Case Study

Local State Responses to Crisis-Induced Shrinkage in the *World's Factory* Dongguan, China: Regional Resilience Perspective

Zhiwei Du, Ph.D.[1]; Hongou Zhang[2]; Gengzhi Huang, Ph.D.[3]; and Lixia Jin, Ph.D.[4]

Abstract: Since the beginning of the 21st century, the phenomenon of urban shrinkage, accompanied by symptoms of a structural crisis in urban areas, has spread on a global scale. The recent 2008 global economic crisis has been proven to have accelerated urban shrinkage in many previously prosperous cities. The city of Dongguan, which is known as the *World's Factory*, suffered a manufacturing downturn and labor outflow induced by the crisis; however, it exhibited high resilience as it displayed a quick recovery in the postcrisis period. The notion of regional resilience and its potential applications can explain why urban and regional economies resist and adjust to internal and external challenges in a long-term development process. Based on the adaptive cycle analytical framework, this study focused on specific policies and plans initiated by the Dongguan municipality when it faced the financial crisis and its implementation effects. It contributes to current knowledge by elaborating on how the local state reacted to and coped with crisis-induced shrinkage and by providing a valuable case for exploring the dynamic evolution of shrinkage and resurgence in the context of globalization. Three main resilient strategies are identified: (1) moving toward a more diversified industrial structure; (2) highlighting endogenous momentums in economic transition; and (3) advancing the equalization of social welfare for local residences. Moreover, it provides implications for the urban planning community on how to respond to uncertainty and vulnerability from the perspective of regional resilience. **DOI: 10.1061/(ASCE)UP.1943-5444.0000697**. *© 2021 American Society of Civil Engineers.*

Author keywords: Regional resilience; Urban shrinkage; Shrinking cities; Adaptive cycle; Financial crisis; Globalization.

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Introduction

After the turn of the new millennium, urban shrinkage, which describes the fact that population loss and economic transformations accompanied by symptoms of structural crisis within an urban area (Hollander et al. 2009; Martinez-Fernandez et al. 2012), is witnessed as a prevailing phenomenon linked to globalization spreading across industrialized cities and metropolises in Europe, North America, Australia, Russia, and Japan (Martinez-Fernandez et al. 2012; Pallagst 2009; Cunningham-Sabot and Fol 2009; Martinez-Fernandez et al. 2016; Hattori and Matsuyuki 2017; Hartt 2018). Notably, the global financial crisis of 2008 has been proven to have accelerated the emergence of shrinkage in many previously prosperous cities (UN-Habitat 2008; Großmann et al. 2013; Silverman 2018; Audirac 2018). China was no exception to this trend. Shocked by the crisis, China's net foreign direct investment decreased from USD 121.68 billion in 2008 to USD 70.32 billion in 2009 and exports fell by about 17% in the same period (Li et al. 2012). During the 2000–2010 period, Long and Wu (2016) found that 40 prefecture-level cities and 139 county-level cities experienced population loss; these cities were largely associated with resource-exhausted cities as well as medium- and small-sized towns (Li and Mykhnenko 2018; He et al. 2017).

As the 2008 global economic crisis acted as one of the most severe economic downturns in history, it prompted increasing scholarly interest toward the notion of regional resilience (Simmie and Martin 2010; Martin 2012; Martin and Sunley 2015; Hu and Hassink 2017). Regional resilience, a concept derived from resilience theory, refers to a given regional/urban system's capacity to maintain or revert to its previous state after experiencing an adverse shock or its ability to transition to a completely new state (Hill et al. 2008; Simmie and Martin 2010; Martin 2012; Martin and Sunley 2015). This notion plays a role in explaining why some regions and localities are more effective than others in their reactions to and recoveries from external shocks (Hudson 2010; Martin and Sunley 2015). In terms of urban shrinkage, it has been found that regional resilience is conducive for understanding the dynamic evolution of shrinkage and resurgence; furthermore, some scholars have demonstrated that these two topics can be

[1]Assistant Professor, Key Lab of Guangdong for Utilization of Remote Sensing and Geographical Information System, Guangdong Open Laboratory of Geospatial Information Technology and Application, Guangzhou, Guangdong 510070, China; Guangzhou Institute of Geography, Room 501, No. 100, Xianliezhong Rd., Guangzhou, Guangdong 510070, China; Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou), Guangzhou, Guangdong 510070, China. Email: chiwai_do@foxmail.com

[2]Professor, Key Lab of Guangdong for Utilization of Remote Sensing and Geographical Information System, Guangdong Open Laboratory of Geospatial Information Technology and Application, Guangzhou, Guangdong 510070, China; Guangzhou Institute of Geography, Room 501, No. 100, Xianliezhong Rd., Guangzhou, Guangdong 510070, China (corresponding author). Email: hozhang@gdas.ac.cn

[3]Associate Professor, School of Geography and Planning, Sun Yat-sen Univ., Guangzhou, Guangdong 510275, China; Guangzhou Institute of Geography, Room 501, No. 100, Xianliezhong Rd., Guangzhou, Guangdong 510070, China. ORCID: https://orcid.org/0000-0001-9987-0353. Email: hgzhi3@mail.sysu.edu.cn

[4]Professor, Key Lab of Guangdong for Utilization of Remote Sensing and Geographical Information System, Guangdong Open Laboratory of Geospatial Information Technology and Application, Guangzhou, Guangdong 510070, China; Guangzhou Institute of Geography, Room 501, No. 100, Xianliezhong Rd., Guangzhou, Guangdong 510070, China; Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou), Guangzhou, Guangdong 510070, China. Email: jlx906@163.com

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suitably studied in an integrated manner (Kotilainen et al. 2015; Bănică et al. 2017; Du et al. 2019). In Audirac's (2018) recent contribution, she pointed out that shrinking cities could be regarded as a *natural* laboratory for testing resilience, both theoretically and empirically.

