation platforms. In addition, the comparison of the ICT sector in Dongguan and Kunshan also reflects significant regional differences within China between the PRD and the YRD, respectively (Yang, 2009), which are the coastal province heartlands for China's highly successful export-oriented development model.

4.1 *Pre-2010 Development of the ICT Sector in Kunshan and Dongguan*

Both Kunshan and Dongguan experienced rapid economic growth in the 2000s. From 2000 to 2010, Kunshan and Dongguan's nominal GDP grew at an average annual rate of 26% and 18%, respectively. Kunshan's economy expanded tenfold during this period, rising from a quarter to almost half of Dongguan's economic output. This largely resulted from a faster increase in the total industrial output of Kunshan, rising from

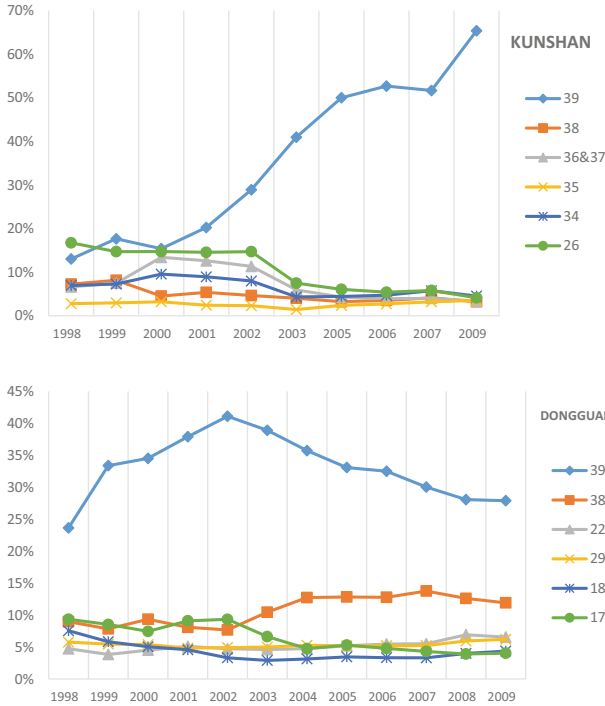
only 39% of Dongguan's total in 2000 to 52% in 2005 and 86% in 2009. By 2009, Dongguan's and Kunshan's industrial output reached RMB 676 billion and RMB 580 billion, respectively (Dongguan Bureau of Statistics, 2022; Kunshan Bureau of Statistics, 2022).

However, the evolution of the economic structure diverged significantly: Kunshan developed an increasingly dominant secondary (manufacturing) sector, while Dongguan's tertiary (services) sector gained more importance. By 2010, manufacturing contributed 64% to Kunshan's GDP, up from 59% a decade earlier, while the manufacturing sector's contribution to Dongguan's economy decreased from 55 to 51% and the service sector share rose from 42 to 48% (Kunshan Bureau of Statistics, 2019).

Comprehensive firm-level data from the China Annual Surveys of Industrial Firms (ASIF) provide a more detailed look into the development of the ICT manufacturing industry in Kunshan and Dongguan before 2010 (Fig. 1). Since 2000, the ICT industry (industrial code 39) has dominated the manufacturing sector in both cities. In Kunshan, the ICT industry expanded rapidly in the 2000s, rising from less than 20% of total manufacturing output in 2000 to over 60% in 2009, which can be attributed both to China's entry to the WTO in 2001 and more specifically to Kunshan's coupling with Taiwan investors. In Dongguan, however, the ICT industry followed a very different trajectory. Although it started at a higher level, producing close to 35% of total manufacturing output in 2000, and continued to expand relative to other manufacturing subsectors until 2004 (over 40%), its relative significance fell sharply, accounting for less than 30% of the total manufacturing output in 2009.

These sectoral trends highlight a striking contrast in development strategies: Kunshan's manufacturing industry became highly concentrated around ICT production, while Dongguan had a broader manufacturing base prior to 2010. Delving more deeply into the ICT manufacturing industry of both cities (Fig. 2), Kunshan depends strongly on computer manufacturing (industrial code 391), primarily laptop computers, which accounts for over 50% of total ICT manufacturing output in the 2000s. Meanwhile, Dongguan's ICT industry is much more fragmented with electronic component manufacturing (industrial code 397) leading the ICT sector, followed by computer manufacturing activities (industrial code 391) in 2009.

