

# Restructuring for Growth in Development Zones, China: A Systematic Literature and Policy Review (1984–2022)

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**Abstract:** China's development zones have been enjoying a process of dramatic growth and restructuring since the start of the new millennium, which has been extensively documented in the literature. The growth stems from the increased scope and expansion in demand created by China's economic growth, as well as gradual global economic reconfiguration, which has, in itself, become a factor in advancing the country's spiraling economic growth. This article examines the trajectory of the growth and restructuring of China's development zones since 1984, by reviewing critical policies and their measures and effects, as well as academic research in this field, focusing on transitional stages, features and mechanisms. Based on different academic viewpoints, the work sets out a three-pronged conceptual framework composed of institutional transition, industrial evolution and land use transformation to systematize the growth process. In recent years, the restructuring of development zones has come to be considered as a comprehensive and complex issue, and its main challenges arise from factors such as overcoming outdated institutional arrangements, strengthening market participation, promoting high-end industrial agglomeration and breaking the bottleneck of inefficient land use. This article uses a multi-dimensional, logical approach to address the growth of development zones, and examines relevant practices and studies so as to explore the deeply rooted correlations between different dimensions in more depth and to examine the innate and unchanged logic involved in the restructuring of development zones.

**Keywords:** development zones; export processing zones; science parks; restructuring; decentralization; globalization; urbanization; China



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## 1. Introduction

This study provides a holistic review of the restructuring of development zones (DZs) between 1984 and 2022 in China in the light of globalization and post-Fordism, contributing to the growing body of literature on the rapid growth and transition of Chinese cities. For decades, emerging development zones in China have been widely perceived as a crucial strategic tool in deploying the country's Open-Door policy, becoming the most energetic growth areas of post-Maoist Chinese cities and developing as part of the cutting-edge trend in globalization [1,2]. As mega-city projects, development zones play an increasingly important role in global production, the redistribution of power between multi-scale governments and territorial reconfiguration [3,4]. Their importance and multifaceted significance have made them an ever-increasing focus of interdisciplinary research in political economy, geography, land resources and urban planning [5–8].

Debates on development zones have been ongoing since the Chinese state established the first of such zones in Dalian in 1984, and the first wave of development zone construction in the 1990s sparked heated discussions on the topic across various fields. Empirically, scholars have maintained a perspective that emerging development zones in China were shaped by the proliferation and territorial reconfiguration of export processing zones (EPZs) from the start [9–11]. The zones were based on the concept of free ports in European cities,

such as Venice and Marseilles, dating back to the early seventeenth century, but within an East Asian context that fostered labor-intensive manufacturing, and ran parallel to a series of economic and social crises [12–18]. Nevertheless, an emerging body of supporters has looked at a longer-term process, underlining the opinion that development zones begin as spatial formations, in which the main conditions for success are created, leaving space for the developments of practicality and entrepreneurship [19]. In such spaces, China's national policymakers learned from more advanced global governing and economic bodies, enabling them to shift to different strategies, based on the requirements of entrepreneurs and economic law, to produce more efficient and advanced areas of global production [3,4]. By reconfiguring the relationships between national and global forces, development zones brought growth and prosperity to China. However, these arguments suggest a systematic reinterpretation of development zones [5–8].

Since 2001, the debate on the pros and cons of development zones has gradually been replaced by research into their reconstruction, and this has become a popular academic topic [6,20,21]. The idea of development zones as flexible, efficient and multi-functional policy tools for growth is widely accepted in academia, supported by legal and economic decision-making bodies [3,4,21–23]. Meanwhile, the driving force for restructuring now stems from the increased scope and deeper demand that has resulted, firstly, from China's economic growth and, secondly, from the process of gradual global economic reconfiguration [1,24].

Subsequent restructuring processes in China used a variety of platforms for the reorganization and acceleration of urban economic activities during different stages. Before the "Second Transition" in China's economic development in 2000, Jiang Zemin, then general secretary of the CPC's Central Committee, proposed in his editorial "Science in China" written for 'Science' magazine:

*"An historic, unprecedented transition is unfolding in present-day China. We face pressing imperatives—the restructuring of the national economy, the rational use of our resources, the protection of our environment, the coordinated economic development of different regions, the alleviation of poverty, and the raising of living and ethical and cultural standards across our diverse country."*

Shifting redevelopment tasks, through the use of pragmatism and entrepreneurship, resulted in restructuring for growth [3,21]. By 2018, China's central and provincial states had established 2543 development zones. Approximately 11.3% of China's GDP is generated within national-level development zones. In Jiangsu, China's leading manufacturing province, up to 55% of the province's GDP was created in its development zones as of 2020, which indicates that development zones have become the most successful drivers of growth since China's economic transition began in the 1970s.