Existing literature has identified multiple dynamics that are related to urban shrinkage, including deindustrialization, suburbanization, ageing and low fertility, and postsocialist transformation (Oswalt and Rieniets 2006; Cunningham-Sabot and Fol 2009; Martinez-Fernandez et al. 2012; Wiechmann and Pallagst 2012; Martinez-Fernandez et al. 2016). Specifically, most cases of urban shrinkage are generally caused by deindustrialization and suburbanization in the United States and Europe (Wiechmann and Pallagst 2012; Martinez-Fernandez et al. 2016; Hartt 2018) and massive emigrations from Eastern Europe and Russia due to the postsocialist political transformation (Oswalt and Rieniets 2006; Mykhnenko and Turok 2008; Bartholomae et al. 2017). Meanwhile, in Japan, the national population decline is seen as a result of low fertility rates and aging (Martinez-Fernandez et al. 2016; Hattori and Matsuyuki 2017). It should be pointed out that previous research on urban shrinkage in these countries mainly involves a long-term and *slow-burn* shrinking process (Du et al. 2020). In the context of globalization, urban shrinkage is no longer regarded as a specific stage that can be interpreted by cyclical models (Van den Berg et al. 1982; Hall 1988); rather, it tends to be considered as a short-term event caused by sociospatial flows of labor and capital (Martinez-Fernandez et al. 2012; Hartt 2018). Thus, we argue that the dynamic evolutionary trajectories of shrinkage and resurgence should be underlined in current urban shrinkage research.

It is worth noting that several policies and strategies aim to cope with urban shrinkage by strengthening economic competitiveness, including attracting foreign investments, reorienting the economy toward innovation, building new residential areas and landmarks, improving quality of life in urban areas, and right-sizing through green infrastructure (Schilling and Logan 2008; Hollander and Németh 2011; Wiechmann and Pallagst 2012; Rink et al. 2012; Hospers 2014; Wiechmann and Bontje 2015; Sousa and Pinho 2015; Pallagst et al. 2019). However, most existing strategies for coping with urban shrinkage are related to regeneration policies and urban governance and highlighting shrinkage-oriented paradigm shifts in the field of urban research and planning (Wiechmann and Pallagst 2012; Großmann et al. 2013; Sousa and Pinho 2015). From a regional resilience perspective, a specific set of socioeconomic aspects, such as economic diversity, innovation, and human and social capital, is regarded as endowments that can help to reduce uncertainty and bring about economic renewal after recessionary shocks (Hassink 2010; Cowell 2013; Martin and Sunley 2015; Boschma 2015). Regions with strong resilience, such as Ruhr in Germany (Grabher 1993), Cambridge in the United Kingdom (Simmie and Martin 2010), and Heerlen in the Netherlands (Hospers 2013), can overcome the adverse effects induced by exogenous shocks and even achieve sustainable development; conversely, regions with weak resilience, such as North East England (Hudson 2005), Małopolskie in Poland (Dawley et al. 2008), and Buffalo in the United States (Cowell 2013), tend to remain in a state of recession and marginalization and cope with the *decline* problem diligently over the long term.

Based on the regional resilience theory, this study seeks to bridge this gap in the literature by investigating how a local state coped with and successfully recovered from crisis-induced shrinkage in an emerging industrialized city, Dongguan. As the well-known *World's Factory*, Dongguan experienced a manufacturing downturn and labor outflow triggered by the global economic crisis of 2008 (Du et al. 2020); furthermore, it exhibited high resilience in the postcrisis period as shown by its quick recovery. This study contributes to the literature by enriching strategies for dealing with urban shrinkage integrated with the resilience perspective and providing implications for the urban planning community regarding responding to exogenous shocks in the future. In the context of globalization, Dongguan's case offers valuable evidence of crisis-induced shrinkage and transition for the emerging countries in Southeast Asia and Africa that are still experiencing fast industrialization and urbanization. Statistical data and official documents for this study were collected from departments on economic and demographic affairs, including the Dongguan Bureau of Statistics (DBS), the Dongguan Human Resources and Social Security Bureau (DHRSSB), and the Dongguan Administration for Industry and Commerce (DAIC).

Theoretical Background

Theoretically, the notion of regional resilience involves at least three different perspectives, namely, engineering, ecological, and adaptive (Martin 2012; Martin and Sunley 2015). Specifically, engineering resilience highlights the ability of a system to return or *bounce back* to its preshock state following a shock or disturbance. In this perspective, the system is assumed to be a single-state equilibrium, and resilience is accordingly measured by the system's resistance to disturbances and the speed of its recovery (Holling 1973; Pimm 1984; Walker et al. 2006). Ecological resilience highlights the system's *ability to absorb* a disturbance without reorganizing its structure but moving to a different trajectory (Gunderson and Holling 2002; Walker et al. 2006). Different from single equilibrium in engineering resilience, the ecological resilience perspective features a multiple-state equilibrium. It assumes that if a shock pushes a system beyond its *elasticity threshold*, then the system may move to a new stable state (Martin 2012). Regarding the socioeconomic system, however, resilience is rarely maintained in a stable equilibrium—particularly in the context of globalization (Simmie and Martin 2010; Cowell 2013).