Kunshan's specialization in computer manufacturing activities within the ICT manufacturing industry compared to Dongguan reflects its



Industrial output	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Kunshan	73	91	109	131	160	241	307	447	551	582	722	676
Dongguan	30	36	43	51	75	107	163	233	308	403	500	580

Fig. 1 Industrial evolution of top 6 two-digit manufacturing sectors in Kunshan and Dongguan, 1998–2009

Notes Industrial output in RMB billions. The industry codes are based on Industry Classification Standard 2017 [GB/T4754-2017] released by China’s National Bureau of Statistics: 39 – Manufacture of telecommunication equipment, computers, and other electronic products; 38 – Manufacture of electric equipment and machinery; 36 & 37 – Manufacture of transportation equipment; 35 – Manufacture of special purpose equipment; 34 – Manufacture of general-purpose equipment; 26 – Manufacture of chemical raw materials and chemical products; 22 – Manufacture of paper and paper products; 18 – Manufacture of garments, footwears, and headgears; 17 – Textile manufacturing

Source China Annual Survey of Industrial Firms [ASIF]

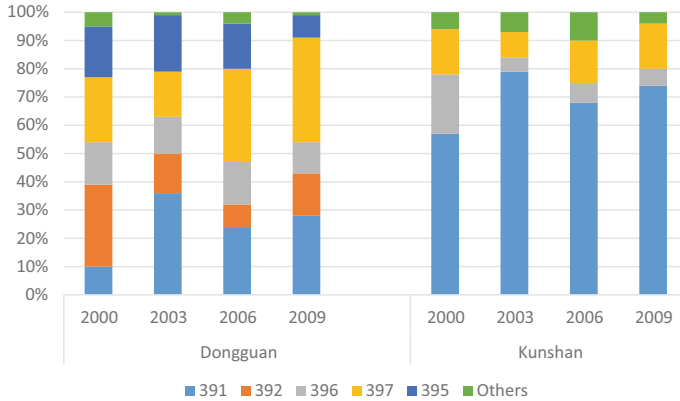


Fig. 2 Distribution of ICT manufacturing industry in Kunshan and Dongguan by output value in selected years (2000, 2003, 2006, 2009)

Notes 391 – Manufacture of electronic computer; 392 – Manufacture of telecommunication equipment; 395 – Manufacture of home audio and video equipment; 396 – Manufacture of electronic device [transistor, electronic tube, integrated circuit, etc.]; 397 – Manufacture of electronic component Others – including all other subsectors within sector 39, including 394 [Manufacture of radar and related equipment], 393 [Manufacture of broadcast and television equipment], and 399 [others]

Source China Annual Survey of Industrial Firms [ASIF]

more advanced position in the computer manufacturing GVC based on consistent policy support by the local government. In 2003, Kunshan's computer industry was already driven by the production of finished computers (65%), while Dongguan was almost exclusively (98%) devoted to making peripheral devices for the computer sector (Table 2). Through the 2000s, Dongguan's manufacturing capacity diversified into network equipment and finished computer manufacturing, while Kunshan increased its specialization, with computers accounting for 76% of its total exports in the computer manufacturing industry and peripheral devices just 23%.

Kunshan's production specialization is coupled with an ownership specialization by its leading firms. In 2009, the top five business groups in Kunshan (Table 3) accounted for over 90% of total sales of the city's computer manufacturing industry, while those in Dongguan accounted for just over 50%, a drop from over 70% in 2003. In both cities, the

Table 2 Computer manufacturing sub-industry export as a share of total computer manufacturing exports in Kunshan and Dongguan, 2003 and 2009

<i>Code</i>	<i>Industries</i>	<i>Kunshan</i>		<i>Dongguan</i>	
		<i>2003 (%)</i>	<i>2009 (%)</i>	<i>2003 (%)</i>	<i>2009 (%)</i>
3911	Electronic computer manufacturing	65	76	0	21
3912	Network equipment for computers	0	1	1	20
3913	Peripheral devices for computers	35	23	98	59
Total		100	100	100	100

Source ASIF and authors' calculation

Table 3 Top 5 business groups dominating the computer manufacturing industry in Kunshan and Dongguan and their concentration ratio (CR5) in 2009

<i>Rank</i>	<i>Kunshan</i>		<i>Dongguan</i>	
	<i>Business Groups</i>	<i>HQ</i>	<i>Business Groups</i>	<i>HQ</i>
1	Compal	Taiwan	Chicony	Taiwan
2	Wistron	Taiwan	Primax	Taiwan
3	Clevo	Taiwan	Celestica	Canada
4	Foxconn	Taiwan	Lite-on	Taiwan
5	Samina	U.S	Soly-tech	Taiwan
CR5 (Sales)	91%		52%	

Source ASIP and author's calculation

Taiwanese dominance in the industry is clear: four of the top five business groups in both cities come from Taiwan in 2009 (Table 3).