The tripartite logic of decentralization, globalization and marketization has driven the continuous transition of China's cities over the past 20 years [1,21]. As one of the main tools for promoting urban transformation, the restructuring of the development zones themselves has begun to break away from its initial form and take on multiple reconfiguration roles, gaining wider attention in terms of the redistribution of state power, knowledge spillover, industrial innovation, urbanization, production-residence integration and land use transformation [2,4,25–40], as well as intricate interactions that have taken place between, and within, other fields [6,41–45].

However, the deep-rooted and lagging epistemology is not reasonably addressed in all studies, and an emerging number of domestic and international studies have directly, or indirectly, addressed this topic, as development zones have gradually become a key carrier of urban development, economic system reform and land development in China [1–4,21,25–27]. However, in recent years, due to the lack of reference to relevant knowledge of interdisciplinary literature, the research protocols, indicator selection and analysis, as well as the discussion and proposals in some studies, are often biased, one-sided, out of date or ill-considered. Since 2001, there has been almost no research to systematize the growing complexity of the phases, features and mechanisms of develop-

ment zones. This article, therefore, seeks to understand and explain the transition and the changing dynamics of zones by using the wealth of historical materials and studies that are available. Conceptually, the paper uses a three-pronged framework, consisting of transitional institutions, industrial evolution and land use transformation to systematize and explain the restructuring mechanisms involved in development zones.

Methodologically speaking, the paper starts with a critical review of the main literature since 2001 and examines theories and perspectives from different fields of study. Semi-structured interviews were important for the validation and structuring of the main ideas of these studies. The interviews mainly involved the different stages of development tasks, governance models and personnel relations, industrial operations, land development events and insights into the directional issues of the recent transition. Fieldwork began in August 2020 and ended in February 2022. More than 30 semi-structured interviews with leaders and senior staff members of the Bureaus of Land Management, Urban Planning, Commerce, Industry and Information Technology were conducted, as well as with senior-level managers in provincial governments. The researcher also attended provincial consultation meetings and formal and informal discussions during relevant urban planning processes. This was important for the validation of our main arguments. Meanwhile, statistics from six development zones, with readily comprehensive information, were used as supporting evidence for our study of development zone transformation. Two of these development zones, which have the most complete information and statistics, and which have also been mentioned the most in previous studies, were used in our case study in Section 5.

The literature review begins by looking at the restructuring of development zones, following a three-pronged conceptual framework to underscore the necessary mechanisms and pathways that help us to understand why, and how, these zones achieved their growth. Following this, in Section 3, we systematize the characteristics and research priorities of development zones, in terms of the key research issues in different periods and the collation of backgrounds and relevant policies. We summarize research in different fields in Section 4 and systematize the factors that drive the restructuring of development zones in terms of the three dimensions of our conceptual framework, thereby revealing the restructuring mechanisms. Finally, in order to concretize these mechanisms, we select two cases that have been discussed in past studies, analyze them, in terms of their conceptual framework, and critically examine the shortcomings of these studies, further reinforcing the importance of adopting a multi-dimensional perspective.

## **2. Literature Review: Towards a More Holistic and Dynamic Understanding**

### *2.1. Restructuring of China's Development Zones*

Restructuring entails a huge transformation of existing social, economic, and political orders. From the late 1970s, the economic and social transition to post-Fordism and Neoliberalism has triggered a wave of global urban restructuring, and the pathways of global urban areas have been dramatically deconstructed and reshaped by a variety of different forces [46–49]. The concept of restructuring—the multi-scalar reorganization of state power, capital accumulation and material body—has been developed as a multidisciplinary concept [50,51]. In the context of globalization, the restructuring of development zones is therefore best seen as a complex process that is at once dynamic, heterogeneous and pluralistic.

Industrial parks were first widely deployed in post-Fordist markets, such as Silicon Valley in Southern California, Northern Italy and parts of the UK [52]. The rapid growth in industrialization triggered by these zones soon came to be considered as an engine of economic growth and development in North America and Europe [6,53]. In 1996, Markusen proposed four prototypes of industrial parks, namely Marshallian districts, hub-and-spoke districts, satellite platforms and state-anchored districts [54]. These leapfrog nodes were based on industrial knowledge and management links, and were then launched

to accelerate inner- and inter-region contact and reinforce global production networks to enable even more rapid growth [55,56].

The industrial parks of North America and Europe are mainly driven by local investment, industrial enterprises and the growth of domestic markets. Under the post-Fordist order, this model has ensured the innovation and value-addition of high-technology capital in a free-market environment, which is appropriate for developed capitalist countries. Industrial parks have been promoted in developing countries in the second half of the 20th century, but with less success. The rise of China's development zones has allowed China to be seen as a leader in the developing world, successfully breaking through the bottleneck of building high-technology industrial parks in third-world countries. Analyses of development zones in China unveil distinctly different pathways of development, based on China's unique political, social and economic characteristics, that can be considered a greater length [6].