A more recent interpretation of adaptive resilience highlights the dynamic evolution of a region to *bounce forward*—that is, to respond to shocks by adapting and transforming its functions (Pendall et al. 2010; Pike et al. 2010; Martin 2012). This perspective refers to the ability of a system to resist disturbances by, if necessary, changing its structure and components but maintaining or restoring certain core performances or functionalities (Carpenter et al. 2005; Martin and Sunley 2015). Adaptive resilience is most often explained through the adaptive cycle mode, which posits four phases (i.e., exploitation, conservation, release, and reorganization) in two consecutive loops, with each loop involving two phases. To be specific, the first loop relates to a slow process of developing from emergence or innovation (exploitation) to stabilization and maturity (conservation); and the second loop occurs rapidly through a period of destruction or collapse (release) moving toward innovation and restructuring (reorganization). Each phase exhibits varying levels of resilience, which depend on the potential of accumulated resources and internal connectedness (Gunderson and Holling 2002; Pendall et al. 2008; Cowell 2013; Simmie and Martin 2010). The adaptive cycle offers an analytical framework for exploring the dynamic evolution of shrinkage and resurgence within a region, specifically in response to a given challenge.

Moreover, some basic socioeconomic aspects of regional resilience have been suggested and examined in recent literature, such as economic diversity, innovation, and human and social capital (Simmie and Martin 2010; Cowell 2013; Martin and Sunley 2015; Evenhuis 2017). Generally, a diversified economic structure

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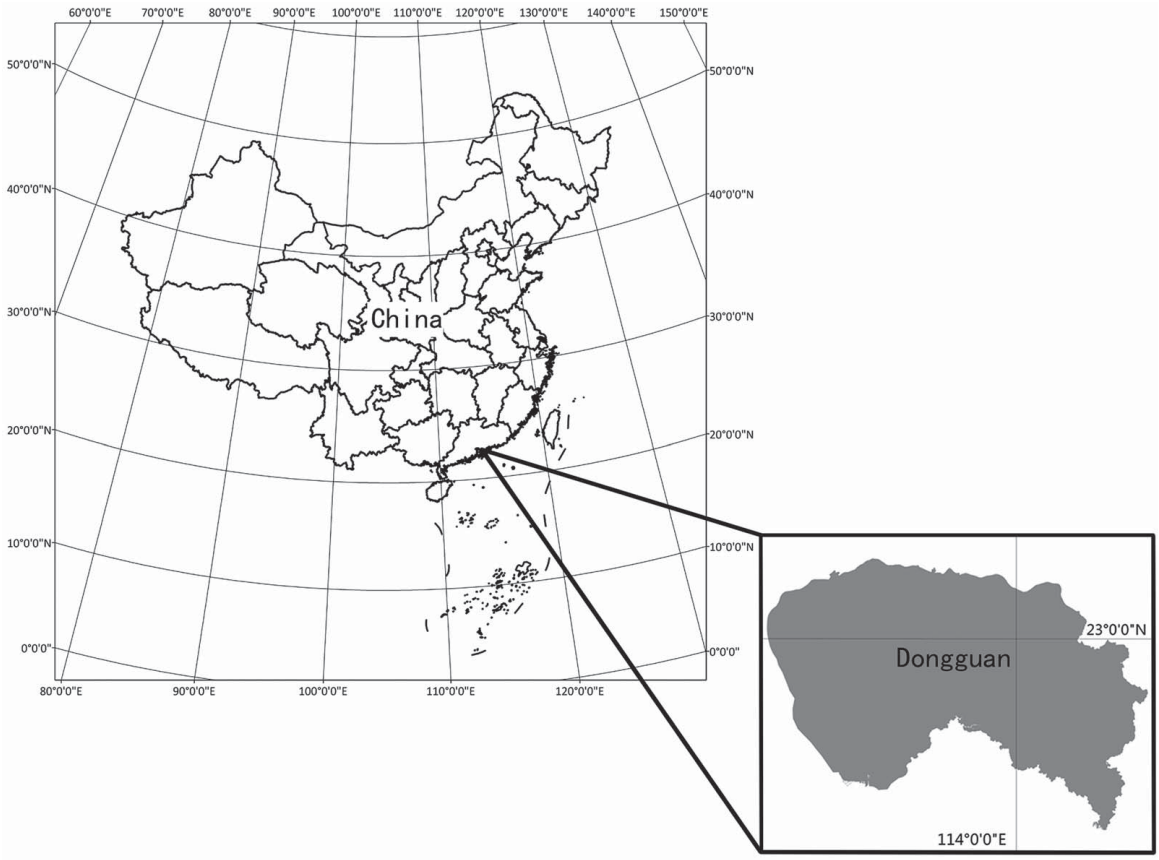

Fig. 1. Location of Dongguan.

is assumed to be more resilient than a specialized one in socioeconomic terms, as the diversity can act as a *shock absorber* to diminish the impact of external shocks by spreading the risks across different relative industries (Davies and Tonts 2010; Martin 2012). In addition, the region is capable of withstanding external shocks with its diversified economy in the form of either unrelated variety (UV) or related variety (RV); the UV is conducive to buffering against shocks among sectors, while the RV tends to foster new sectors or technologies (Frenken and Boschma 2007; Brown and Greenbaum 2017). Based on this, a growing body of studies has underlined innovation and human capital as being critical to enhancing regional resilience and shaping industrial and technological structures over time (Glaeser 2005; Cooke et al. 2012; Wolfe and Gertler 2016; Giannakis and Bruggeman 2017). Moreover, the mobility of global capital and markets imposed by globalization also exerted various influences on resilience in the socioeconomic field through labor markets (Eraydin 2013). As social equity and access to resources are important components of resilience from the human dimension, a more equitable society can contribute toward enhancing a society's capacity to deal with adversities (Cruz et al. 2013).