This firm-level analysis accentuates a sharp contrast in industrial development strategies underpinning the structural shift in Kunshan and Dongguan in the 2000s. Kunshan pursued a path of continuous specialization, especially in the highly export-oriented computer manufacturing industry dominated by a few Taiwanese business groups, while Dongguan's development is more diversified with less dependence on the ICT manufacturing industry, with greater participation in both peripheral devices and telecom network activities (Table 2).

Kunshan's specialization and Dongguan's diversification in the 2000s have substantial impacts on their development in the 2010s. While specialization and improving competitiveness brought impressive economic

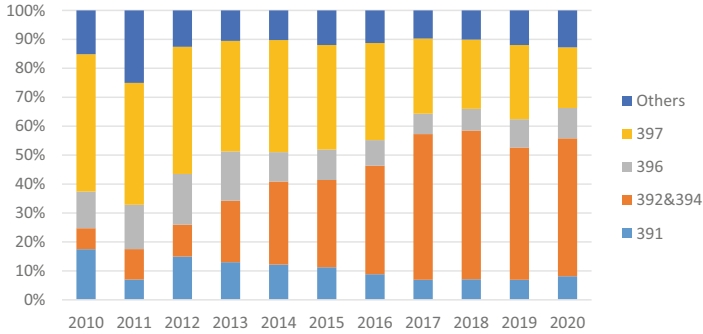
benefits based on robust external demand, Kunshan's extensive dependence on laptop computer production was more vulnerable to external shocks, including the shift to smartphones and mobile computing after the introduction of the iPhone in 2007 and the rise of smartphones to become a critical portal within the digital economy (Sturgeon & Kawakami, 2011; Lee & Gereffi, 2021). Dongguan's more gradual diversification strategy enabled greater flexibility and provided a head start in subsequent reforms. From a GVC perspective, Dongguan's emphasis on peripherals and telecom segments represented more standardized (less profitable) segments of the ICT sector, but post-2010 they became key advantages in China's shift to more domestic-oriented development strategies and also in attracting Chinese firms (rather than FDI) as a basis for local upgrading.

4.2 *Post-2010 ICT Industry Development in Kunshan and Dongguan*

In the 2010s, local governments in both Kunshan and Dongguan formulated industrial policies to actively encourage endogenous economic growth, reduce FDI dependency, and boost domestic innovation capacities in response to national directives by China's central government. Both Kunshan and Dongguan provided support for strategic emerging industries, established pro-growth coalitions with priority firms and investors, and started building innovation platforms by welcoming research institutions and promoting industrial clusters in diverse sectors.

Based on published data from Dongguan and Kunshan on industrial enterprises above a designated size (i.e., with an annual revenue of 20 million RMB or more), the ICT-related industries in both cities continued to dominate the manufacturing sector in the 2010s. Kunshan's ICT industry retains its prominence from the 2000s into the 2010s, accounting for around 60% of the total manufacturing output, while Dongguan's manufacturing industry is more diversified with its ICT sector accounting for less than 40% of the total manufacturing value added (MVA) in the 2010s. This trend has been consistent in the 2000s and the 2010s.

Available data from Dongguan allows an in-depth look into the development of its ICT industry in the 2010s (Fig. 3). Manufacturing of telecommunication equipment (industrial code 392) has seen a substantive increase over the years, from less than 10% of the ICT industry's



ICT industrial value added	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Dongguan	42	43	57	77	73	77	99	133	137	150	154

Fig. 3 Distribution of ICT manufacturing industry in Dongguan by annual industrial value added, 2010–2020

Note Industrial value added in RMB billions. For definition of industry segments, see Fig. 2

Source Dongguan Bureau of Statistics

manufacturing value added (MVA) in 2010 to over 40% in 2020. This is largely due to the successful expansion by domestic telecommunication and smartphone companies such as Huawei, Oppo, and Vivo (Lee and Gereffi, 2021). In comparison, manufacturing of electronic computers, once the most important subsector of the ICT industry (over 40% in 2010), accounts for just 20% of total MVA in 2020.

The rise of domestic telecommunication companies in the 2010s has helped reduce Dongguan’s FDI dependency on the ICT industry significantly from over 80% in 2010 to around 30% in 2020 (Fig. 4). In contrast, Kunshan’s ICT industry is still heavily dependent on FDI despite a mild decline, with over 80% of its ICT manufacturing output coming from foreign invested companies (including Hong Kong, Macau, and Taiwan).