Firstly, China's development zones not only result from global capital activity, but their success also benefits from the efficient interaction between capital and power [57]. Capital spreads horizontally through deterritorialization and reterritorialization in the form of factor mobility to seek new spatial carriers of capital sub-circulation on a global scale. Meanwhile, the system of power constituted by the polity continues to form new state spaces in the vertical plane and actively seeks cooperation with international capital to achieve local development. With the intervention of state power, policy environments for development are formed in development zones, and a series of policies covering institutions, industries and land, are used to structure and restructure development zones, which are then considered as experimental grounds for concentrated testing and promotion of new policies, based on the concept of experimental regionalism [1,42,58,59].

Secondly, development zones are reconstructing themselves in order to achieve higher levels of development. The state promotes the gradual transition of the priorities of development zones from developing export processing industries to urban services and innovation industries to achieve higher levels in the global value chain and create a global competitive advantage in each period, with the help of the aggregation effect, which has proved to be a successful yet circuitous route to overcoming backward technological limitations [7,28,43,60]. In summary, this paper will prove informative for international researchers by helping them to understand how, and why, China's development zones have gained prosperity for the country.

According to the complexity of urban restructuring, and the differences between the dimensions involved, it is generally assumed that the restructuring itself is driven by, or at least affected by, several of the critical components described. There are many examples of this process. According to Luo, growth coalitions and coordinated layers of government and enterprises have formed at each stage, co-determining the comprehensive mechanisms of transition while reconfiguring multi-level state power, as well as relationships between the domestic and global markets [21,57]. Luo further conceptualizes the restructuring of development zones into three stages: the agglomeration of export processing industries, technological upgrading and new city districts. Discussing the policy life cycle, Zheng et al. took the interactions between national strategic turns and industrial evolution as their evidence, asserting, firstly, that the agglomeration of enterprises is the initial task of development zones, secondly, that different levels of Chinese government attention turned to the launch of industrial new towns and, thirdly, that the process helped to create urban innovation spaces [20,23]. From the perspective of land use, Shi combines the national land policies, local government action, industrial evolution and a network of stakeholders, dividing the restructuring into three stages: brownfield land redevelopment, the creation of micro science parks and encouraging urban innovation spaces [25,31,61]. Meanwhile, the restructuring of development zones is actually thought to be a process of space production, which fixes surplus global capital organically [8]. This process itself passes through three stages: industrialization and creating the space for production, urbanization to create a

space for consumption, and innovation, based on investment in science and technology, as well as social expenditure on health and education [6,62–64].

There are three shortcomings in the existing studies. Firstly, in terms of timeline, the existing studies focus more on the export processing zone and the new industrial town phases of the development zones. Although they are considered innovative urban districts and the new direction of restructuring has attracted emerging attention from scholars, its characteristics and mechanism systematization still need further discussion [21,63–66]. Secondly, in terms of research fields, many studies are biased toward focusing on, and reinforcing knowledge of, their own field (albeit with reference to other fields) [21,63–71]. This means that the fact that development zones themselves have become a complete system for restructuring China's development approach in the post-reform era, including different dimensions of policies and actions, has been downplayed. Development zones should be understood from a more holistic perspective. Finally, in methodological terms, research papers will inevitably be grounded in internationally popular research theories, such as entrepreneurial cities, rescaling and industrial clusters, but these studies have led to the undervaluation and fragmentation of the systematicity and comprehensiveness of development zones [3,5,21,72]. We provide a comprehensive review of the processes and mechanisms of restructuring development zones in a holistic overview in which we propose that three fundamental problems should be addressed: the representational components underpinning transition, the roles played by these components during the process of change and the logic within, and between, these different components [22,39].

## 2.2. A Conceptual Framework to Understand the Restructuring of Development Zones in China

Based on a review of research results in different fields, we propose a three-pronged framework, composed of transitional institutions, industrial evolution and land use transformation, to enable a more systematic and fine-grained description of the restructuring practices (Figure 1). This framework covers, to the fullest possible extent, current research results and main ideas in key fields, and structures the principles followed by the relevant studies, their evolutionary processes and the relationships between them.