Among these aspects, the roles of institutional capacity and policy interventions in shaping regional resilience have attracted a growing academic interest in many recent studies (Christopherson et al. 2010; Wolfe 2010; Martin and Sunley 2015; Kakderi and Tasopoulou 2017; Bristow and Healy 2018). As economic performance through periods of disruptive change depends on the institutional capacity to manage the transition (Wolfe 2010), effective strategies for regional resilience rely on acquired levels of social capital and the existing endowment of institutional arrangements (Pike et al. 2010; Christopherson et al. 2010; Fingleton et al. 2012; Martin and Sunley 2015; Evenhuis 2017). By integrating urban shrinkage, we argue that the term *regional resilience* could provide new insights to help policymakers and planners respond to problems of population decline and economic downturn, especially when faced with the short-term shrinkage caused by exogenous shocks and disruptions.

Economic Development and Fluctuation in Dongguan

Dongguan, a world-famous processing and manufacturing hub, is located in south-central Guangdong Province on the eastern bank of the Pearl River Estuary in southern China (Fig. 1). The processes of economic development in Dongguan are closely related to its industrialization and urbanization after the reform and opening-up policy. In the past 40 years, Dongguan's GDP has increased from 0.6 billion RMB to 758.2 billion RMB, with the number of permanent residents growing by 5.14% per year on average and numbering over 8.3 million in 2017 (DBS 2008–2018). In relation to the adaptive cycle, four main phases of economic development can be identified in Fig. 2: the exploitation phase (1980–2000), conservation phase (2001–2006), release phase (2007–2009), and the reorganization phase (2010–2017).

After the reform and opening up in the early 1980s, with its excellent location and comparative advantages in the form of abundant labor and low-cost land (Sit and Yang 1997; Yeung 2001), Dongguan began its *rural industrialization* process by attracting thousands of foreign-funded enterprises from Hong Kong, Taiwan, and other countries. Although these enterprises engaged in labor-intensive industries (such as textiles, garments, shoes, plastics, metals, and furniture), which are located at the

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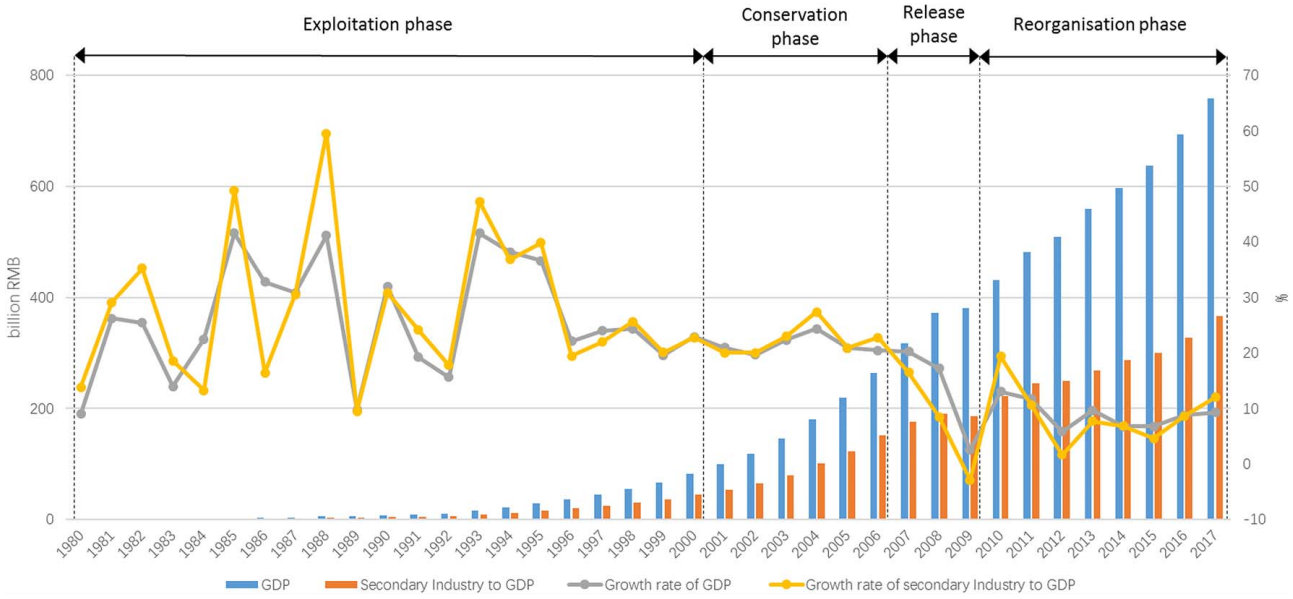

Fig. 2. Development phases of Dongguan, 1980–2017.

bottom of the production *smiling curve* with the lowest value added, they did act as new events that stimulated Dongguan; this transformed it from a poor and backward agricultural county to a well-known *world factory*. In the exploitation phase, Dongguan's production, human, and knowledge capitals were accumulated, as new local industries exploited comparative advantages and various external economies of localization (Pendall et al. 2008). During the 1980–2000 period, the GDP increased from 0.72 billion RMB to 82.11 billion RMB, and the average annual growth rate of the GDP reached 26.71%; Dongguan was regarded as a prime exemplar of rapid industrialization and urbanization in China (Yang 2007; Lin 2006).