Faced with external development challenges such as the rise of international protectionism and the relocation of FDI due to U.S.-China trade tensions, both cities have responded to the national directives to encourage endogenous economic development, boost productivity, and

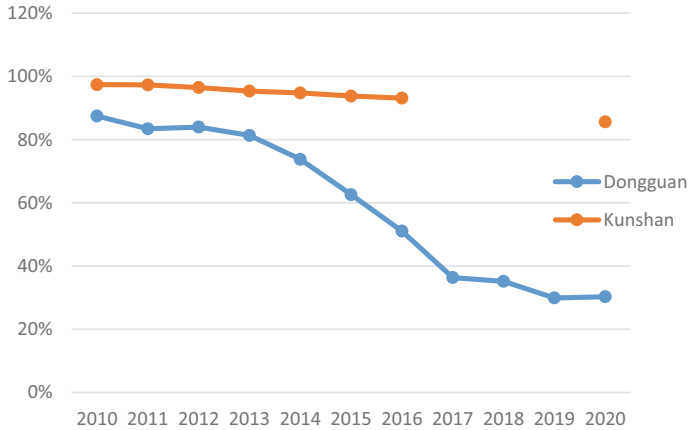


Fig. 4 FDI dependency of the ICT industry in Kunshan and Dongguan, 2010–2020

Notes Calculations based on data on enterprises above designated size. Dongguan’s FDI dependency is measured by the contribution of MVA of FDIs to the total MVA of the ICT industry. Kunshan’s FDI dependency is measured by the contribution of industrial outputs of FDIs to the total industrial output of the ICT industry

Source Dongguan Bureau of Statistics and Kunshan Bureau of Statistics

make indigenous innovation a driver of economic growth through state-led industrial policies. Emerging industries have been strategically identified in the 13th Five-Year Plans (2016–2020) of Kunshan and Dongguan with supporting policies designed to encourage their development. There have been significant policy overlaps such as a common emphasis on next-generation information technology, advanced manufacturing, new energy, new materials, energy saving and environmental protection, and biotechnology, indicating quite similar development models pursued by both cities and growing competition to attract needed foreign and domestic firms and technologies.

Kunshan’s local state explicitly disclosed the priority firms it would like to support in the fields of several newly emerging industries in its 13th Five-Year Plan (2016–2020). As shown in Table 4, the local government attempted to form a diverse coalition of firms at this stage. First, although several Taiwan-invested enterprises play an important role in new flat panel displays as well as the smart grid and the internet of

Table 4 Priority firms with a registered capital above 50 million yuan in Kunshan's 13th five-year plan on industrial economy (2016–2020)

<i>Industries</i>	<i>Priority firms</i>	<i>Year founded</i>	<i>Registered capital</i>	<i>Headquarter</i>
New flat panel displays	AU Optronics Corporation (Kunshan) Co., Ltd	2009	10,927	Taiwan
	Kunshan Guoxian Optoelectronics	2012	6,707	Mainland China
	Infovision Optoelectronics (Kunshan) Co., Ltd	2005	3,000	Taiwan
	KunShan Visionox Technology	2010	317	Mainland China
New materials	Kunshan Zhiqimei Materials Technology Co., Ltd	2014	2,272	Taiwan
	Kunshan Samsung Electro-Mechanics	2009	1,694	Korea
	Dongxu (Kunshan) Display Material Co., Ltd	2014	1,300	Mainland China
	Kingfa Sci.&Tech. Co., Ltd	2010	680	Mainland China
	Kunshan Dotop Metal Technology Co., Ltd	2009	50	Mainland China
Smart grid and internet of things	Kunshan Lanto Electronic Co., Ltd	2004	1,220	Mainland China
	Fugang Electric (Kunshan) Co., Ltd	2002	851	Taiwan
	MiTAC (Kunshan) Co., Ltd	2000	475	Taiwan
	Kunshan Nicera Electrical Appliance Co., Ltd	1995	449	Japan
	Acme Electronics (Kunshan) Co., Ltd	2000	255	Taiwan
	Suzhou Aizhi Motor Co., Ltd	2001	150	Mainland China

(continued)

Table 4 (continued)

<i>Industries</i>	<i>Priority firms</i>	<i>Year founded</i>	<i>Registered capital</i>	<i>Headquarter</i>
Robots and intelligence manufacturing	Gemtek Electronics (Kunshan) Co., Ltd	2004	105	Taiwan
	Compal Networking (Kunshan) Co., Ltd	2006	87	Taiwan
	Tyco Electronics (Kunshan) Co., Ltd	2005	84	USA
	Jiangsu Zhengbai Electric Co., Ltd	2006	75	Mainland China
	Jiangsu Kunshan General Electric Co., Ltd	1992	50	Mainland China
	LG Electronics (Kunshan) Co., Ltd	2003	50	Korea
	AdvanTech (China) Co., Ltd	2000	397	Taiwan
	Kunshan Huaheng Welding Co., Ltd	1995	259	Mainland China
	Suzhou Zelgen Biopharmaceuticals Co., Ltd	2009	180	Mainland China
	Kawasaki Robotics (Kunshan) Co., Ltd	2012	109	Japan
Integrated circuit	Comau (Kunshan) Automation Co., Ltd	2011	56	Italy
	Hieicse Precision Equipment Co., Ltd	2003	56	Mainland China
	Kunshan Q-Tech Microelectronics Technology Co., Ltd	2007	2,625	Mainland China
	Advanced Semiconductor Engineering (Kunshan) Co., Ltd	2004	2,016	Taiwan
	Huatian Technology (Kunshan) Electronics Co., Ltd	2008	940	Mainland China
	Brigates Microelectronics (Kunshan) Co., Ltd	2008	145	Mainland China