### 2.2.1. Transitional Institutions

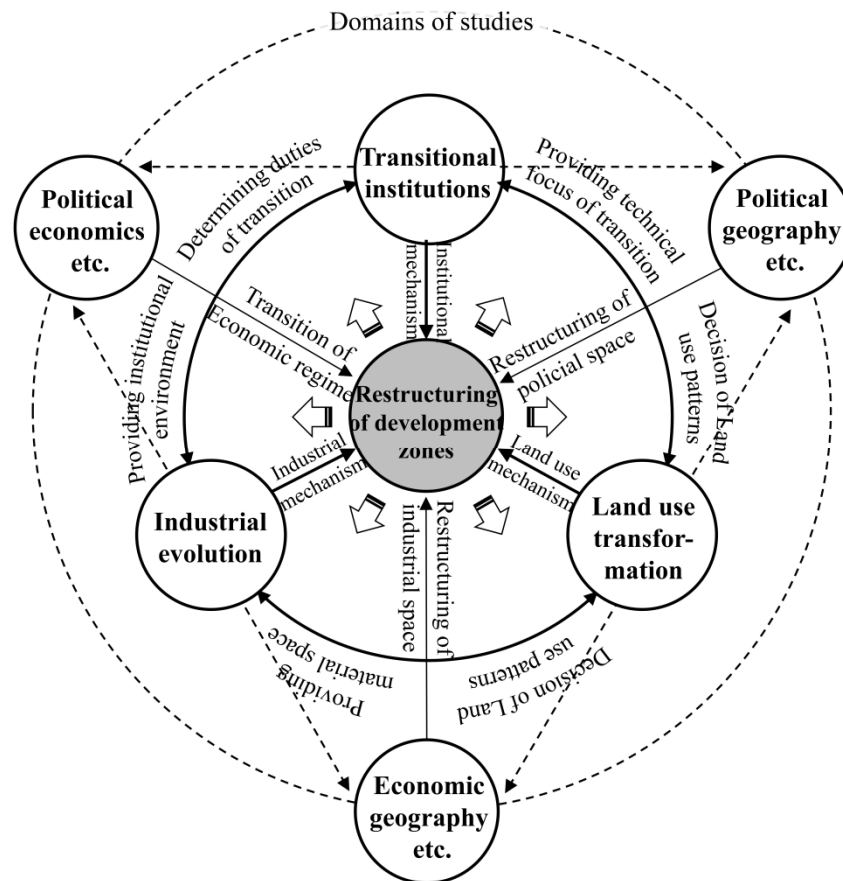
The organization, transmission and implementation patterns of state power, and the division and deployment of state space are the core contents of development zone institutions. State power and space were reorganized at central and local levels to create potential areas for political and economic growth in a process of experimental regionalism, enabling the centralized innovation of new institutions, altering the institutional basis for economic growth in China [1,3,4].

Between 1949 and 1978, China operated a centrally planned economic system characterized by vertical administration and resource allocation [73]. In the early 1980s, the Fiscal Responsibility System (FRS) was launched by central government, promoting decentralization. Fiscal and administrative resources were gradually decentralized to local governments, which were then encouraged to compete with each other to become more financially self-sustaining and economically self-reliant [74,75]. This institutional arrangement was referred to as Chinese-style federalism and local state corporatism, and the process successfully stimulated new levels of vitality in local growth [74,75]. Development zones were initially established in 1984 as a tool to attract FDI into cities, accelerate local industrialization and promote competition between cities on the back of a policy package of tax rebates, export tax incentives, private property and land transfer rights and high-level project approval. Repackaging and delegating policies and powers to local governments, in the form of state spaces with boundaries and development zones, became a novel and indispensable strategy for local government competition [74,75].

However, the institutional arrangements used for development zones in the early stages showed that they were considered transitional institutions, because such arrangements could easily lead to excessive competition, and only at the lower end of the global



value chain, and could also easily lead to excessive competition, because of low land prices and low interest rate loans, promoting the concept of “Zone fever” [15,28,43]. Since 2001, the institutional basis of development zones has been extensively restructured to reflect changes in development duties, to address changing external environments and to reduce tension in the relationships between cities. This restructuring process involved three main aspects, namely multi-level government relationships, government–market relationships and relationships between governmental sectors. Emerging institutional transitions in these sectors signaled a continuous restructuring of pathways, as well as rising capacities in governance, forming an institutional driving force for the restructuring of development zones [5,45].



**Figure 1.** Conceptual framework of restructuring for growth in development zones. Source: Prepared by the authors.

### 2.2.2. Industrial Evolution

It is generally accepted that the restructuring of development zones has played a significant role in intensifying the process of industrial evolution. In that process, enterprises continuously enter, expand and then leave the zones. Since 1978, the Chinese state has interacted with multinational enterprises to encourage the influx of FDI to compliment the original accumulation of capital by taking on low-end links in the global production chain [76]. Current literature suggests that terms like “Enclave Park”, “Garden Factory” or “Isolated Island” can also be used to describe the characteristics of these early development zones [31,77]. By providing shared facilities and specialized services, and by taking advantage of tax incentives and policy, development zones helped to encourage the aggregation of labor and resource-intensive enterprises. Yi discussed the effectiveness of development zones, claiming that they resulted in a 12% growth in local employment and a 14.2% growth in industrial output [78].