As an economy grows, the internal connectedness between the various components of the economic system increase, which suggests that Dongguan's economy became more rigid and inflexible and its resilience decreased as it grew. After 2000, Dongguan seemed to be in transition from the exploitation phase to the conservation phase, in which the economic system (dominated by export-oriented manufacturing) reached high levels of accumulated resources. It is worth noting that Dongguan's economy relied heavily on overseas markets and investments, with the foreign trade dependence (in terms of the ratio of the total amount of foreign trade to GDP) being as high as 433.8% in 2005. As this phase is characterized by high internal connectedness and the potential of accumulated resources, but low resilience, it was expected that Dongguan would be vulnerable in the face of external disturbances due to its high dependence on external momentum.

The financial crisis in 2008 marked a turning point for Dongguan's economic development, and the path of fast growth that had lasted about 30 years was disrupted. Due to a decline in consumer market demand and foreign capital supply caused by the economic shock, these export-oriented manufacturing enterprises began to face substantial threats to their survival. In 2009, Dongguan's growth rate of the secondary industry to GDP incurred negative growth (−2.83%), and in the same year, its economy endured its worst performance since 1978. Subsequently, manufacturers had to maintain their operations by utilizing many business strategies, including transforming modes of production, reducing the size of workforces, or relocating to neighboring inland regions of China or to Southeast Asian countries (Yang 2012; FHKI 2015). Statistics from the DAIC show that 3,877 manufacturing enterprises, which accounted for 4.06% of the total industrial enterprises, either moved away or were shut down during the 2008–2010 period. Under these circumstances, several symptoms related to urban shrinkage could have manifested in Dongguan, such as the closure of manufacturing enterprises, a sharp decrease in job opportunities, and a rising high-level rental vacancy rate (Du et al. 2020). The substantial shock and uncertainty indicated that Dongguan was in the release phase, which is characterized by declining internal connectedness and the exhaustion of accumulated resources. Resilience during this phase was likely be low but would probably increase as regional leaders begin to take stock of the problem (Cowell 2013).

Along with industrial transformation and upgrading in the postcrisis period, Dongguan exhibited high resilience as its economic performance recovered quickly after 2010, showing a significant rebound in its trajectory. Simmie and Martin (2010) pointed out that new types of activities begin to emerge in the second loop. The share of the tertiary sector to GDP grew rapidly from 48.73% in 2010 to 51.38% in 2017; by 2016, the share of the tertiary sector to GDP exceeded that of the secondary sector. Furthermore, the economy can manifest an innovative capacity: the revenue of new product sales and the number of invention patents reached 640 billion RMB and 4,969 pieces in 2017—that is, 32.2 times and 1.6 times higher, respectively, than those in 2010. Thus, Dongguan appeared to be moving away from the release phase to the reorganization phase (the second loop), in which resilience is high, internal connectedness is low, and innovation and restructuring occur (Pendall et al. 2010).

Resilient Local Government Strategies to Overcome Shrinkage

A series of policies and measures were adopted by Dongguan to address urban shrinkage before and after the financial crisis. Although these policies and measures were all implemented by the local state, they were also related to policies from national and provincial level governments. In line with the regional resilience perspective, three main strategies forged by Dongguan can be identified.

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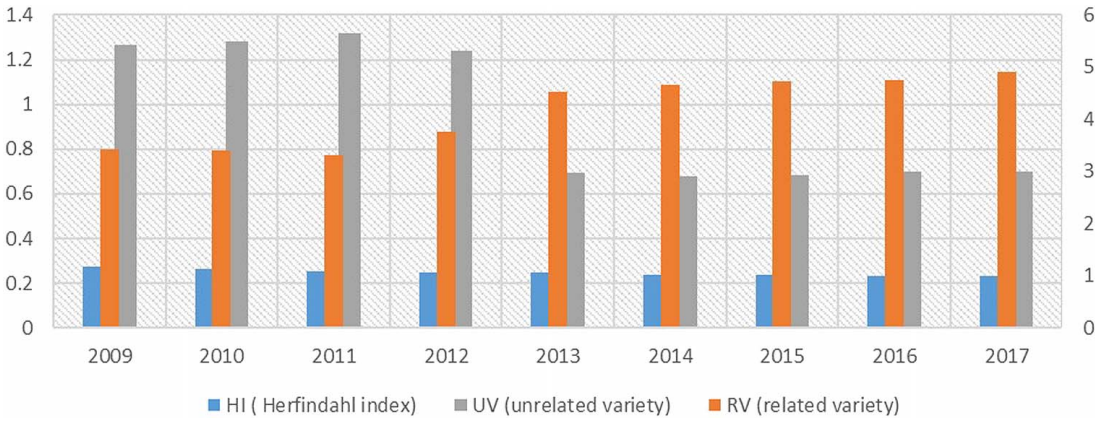

Fig. 3. HI, RV, and UV of GDP according to the sector in Dongguan, 2009–2017.

Moving toward a More Diversified Industrial Structure

Although the industrial diversification was never explicitly mentioned as a strategy in official documents, Dongguan did present a picture of a more diversified economy after the crisis by optimizing traditional industry and encouraging promising sectors.

On the one hand, Dongguan took measures to encourage such low-value-added and labor-intensive manufacturing industries to relocate to less developed regions within Guangdong. In 2008, the provincial government initiated a decision called *tenglonghuanniao* (emptying the cage for new birds), which aimed to attract new and higher value-added industries as well as push low-value-added productions to the peripheral areas of Guangdong province. From 2008 to 2012, the provincial government annually allocated 1.5 billion RMB out of special funds for promoting the construction of cooperative industrial transfer parks. With the support of the provincial government, nine cooperative industrial transfer parks were established by Dongguan and the seat governments of the peripheral area, and more than 1,500 traditional enterprises were relocated from Dongguan.