(continued)

Table 4 (continued)

<i>Industries</i>	<i>Priority firms</i>	<i>Year founded</i>	<i>Registered capital</i>	<i>Headquarter</i>
	ViewSil Microelectronics (Kunshan) Co., Ltd	2005	53	Mainland China

Source Kunshan 13th Five-Year Plan (2016–2020) on Industrial Economy; Firm information is searched via Baidu Baike and homepage of firms; registered capital in million yuan; 1 US dollar = 7 yuan

things, Kunshan's government began to diversify its strategic industrial partners by supporting influential investors from Japan, Korea, Italy, and United States. Notably, most firms that Kunshan targeted are domestic Chinese companies with a growing potential to be innovative. This points to Kunshan's active effort to transform its export-oriented economy into a more endogenously innovation-driven one. This conclusion is reinforced by the decline in the actual utilization of FDI arriving in Kunshan, which dropped from US\$ 1,725 million in 2010 to US\$ 1,048 million in 2020 (Kunshan Bureau of Statistics, 2021).

Focusing on these strategic emerging industries, Kunshan had established nine national industry bases and one provincial base at the end of 2015 to transform and diversify its local industrial structure. More recently, Kunshan's small interfering RNA (siRNA) and biomedicine industry base were approved by the China Torch Program in 2017. This shows that the effort and initial performance made by Kunshan to promote its newly emerging industries and diversity of its industrial structure has been recognized by the central government, which gave Kunshan's local state more incentives to pursue better performance in the coming years.

Like Kunshan, Dongguan has also identified priority firms in emerging industries that have the potential to initiate industry clusters (Table 5). A striking finding is that most of the firms identified in the 13th Five-Year Plan (2016–2020) are domestically based, indicating Dongguan's strategy to encourage endogenous growth and build domestic capacity. The efforts of both cities to reduce their reliance on FDI in the ICT sector and emerging industries have pressured foreign, especially Taiwanese, enterprises to adapt and shift their roles in GVCs. Taiwanese subsidiaries

Table 5 Priority firms with a registered capital above 50 million RMB and research institutes in strategic emerging industries in Dongguan's 13th five-year plan (2016–2020)

<i>Industries</i>	<i>Priority firms</i>	<i>Year founded</i>	<i>Registered capital</i>	<i>Headquarter</i>	
New generation of information technology	Huawei Machine Co., Ltd	2007	2,100	Mainland China	
	Kinpo Electronics (China) Co., Ltd	1998	823	Taiwan	
	Samsung Display Dongguan Co., Ltd	2001	704	South Korea	
	Huawei Device Co., Ltd	2012	600	Mainland China	
	Guangdong OPPO Mobile Telecommunications Co., Ltd	2003	459	Mainland China	
	Dongguan Yulong Telecommunications Scientific Co., Ltd	2006	120	Mainland China	
	Jing Guang Semiconductors (Dongguan) Limited	2005	53	Mainland China	
	Vivo Mobile Communication Co., Ltd	2010	50	Mainland China	
	High-end equipment manufacturing	Guangdong Intelligent Robotics Institute	2015	10	Mainland China
		Dongguan Songshan Lake International Robot Research Institute Co., Ltd	2016	30	Mainland China
New energy vehicles		Guangdong Hansen Biological Pharmaceutical Co., Ltd	2008	190	Mainland China
	Dongguan Amperex Electronics Technology Co., Ltd	2001	133	Hong Kong	
	Dongguan Shanshan Battery Material Co., Ltd	2005	100	Mainland China	

(continued)

Table 5 (continued)

<i>Industries</i>	<i>Priority firms</i>	<i>Year founded</i>	<i>Registered capital</i>	<i>Headquarter</i>
New material	East Group Co., Ltd	2001	89	Mainland China
	Shengyi Technology Co., Ltd	1985	1,423	Mainland China
	Dongguan CSG Solar Glass Co., Ltd	2005	480	Mainland China
	Sino Nitride Semiconductor Co., Ltd	2009	130	Mainland China

Source Dongguan Municipal People's Government; registered capital in million yuan; 1 US dollar = 7 yuan

are tapping into China's domestic market and moving into higher-value digital services related to manufacturing (Murphree, 2022).