However, the closed, outward-looking, low-end export processing zones did not make a strong contribution to the development of their host countries at national levels, a fact that was proved in studies in the early twenty-first century [79,80]. Enterprises in the zones mainly interacted with their overseas headquarters or upstream and downstream enterprises in China, and there was little interaction with each other, resulting in ineffective aggregation and incentivization centered on taxation revenue only. To combat this decline, in 2001 development zones entered a period of industrial upgrading referred to as the “Second Transition”, a process that was driven by the Chinese state. Development zones became global innovation poles for knowledge spillovers in an innovation economy, relying on spatial growth and the state’s political interventions that were conducive to the aggregation and the activities of scientific institutions, universities, creative enterprises, a skilled workforce and the creative stratum [33,81]. The geographical basis of industries also developed into a “siliconized” integrated space for production and research, instead of individual production spaces [82]. Meanwhile, this transition encouraged development zones to gradually reinvent themselves as modern urbanized areas. Co-driven by rescaling as a state strategy and a surplus of capital that spilled over from manufacturing, the boundaries of the development zones became porous and the zones themselves merged with urban spaces, as they gradually broke away from their previous shackles as industrial islands [35,36].

### 2.2.3. Land Use Transformation

The restructuring of development zones in China was considered as a way of changing land use patterns and stimulating the spatial reorganization of urban land, a process that was rooted in China’s land policy reform [40,42]. Prior to a constitutional amendment in 1982, China’s land resources were only regarded as a container for production, allocated by the state to state-owned enterprises under a centrally planned economic system. To attract FDI, reform in the land market was launched, and the paid land use of cities and towns was supported by the Chinese state from 1982 onwards. In 1988, a subsequent amendment to the Land Administration Law allowed easier land sales. China’s urban land gradually changed from a production container to a global commodity, and development zones were established to manage urban development land resources centrally [61]. However, the excessive and unchecked empowerment of development zones and low land costs in the early stage of marketization meant that urban land resources were seen as cheap capital that attracted labor- and resource-intensive enterprises, triggering a rapid sprawl and the inefficient utilization of land during this period [83,84]. In 1997, more than 70 percent of the land sold or leased to real estate enterprises remained undeveloped.

Since the early twenty-first century, land use transformation in development zones has been guided by state forces and evolving industry. To control excessive exploitation and the inefficient use of land, the state set up a series of adjustments to land use policies. In 1998, an amendment to the Land Administration Law took control of local land development quotas, restricting the potential growth of development zones, especially in coastal regions, and forcing local governments to access spatial resources from inefficient brownfield land redevelopment. Then in 2008, the state set a goal of more intensive land use for the first time. In 2014, the “Regulations on Economical and Intensive Land Use” were launched, and in 2016, guidelines on “Trial Guidance on Deepening the Redevelopment of Inefficient Urban Land” were issued by the Chinese state. Meanwhile, as previously noted, the growth of an innovative economy put more emphasis on urban land use. The single centralized industrial land pattern no longer met the requirements of innovative industries for high-quality urban space. Since the start of the twenty-first century, the transformation of urban land use patterns has become a topical issue.

In a nutshell, institutional restructuring, industrial evolution and land use transformation can be seen as the driving forces behind the growth and restructuring of development zones. From a political economic perspective, this restructuring can be considered as an adjustment of the economic regime, aimed at forming new organization, transmission and

implementation patterns for government power that meet the demands of higher-level development. From the perspective of political geography, this restructuring is manifested in the re-division and redeployment of state power and state spaces in geographical space with the aim of creating new spatial governance models. From the perspective of disciplines such as economic geography, urban planning and land resources, the restructuring represents a process of guiding industrial evolution and laying out efficient land use patterns to meet the needs of various industrial activities in the course of global level economic restructuring. In this sense, the process fosters internal and external mechanisms for the restructuring of development zones, in light of the increased scope and growing demand resulting from China's economic growth and the process of gradual global economic reconfiguration. The conceptual framework of this study was based on these assumptions.

### 3. The Restructuring of China's Development Zones

Using the conceptual framework outlined above, this section presents a historical account of the restructuring of development zones in contemporary China (Figure 2).