On the other hand, many industrial plans and funds were adopted by the local state to support industrial transformation and upgrading. In the 12th Five-Year Plan period (2011–2015), the municipality set up a guidance fund amounting to 2 billion RMB to promote the generation of future-oriented industries with regard to strategic emerging industries (high-end electronic information, LED, new energy vehicles, solar photovoltaic, bioindustries, new materials, and so on) and productive and modern services (electronic information, headquarters economy, Fintech, modern logistics, e-commerce, and so on). Responding to the *Made in China 2025* initiative unveiled by the State Council, moreover, Dongguan also provided rewards for investment projects in order to promote the transformation of production-based manufacturing into service-based manufacturing. Following well-directed plans and funds, Dongguan has not only shaken off its traditional manufacturing economy but has also successfully fostered new forms of industrial sectors. During the 2010–2017 period, the fastest growing sectors in Dongguan's GDP were chemical fiber manufacturing (26.18%), petroleum processing (22.66%), pharmaceutical manufacturing (19.52%), and special equipment manufacturing (18.87%), while traditional sectors (such as textiles and beverage manufacturing, which decreased by 7.77% and 0.41%, respectively) witnessed comparatively sluggish performances (DBS 2008–2018).

Empirically, Herfindahl index (HI), RV index, and UV index have been measured to investigate the change in diversification according to Dongguan's economic sector, via the measurement proposed by Frenken and Boschma (2007) and Giannakis and Bruggeman (2017). The result (Fig. 3) demonstrates the HI's gradual decline from 0.27 in 2009 to 0.23 in 2017, indicating that Dongguan's economy tended to be more diversified after the crisis. Our finding supports the assumption that a diversified economic structure is more resilient in a socioeconomic system (Davies and Tonts 2010; Martin and Sunley 2015). In the case of Dongguan, the diversification not only contributed to its ability to withstand the external shock by risk diffusion in combination with related sectors (the RV index increased from 3.42 to 4.91, while the UV index decreased from 1.26 to 0.69), but it will also likely provide new employment opportunities in emerging sectors, especially sectors in service. From 2010 to 2017, the number of employees in manufacturing sectors declined by 267,126 persons, while the number of employees in service sectors increased by 605,564 persons (DBS 2008–2018). This data manifested that an employment shift from the secondary to the tertiary industry, such as food delivery, courier service, and online car-hailing (Li et al. 2020), accompanied by the industrial transformation toward services.

Highlighting Endogenous Momentums in Economic Transition

As previously mentioned, the export-oriented manufacturing industries did make great contributions to the industrialization and urbanization of Dongguan, but they also led to an overreliance on exogenous momentums (market and capital from overseas as well as migrant labor from mainland China) in its economy. Regional resilience theory suggests that regions or cities are vulnerable to suffering severe shocks from global markets if they experience great reliance on foreign investments and exports (Briguglio et al. 2009; Davies and Tonts 2010; Hadjimichalis and Hudson 2014). In the reorganization phase, endogenous momentums in relation to technological change, human capital, and knowledge creation can be observed in Dongguan's economic transition.

Drawn from Schumpeterian notions of innovation, endogenous growth theory highlights monopolistic returns generated by innovation as well as technological advancement (Armstrong and Taylor 2000) and the positive spillover effects that boost labor productivity produced by human capital investment (Martin and Sunley 1998). In addition, an economy with RV tends to enhance the adaptability of the local economy (in the long run) by facilitating the transferability of resources from one subset to another and promoting innovation in the process (Frenken and Boschma 2007; Martin and Sunley 2015).

Like many cities (e.g., Shenzhen and Shanghai) in China, the local state of Dongguan vigorously promoted the *innovation-driven*

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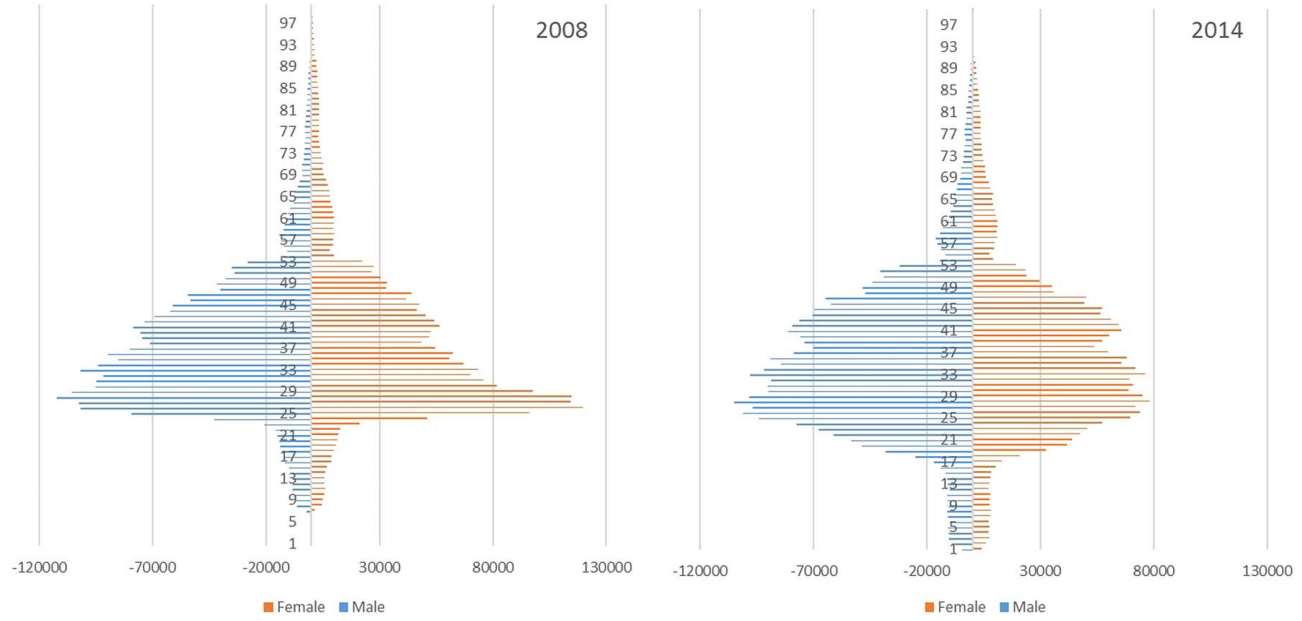