Unlike Kunshan, Dongguan has a tiered system, assigning different levels of priority to different industries. Next-generation ICT technologies such as telecommunication networks, integrated circuits, and key electronic components and devices are of the highest development priority with the city's strong IT firm base. They are followed by advanced manufacturing and new energy vehicles in which Dongguan has an early development advantage over other cities. Industries new to the city such as biotechnology, energy saving, new materials, and additive manufacturing are selected due to their development potential (Dongguan Municipal People's Government, 2017).

Spatially, the development of Dongguan's emerging industries is built around two "industry belts" centering around Songshan Lake Hi-Tech Industrial Development Zone (SSL) and Dongguan's urban area, with multiple specialized economic zones scattered in peripheral towns around the city. Songshan Lake Hi-Tech Industrial Development Zone is undoubtedly the center of Dongguan's development plan, serving as the key platform for all strategic emerging industries except for energy saving and additive manufacturing industries (Table 6).

The central role of SSL in the development of Dongguan's emerging industries is supported by its status as the core innovation platform of the Guangzhou-Shenzhen-Hong Kong-Macao Science and Technology

Table 6 Songshan Lake Hi-Tech Industrial Development Zone's role in the development plan of Dongguan's strategic emerging industries

<i>Emerging industries</i>	<i>Industrial clusters and industrial bases to develop</i>	<i>SSL's role in development plan</i>
New generation information technology	Mobile Internet industrial cluster	Encourage industrial clustering through lead firms such as Huawei, Yulong, and Jing Guang in SSL
	IoT industrial cluster	Build SSL's "next-gen IoT telecommunication" base
	Big data industrial cluster	Build big data industrial base in SSL and other towns
	Integrated circuit industrial cluster	With SSL's development base, build IC industrial clusters
High-end equipment manufacturing	Industrial robotics industrial base	Establish Songshan Lake International Robotics Industrial Base and Guangdong Intelligent Robotics Institute
	High-end CNC machining base	Promote SSL and Yinping as the centers for industrial clustering
New energy vehicles	Promote SSL and Mayong as the center for industrial clustering	
Biotechnology	Centering around the Cross-strait Cooperation Base for Biotechnology, develop biotech industries with SSL as its center	
New materials	Build the New Materials Manufacturing Base with SSL as its center	

Source Dongguan Municipal People's Government

Innovation Corridor (SSL Hi-Tech Industrial Development Zone Administrative Committee, 2021). Public science institutions, innovative firms, industrial clusters, and service platforms are agglomerating. The Phase-I project of China Spallation Neutron Source, the first pulsed neutron source facility in developing countries, was completed in March 2018 (Institute of High Energy Physics, CAS, 2022) and City University of

Hong Kong is opening its Dongguan campus in SSL, further strengthening the development zone's innovation base (Liaison Office of the Central People's Government in the Hong Kong S.A.R., 2021).

As of 2021, SSL houses 320 national high-tech enterprises, 30 new R&D institutions, 14 national incubators, and 189 key laboratories and engineering research centers at municipal level or above (SSL Hi-Tech Industrial Development Zone Administrative Committee, 2021). It exemplifies Dongguan government's meso-level implementation of national innovation policies by targeting emerging industries, constructing innovation platforms, developing new industrial clusters, and fostering science-industry interactions (Zhao, 2021).

5 CONCLUSION

Local governments have been playing an increasingly important role in China's economic development since the 1990s. Through the comparison between Kunshan and Dongguan, two cities located at the core of YRD and PRD, respectively, two of China's most important economic development regions, we highlighted the evolution of local government policies and industrial structures in both cities. Kunshan's entrepreneurial local government jumpstarted the city's export-oriented economic growth in the 1990s by actively welcoming Taiwanese investments, while Dongguan's local government adopted a passive governing style during the same period. This trend persisted as local governments developed a more collaborative style in the 2000s with Kunshan's economy specializing and Dongguan's development strategy becoming more diversified. Both governments are assuming an active role in formulating and implementing local industrial policies in the 2010s to encourage endogenous economic development and boost domestic innovation capacities.

Our approach to comparing cities and local governments as meso-level actors in regional economic development and GVC upgrading from an evolutionary perspective has several implications. Responding to the same overarching national directives, cities are subjected to overlapping goals and therefore are forced to compete with each other for resources and investments. Comparing local government efforts could thus provide insights in how cities are identifying niches in their upgrading processes and how geographic characteristics are contributing to, or hindering local development strategies. It could also help identify potential policy innovations of local governments when facing shifting national strategies as well

as international disputes, and illustrate whether the duplication of industries in city upgrading strategies is beneficial or redundant for the local economy.