**Figure 2.** The restructuring of development zones and relevant policy evolution. Source: Prepared by the authors.



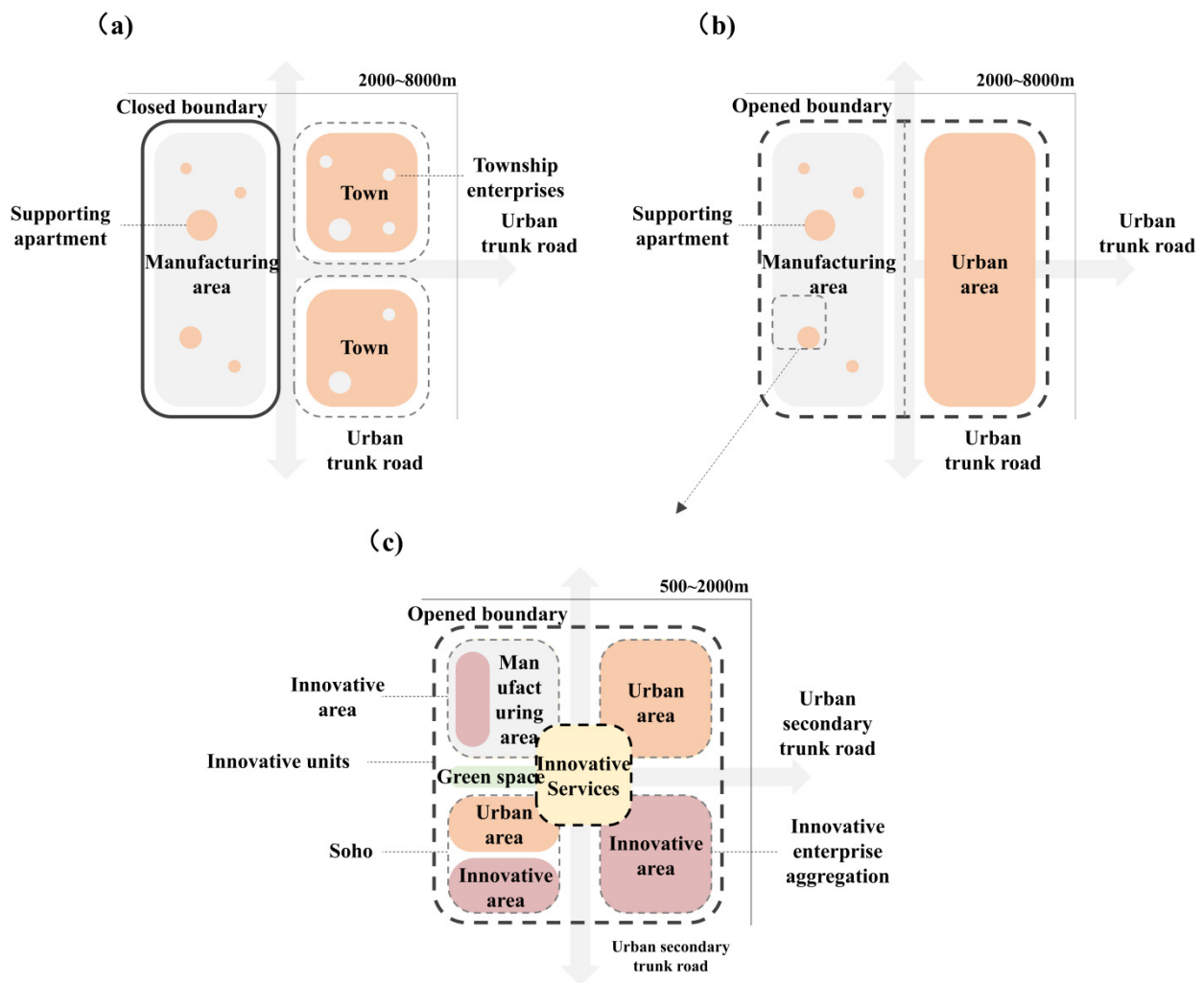
### *3.1. Spaces of Economic Exception: Decentralization; Industrial Enclaves; Urban Land Sprawl (1984–2000)*

Before 1978, China's centrally oriented economic activities were strictly controlled within administrative jurisdictions, and exchanges of materials were organized by the state [73]. Such all-embracing roles and the cumbersome bureaucracy that accompanied them were soon deemed inefficient and in contradiction with contemporary globalization. Institutional reform was, therefore, considered a vital prerequisite for economic reform since 1978.

As well as decentralization, flexible and creative institutional tools were constantly explored to operate powers along a centralized pathway, in order to get rid of the constraints on localized jurisdictions. In 1984, while inspecting Shenzhen (a Special Economic Zone, established in 1980), Chinese premier Deng Xiaoping proposed that: "Continuous opening up of port cities is necessary. New open areas in these cities must be allowed to execute the deployment of specific rules governing Special Economic Zones, at a smaller scale than Special Economic Zones."

China's first development zone was established in Dalian City that same year. In the early stages, development zones clearly operated as spaces of economic exception that were separated from social and administrative spaces. It is generally accepted that the effectiveness of development zones in promoting economic development stemmed from three main factors. Firstly, development zones were superimposed upon administrative districts and enjoyed higher economic incentives than administrative districts, with tax rebates, export tax incentives and high-level project approval from the authorities. Secondly, they were operated by micro-scale independent professional teams with their own decision-making authority over urban planning, approval, finance and construction. Thirdly, they had a clear and singular economic goal that revolved around propelling growth [80,85]. Development zones became a major part of institutional reform in the early 1980s, with the central state's purpose of creating dynamic spaces that could compete at a global level. Driven by "Zone fever", China had established 1951 development zones by 1992 [58,86].