Fig. 4. Age structure and gender structure of the total population in Dongguan (2008 and 2014). (Data from DHRSSB.)

strategy in an early phase, even before the Outline of the National Strategy of Innovation-Driven Development was unveiled in 2016. As early as 2006, a project called *Technological Dongguan* was raised by the municipality, and 5 billion RMB (1 billion RMB annually) was put toward promoting higher value-added activities of the production *smiling curve*, such as R&D, design, and marketing. It should be noted that the local government set aside 600 million RMB for a *jiqihuanren* (robots replacing humans) program to subsidize local firms replacing people with automation during the 2014–2016 period. According to the DAIC, on average, this program helped firms to increase labor productivity about 2.5 times over, decreased the unit product cost by 9.43%, and replaced nearly 200,000 workers. As Li et al. (2020) described, the implementation of automation in manufacturing industries and its effects have drastically changed the impetus of Dongguan's development from factor-driven to innovation-driven.

From 2011 to 2015, Dongguan also allocated an additional 10 billion RMB (2 billion RMB annually) to support this project. Moreover, many talent-related policies have been implemented to strengthen the city's human capital and attract professionals and other talents. To be more specific, high-level talents such as academicians, winners of special government allowances, senior professors, postdoctoral fellows, and doctoral candidates can be entitled to a settling-in allowance ranging from 60,000 RMB to 1 million RMB; skilled and highly educated workers who have been identified as special talent can enjoy about 15% of individual income tax surpassing subsidies from the local government. Supported by these projects, the R&D expenditure reached 18.8 billion RMB in 2017, with its share in the GDP increasing steadily from 1.51% in 2010 to 2.48% in 2017; up to 2017, about 1.73 million skilled workers and 115,000 high-level talents had settled down in Dongguan.

Following the adaptive cycle, present-day Dongguan can be seen as being in the second loop, moving from the low-resilient *release* phase to the high resilient and more innovative *reorganization* phase. As this loop is generally characterized by innovation and restructuring (Pendall et al. 2010), new types of activities such as new economic knowledge and firm formation have emerged in Dongguan. Statistics from the DAIC indicate that although 16,820 manufacturing enterprises either moved away or were shut down from 2008 to 2014, more than 95,000 new manufacturing enterprises were set up; most of them are of scientific and technological origin.

Advancing the Equalization of Social Welfare for Local Residences

In China, Hukou (household registration) acts as a barrier by hindering the possibility of migrant populations without local Hukou to use social services even in cities where they have permanently settled (Chan and Zhang 1999; Fan 2008). Because of the limitations imposed by Hukou, migrant workers without Dongguan's Hukou (non-Hukou holders) are largely excluded from the social welfare and public services (e.g., healthcare, children's schooling, public housing, and social insurance) provided by the local government.

In the socioeconomic system, resilience can be acquired and fostered by constructing supportive and protective social structures such as good schools, health clinics, and social services networks (Foster 2007). Akin to policies of welfare states in Western countries, after the crisis, Dongguan began to actively invest in social welfare to extend the coverage and advance the equalization of social welfare to all residents (including both Hukou holders and non-Hukou holders). As the *World's Factory*, Dongguan's backbone is its migrant workers, who accounted for 77.79% of the total permanent residents of the city in 2007 (DBS 2008–2018). The municipality added more support by funding a series of social welfare programs to serve non-Hukou holders during the 2010–2017 period. As materials from the DBS show, improvements in medical health care continued, with the number of hospital beds and the number of students in primary and secondary schools increasing 1.49 times and 1.30 times over, respectively, during this 7-year period.

Moreover, two policies (the Interim Measures for the Entry of Household Registration and the Implementation Rules for the Management of Point-based Household Registration) were proposed by the local state in 2010, with the purpose of providing convenient ways for migrant workers to obtain the Dongguan Hukou through the innovation of the social system. Further inspired by the national New-type Urbanisation Plan (2014–2020),

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which highlights *human-oriented* as the core feature in the future urbanization of China, Dongguan further lowered the barriers to Hukou for migrant workers. Those skilled and highly educated migrant workers together with their families (spouses and children) have priority access to be granted the local Hukou. As of 2017, it is estimated that a total of 101,430 persons, including 44,624 migrant workers and 56,806 family members, have obtained the local Hukou through this system, which contributed to 60.59% of Dongguan's additional resident population during the recovering stage.