We have also paid special attention to the adaptation of local governments when confronted by the challenges of ever-changing political and economic environments in China, both domestically and internationally. While the focus of China's national development programs like "Made in China 2025" has been to prioritize the domestic economy, indigenous innovation, and advanced manufacturing technologies as key sources of growth in the future, active local governments in China have been acutely aware of the critical role played by MNEs and FDI in generating export revenues and jobs that derive from China's highly diversified role in GVCs. Given China's regional heterogeneity and variegated capitalism (Zhang & Peck, 2016), the adaptability of local government to both the external environment of GVCs and the rules of industrial policy set by the central government are a key to understand the divergent trajectories of industrial development within China.

REFERENCES

- Barbieri, E., Di Tommaso, M. R., and Bonnini, S. (2012). Industrial Development Policies and Performances in Southern China: Beyond the Specialised Industrial Cluster Program. *China Economic Review*, 23(3), 613–625.
- Cattaneo, O., Gereffi, G., and Staritz, C. (Eds.). (2010). *Global Value Chains in a Postcrisis World: A Development Perspective*. Washington, D.C.: The World Bank.
- Chien, S.-s., and Ho, B. (2011). Globalization and the Local Government Learning Process in Post-Mao China: A Transnational Perspective. *Global Networks*, 11(3), 315–333.
- CNBC. (2022). Apple Becomes First U.S. Company to Reach \$3 Trillion Market Cap, January 3. <https://www.cnbc.com/2022/01/03/apple-becomes-first-us-company-to-reach-3-trillion-market-cap.html>.
- Dai, Y., Hou, J., and Li, X. (2021). Industry Policy, Cross-Region Investment, and Enterprise Investment Efficiency. *Research in International Business and Finance*, 56, 101372.
- Dongguan Bureau of Statistics. (2022, January 3). Data Center - Dongguan Bureau of Statistics. Retrieved January 3, 2022, from <http://tjj.dg.gov.cn/tjnj/index.html>

- Dongguan Municipal People's Government. (2017). 13th Five-Year Plan to Develop Dongguan's Strategic Emerging Industries. Dongguan: Dongguan Municipal People's Government.
- Gao, B., Dunford, M., Norcliffe, G., and Liu, Z. (2017). Capturing Gains by Relocating Global Production Networks: The Rise of Chongqing's Notebook Computer Industry, 2008–2014. *Eurasian Geography and Economics*, 58(2), 231–257.
- Gereffi, G. (2018). *Global Value Chains and Development: Redefining the Contours of 21st Century Capitalism*. Cambridge, UK: Cambridge University Press.
- Gereffi, G. (2019). Economic Upgrading in Global Value Chains. In S. Ponte, G. Gereffi, and G. Raj-Reichert (Eds.), *Handbook on Global Value Chains* (pp. 240–254). Cheltenham, UK: Edward Elgar Publishing.
- Gereffi, G., and Fernandez-Stark, K. (2016). Global Value Chain Analysis: A Primer, 2nd edition. Durham, NC: Duke Center on Globalization, Governance & Competitiveness, July 29. https://gvcc.duke.edu/wp-content/uploads/Duke_CGGC_Global_Value_Chain_GVC_Analysis_Primer_2nd_Ed_2016.pdf.
- Grimes, S., and Sun, Y. (2016). China's Evolving Role in Apple's Global Value Chain. *Area Development and Policy*, 1(1), 94–112.
- Grimes, S., and Yang, C. (2018). From Foreign Technology Dependence Towards Greater Innovation Autonomy: China's Integration into the Information and Communications Technology (ICT) Global Value Chain (GVC). *Area Development and Policy*, 3(1), 132–148.
- Gruss, L., and ten Brink, T. (2016). The Development of the Chinese Photovoltaic Industry: An Advancing Role for the Central State? *Journal of Contemporary China*, 25(99), 453–466.
- He, C., Yan, Y., and Rigby, D. (2018). Regional Industrial Evolution in China. *Papers in Regional Science*, 97(2), 173–198.
- He, S. (2007). State-Sponsored Gentrification Under Market Transition the Case of Shanghai. *Urban Affairs Review*, 43(2), 171–198.
- Institute of High Energy Physics, CAS. (2022, January 3). China Spallation Neutron Source. Retrieved January 3, 2022, from <http://english.ihep.cas.cn/csns/doc/1959.html>
- Kunshan Bureau of Statistics. (2019, April 2). 2019 Kunshan Statistical Yearbook. Retrieved April 12, 2020, from <http://58.211.200.187:9146/book/document/30/mobile/index.html#p=11>
- Kunshan Bureau of Statistics. (2021, April 15). 2021 Kunshan Statistical Yearbook. Retrieved from Kunshan Economic and Social Development Data Center: <http://58.211.200.187:9146/book/document/32/mobile/index.html>