In the territories formulated by institutions, development zones fostered a process of gathering labor-intensive manufacturing enterprises that would help post-reform China to obtain original technology and accumulate capital in the absence of technical capacity. In 1989, a "three priorities" rule was launched at a national working conference on development zones in Shanghai City, which was clearly aimed at utilizing FDI, developing manufacturing and encouraging exports for fiscal revenue. The term "Industrial enclaves" was employed in subsequent academic studies to describe the single, centralized industrial areas formed by the agglomeration of export-oriented manufacturing (Figure 3a) [43,80,87]. These enclaves were considered as containers for manufacturing enterprises, located in suburbs and maintained at a distance from the surrounding towns, and little consideration was given to services or quality of life and spill-over effects beyond their boundaries. From a geographical basis, they provided enterprises with shared infrastructures and public services, including a productive infrastructure, bonded services, a readily available labor market and warehousing logistics. China's FDI has undergone a process of explosive growth since the 1990s, jumping to 40 billion dollars. Research by Wang showed that the introduction of development zones increased the growth rate of FDI by 6.9 percent, resulting in a scale economy driven by the idea of agglomeration [88]. However, the growth occurred in labor-intensive enterprises only. In 1997, China's high-technology products were limited to US\$16.2 billion, representing only 5.3% of total exports, and Research and Development expenditure made up only 0.6% of the country's total GDP.



**Figure 3.** The transition of industrial space land use in development zones. (a) Spaces of economic exception; (b) Quasi-administrative territory; (c) Innovative urban district. Source: Prepared by the authors.

With low-end manufacturing being the preferred approach for the Chinese state to gain tangible advantages in global production, low-price land and land expansion policies were promoted at local government levels to subsidize enterprises and absorb investment in the midst of increasingly fierce competition, in the context of the land sales permitted after amendments of the Land Administration Law in 1988. The waste of land resources and the contradiction between domestic and manufacturing land-use inevitably became the principal problems for China over the subsequent decade. By the end of 1992, the area planned for China's development zones totaled 15,300 km<sup>2</sup>, while China's total urban area was only 13,400 km<sup>2</sup> [86,89]. Much of the land remained without significant investment, and the total area of cultivated land decreased sharply [15,90]. By 1994, Premier Zhu Rongji initiated a series of austerity measures to dampen economic growth, and as part of this process he reviewed and cancelled many development zones. In April 1997, the State Council decided to stop authorizing the approval of any conversion of cultivated land for non-agricultural uses, at least temporarily. However, these policies did not solve the problem of urban land sprawl in development zones. By 2003, 6866 official and unofficial development zones had been established, with a planned area totaling 38,600 km<sup>2</sup>, a figure that was again higher than China's total urban area of 28,500 km<sup>2</sup> [15].

### 3.2. Quasi-Administrative Territory: Zone–Government Integration, New Industrial Towns and Production–Residence Integration (2001–2008)

For academics and national policymakers, the early temporary policies posed obvious challenges to the sustainability of the new zones [91]. In 2001, a second transition phase was, therefore, announced by the Chinese state at a working conference on high-technology zones in Wuhan City.

Firstly, the sharp shift in development zone policy stemmed from the needs of sustainable development. Excess low-end manufacturing, contradictions in the human–environment relationship, lagging institutional arrangements and conflicts between urban and industrial development resulted in a crisis for development zones that limited the room for growth. A great deal of discussion on these issues emerged in the literature of this period [18,58,92]. Meanwhile, China’s accession to the WTO in 2001 meant that development zones lost their export tax incentives for overseas investors, and it became necessary to change the driving force for the country’s economic growth. Since 2001, the priorities of development zones gradually turned towards urbanization and the construction of self-contained new industrial towns, using the spill-over effects from manufacturing to drive development and promote the co-development of a skilled labor force, as well as the upscaling of manufacturing and the domestic market to decrease the heavy dependence on export processing.

Zone–government integration was subsequently used as an institutional tool supported by policymakers and scholars to drive the merger and reorganization of development zone management committees (typical government agencies in China) and the governments of administrative jurisdictions, as well as the jurisdictions themselves. A body of quasi-administrative territories was established by central and local governments, operating to promote economic development and social management, as well as the co-development of manufacturing and urban services. Development zones, therefore, underwent a growing transition to new industrial towns with balanced social and industrial components [35]. In 2005, the “Comprehensive industrial zone” policy was issued by China’s central government. Subsequent studies showed that development zones achieved rapid growth by incorporating urban areas, such as Suzhou Industrial Park, which was established in 1994 centering on four towns, including Loufeng and Xietang, and the Xinwu District, launched in 1995, the main towns of which included Shuofang and Wangzhuang. Between 1995 and 2008, the annual growth rate of various economic indicators for these parks remained above 30% (Table 1) [21].