Another noteworthy point regarding this strategy is that it not only stimulates effective recovery and high resilience in the short term in the face of shock but also accelerates the demographic transition toward human capital accumulation. Interestingly, the demographic structure of Dongguan has become better-educated and younger, which may be more likely to strengthen regional resilience and achieve recovery (Glaeser 2005). Statistical data from the DHRSSB show that the number of children (0–14) in the population increased from 2.04% in 2008 to 4.55% in 2014, while the portions of the population made up of working-aged (15–64) and retirement-aged (65+) individuals fell 2.23% and 0.29%, respectively (Fig. 4). In addition, the share of the population that is highly educated (holding a bachelor's degree or above) increased from 7.51% in 2010 to 11.64% in 2015 (DBS 2008–2018). Consequently, policies and planning should adjust to a more realistic approach that reflects demographic transition.

Conclusion and Implications

Conclusion

Affected by the global economic crisis in 2008, Dongguan's export-oriented manufacturing economy was bound to encounter financial risks from its dependence on overseas markets and external capital, resulting in closures of manufacturing enterprises and the outmigration of laborers from the urban area. The city's economic arrivals severely declined in 2009 but quickly recovered thereafter, exhibiting high resilience after the crisis. Through an analysis of statistical data and official documents, this study contributes to the literature by elaborating on how the local state responded to and coped with crisis-induced shrinkage in this rapidly industrialized city.

In line with the perspective of regional resilience, three resilient strategies have been identified. First, the encouragement of promising sectors both in manufacturing and in service helps to diversify the local economy by diffusing and minimizing the risks associated with a financial crisis within different sectors. In Dongguan's case, it manifests a good example of *related variety*, in which resilience is enhanced by stimulating new economic knowledge and new firm formation. Second, the strategy of *innovation-driven* (including technological change and human capital) strongly improved endogenous momentums for economic growth in Dongguan. In reference to the adaptive cycle, Dongguan is likely to move from the release phase to the reorganization phase during the second loop, in which innovation and restructuring are occurrent. Third, resilience can be acquired and fostered through advancing the equalization of social welfare (e.g., healthcare, children's schooling, public housing, and social insurance) for all local residents. In the face of the shock, Dongguan exhibited a high degree of resilience in terms of the ability to weather and overcome urban shrinkage in the short term, but this also changed the demographic structure, which began to trend toward a population that was better-educated and younger in age.

Having benefited from the adoption of well-designed policies and strategic planning exercises, Dongguan has proved the importance of the local state in overcoming crisis-induced shrinkage as well as improving adaptive capacities in a short-term period. In Dongguan's case, this paper confirms that the evolution of urban shrinkage and resurgence is much more complex and is anchored in the globalization process (Cunningham-Sabot and Fol 2009; Martinez-Fernandez et al. 2012). Rather than relating to engineering resilience or ecological resilience, both of which assume the system returns to a static equilibrium, Dongguan's transition is connected to the adaptive resilience featured by dynamic and nonequilibrium adaptations. Moreover, this study highlights the combination of responses and measures undertaken by multilevel configurations, which influence the ability to cope with shrinkage and promote transition.

Planning Implications

The urban shrinkage caused by external shocks indicates that it is necessary to rethink the uncertainty and vulnerability of contemporary planning theories. As the concept of urban resilience has become a central planning theme (Audirac 2018), resilience thinking, which takes into consideration the withstanding and tackling of potential threats, can be introduced into the urban planning paradigm and practices. Based on Dongguan's case, three implications can be highlighted for the urban planning community.

Diversified Use for Vacant or Inefficient Properties

It is inevitable that many vacant or inefficient properties (e.g., plants, rental houses, and infrastructure) will surface in the urban physical space after economic transformation and upgrading. Unlike the approaches that have been adopted for dealing with a vacancy (Schilling and Logan 2008; Dubeaux and Cunningham-Sabot 2018), we allocated more flexible ways of utilizing those properties for accommodating the trend of industrial diversification. For example, under the guidance of the local government, qualified enterprises or individuals could be authorized for *interim use* of vacant or inefficient properties (e.g., as an artist studio, exhibition space, or creative park) by renting from owners at a low cost for a particular period.

Improve Urban Quality of Life for Neighborhoods

As the resident population of Dongguan grows increasingly younger and more educated, the local state needs to consider those new residents who have higher requirements for quality of life. Thus, planning practices should satisfy their needs in three dimensions: hardware, software, and mindware. The *hardware* dimension refers to physical aspects of a city, such as high-speed rail transit, mixed land use, and convenient facilities. The *software* dimension comprises social fields that refer to high-quality public services (housing, health care, culture, and education) as well as highly efficient governance. The *mindware* dimension relates to psychology or emotion for residents, comprising indicators that minimize cost of living, build urban/neighborhood identity, and promote social justice and equity.

Promote Public Participation in the Planning Mechanism

With China's top-down policy formulation, multiscale governments always play the leading role in urban planning by exercising executive power and intervention, while opportunities or platforms for public participation are nearly absent. Recent literature highlights that public participation and citizen engagement can contribute to improving the social capital that is widely believed to be an essential component of urban resilience (Prior and Eriksen 2013). In the face of external shocks, it is necessary to adopt participatory planning and build collaborative platforms for all interest groups (governments, NGOs, planners, public media, and community residents) to participate in urban planning. In this way, interest groups can communicate with each other and reach a consensus, which unites their thoughts before implementation.

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Data Availability Statement

Some or all data, models, or code used during the study were provided by a third party (the Dongguan Bureau of Statistics, website http://tjj.dg.gov.cn/website/web2/index.jsp). Direct requests for these materials may be made to the provider as indicated in the Acknowledgements section.

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