- Kunshan Bureau of Statistics. (2022, January 3). Kunshan Economic and Social Development Data Center. Retrieved January 3, 2022, from <http://www.kssjzx.com/getNavMenu.action>
- Lee, J., and Gereffi, G. (2021). Innovation, Upgrading, and Governance in Cross-Sectoral Global Value Chains: The Case of Smartphones. *Industrial and Corporate Change*, 30(1), 215–231. Doi:<https://doi.org/10.1093/icc/dtaa062>
- Liaison Office of the Central People's Government in the Hong Kong S.A.R. (2021, April 23). The Founding of City University of Hong Kong (Dongguan). Retrieved January 3, 2022, from http://www.locpg.gov.cn/jsdt/2021-04/23/c_1211124045.htm
- Lin, G. C. S. (2002). The Growth and Structural Change of Chinese Cities: A Contextual and Geographic Analysis. *Cities*, 19(5), 299–316.
- Murphree, M. (2022). Whither Global Value Chains: The Shifting Role of Taiwanese FDI in Mainland China. In G. Gereffi, P. Bamber, & K. Fernandez-Stark (Eds.), *China's New Development Strategies: Moving Up and Moving Abroad Through Global Value Chains*. Palgrave Macmillan.
- Murphree, M., and Breznitz, D. (2020). Collaborative Public Spaces and Upgrading Through Global Value Chains: The Case of Dongguan, China. *Global Strategy Journal*, 10(3), 556–584.
- Po, L., and Pun, N. (2003). Making Transborder Governance: A Case Study of the Role of Taiwanese Capital in Kunshan's Institutional Change'. In F. Lu (Ed.), *China's Economic Transformation and Economic Policy*: Peking University Press.
- SSL Hi-Tech Industrial Development Zone Administrative Committee. (2021, October 8). An Introduction to Dongguan Songshan Lake Hi-Tech Industrial Development Zone. Retrieved from SSL Hi-Tech Industrial Development Zone Administrative Committee: <http://ssl.dg.gov.cn/ywb/aboutssl/introduction/>
- Staritz, C., Gereffi, G., and Cattaneo, O. (eds). 2011. Special Issue: Shift End Markets and Upgrading Prospects in Global Value Chains. *International Journal of Technological Learning, Innovation and Development* 4(1–3).B.
- Sturgeon, T.J., and Kawakami, M. (2011). Global Value Chains in the Electronics Industry: Characteristics, Crisis and Upgrading Opportunities for Firms from Developing Countries. *International Journal of Technological Learning, Innovation and Development*, 4(1–3), 120–147.
- Wang, C. C., Gereffi, G., and Liu, Z. (2021). Beyond Technological Relatedness: An Evolutionary Pro-Growth Coalition and Industrial Transformation in Kunshan, China. *Growth and Change*, 52(4), 2318–2341.
- Wei, Y. D. (2010). Beyond New Regionalism, Beyond Global Production Networks: Remaking the Sunan model, China. *Environment and Planning C: Government and Policy*, 28(1), 72–96.

- Wu, X., and Gereffi, G. (2019). *Amazon and Alibaba: Internet Governance, Business Models, and Internationalization Strategies*. In R. Van Tulder, A. Verbeke, and L. Piscitello (Eds.), *International Business in the Information and Digital Age* (pp. 327–356). Progress in International Business Research, Vol. 13. Bingley, UK: Emerald Publishing.
- Xu, C. (2011). The Fundamental Institutions of China's Reforms and Development. *Journal of Economic Literature*, 49(4), 1076–1151.
- Yang, C. (2009). Strategic Coupling of Regional Development in Global Production Networks: Redistribution of Taiwanese Personal Computer Investment from the Pearl River Delta to the Yangtze River Delta, China. *Regional Studies*, 43(3), 385–407.
- Yang, C. (2015). Government Policy Change and Evolution of Regional Innovation Systems in China: Evidence from Strategic Emerging Industries in Shenzhen. *Environment and Planning C: Government and Policy*, 33(3), 661–682.
- Zhang, J., and Peck, J. (2016). Variegated Capitalism, Chinese Style: Regional Models, Multi-Scalar Constructions. *Regional Studies*, 50(1), 52–78.
- Zhao, W. (2021). Local Government as Integrative Organizer: The Policy Practice of Constructing Innovation Platforms in South China. Unpublished manuscript.
- Zhu, S., and He, C. (2016). Global and Local Governance, Industrial and Geographical Dynamics: A Tale of Two Clusters. *Environment and Planning C: Government and Policy*, 34(8), 1453–1473.