The industrial priorities of development zones shifted to promoting interactions between manufacturing and urban areas, while the geographies of different industries changed to develop open, pluralistic new industrial towns or new urban districts, rather than single manufacturing enclaves (Figure 3b) [30,92–94]. The focus of policies on land use in development zones also shifted from developing more industrial land to promoting the integration and compact layout of industrial and residential areas, and the concept of “Zone–government integration” was subsequently employed. However, although the expansion of industrial land under preferential policies was not approved in principle, the integration of industrial and residential areas contributed to a more rapid increase in the administrative scope of development zones. In the case of Jiangsu Province, for example, the planned area of development zones reached 11,000 km<sup>2</sup> by 2011, nearly three times the 3900 km<sup>2</sup> of built-up urban area, covering approximately 10% of all the land area in Jiangsu. Development zones covered the vast majority of urban development land, and as a phenomenon in academia the layout of these areas was considered to represent a rising trend of “cities surrounded by development zones”, which meant that development zones, rather than just industrial parks, became the main growth space for modern Chinese cities [95].

**Table 1.** Restructuring of growth priorities in some development zones \*.

Name of Development Zone	Start Time	New Functional Positioning	Jurisdictional/Planned Area/km <sup>2</sup>
Suzhou Industrial Park	1994	International modern industrial park	70/278
	2006	Modern, landscaped and international new urban area	278
	2012	National open innovation pilot zone	278
Wuxi High-Technology Zone	1992	Construction of industrial park and development of export processing industry	9.45
	1995	Ecological town, Technological town, Wuxi New Town	200
	2010	Oriental Silicon Valley, Innovative economic entity supporting urban and regional development	220
Guangzhou Economic Development Zone	1984	Product export base and opening window	9.6
	1994/2005	Integrated development of secondary and tertiary industries (1994)/New urban area of Guangzhou (2005)	61.3 (1994)/393.6 (2005)
	—	Promoting innovation and upgrading to build a new highland of reform and opening-up (2019)	393.6
Kunshan Economic Development Zone	1985	Introducing capital, developing manufacturing and exporting products	10
	1995	A new ecological, cultural and technological town with new Jiangnan characteristics	115
	2006/2011	A leading demonstration area for scientific and technological innovation (summarized in 2021)	115
Changzhou High-Technology Zone	1992	Based on trade and driven by industry	5.63
	2003/2009	Multi-functional comprehensive area (2003)/Ecologically livable new urban area (2009)	439.16
	2009	Emerging industry pioneer zone, independent innovation flagship zone	508.91
Zhengzhou High-Technology Zone	1988	Technological industrial zone	3
	1997/2003	Modern new urban area (1997)/Modern ecology and technology new urban area (2003)	89.46
	2011	A high-technology new city; improving the ability of independent innovation	99

\* The resources come from interviews, master planning, paper and network second-hand materials.

### 3.3. Innovative Urban Districts: Cooperative Institutional, Multi-Functional Synthesis and Land Redevelopment (2009–)

After the global financial crisis of 2008, the growth of global industrial competition inspired central and local governments in China to strategically change current urban development patterns. In 2010, China's State Council officially announced the elimination of backward production capacity, encouraging local enterprises to transform instead and issuing, the following year, a five-year plan covering China's economic transition (2011–2015) [42]. In 2015, the State Council issued its renowned "Made in China (2025)" plan, advocating mass innovation and entrepreneurship. The state came to recognize that the sustainable growth of China's global industrial competitiveness not only depended on overseas capital and relevant incentive policies, but also on the establishment of systematic and innovative projects that included institutions, industries, land, knowledge, technology, talent, education and welfare, which was embodied by the reproduction of production relationships and labor [50,96].

The institutional arrangements and strategies of development zones have gradually undergone a third recalibration, particularly since the launch of the China State Council's 2014 project, which was entitled "Opinions on Promoting the Transition, Upgrading and Innovative Development of National Economic and Technology Development Zones". In-

novative enterprises depend on the spillovers of inter-regional or cross-regional knowledge and the division of labor but face limitations in terms of government finance and innovation capacity. A new raft of institutional arrangements was, therefore, launched to promote broader cooperation between different levels of government, zones and various areas of market capital. A growing number of intercity co-construction zones was deployed at regional level, and existing development zones joined forces to move forward together, promoted by central and local government initiatives that were devoted to advancing the flow of regional knowledge, the sharing of scientific facilities and the cultivation of critical innovation cluster projects, such as innovation corridors and development zone coalitions [5,29,32,97–99]. At city level, in the wake of the China State Council's 2017 follow-up project, entitled "Opinions on Promoting the Reform and Innovative Development of Development Zones", the establishment of unified administrative sectors and development mechanisms for zones in urban areas was underscored. This latest project was designed to promote the scale effects of innovation and the cultivation of characteristic clusters and was recognized as a response to the current micro-scale situation, which was scattered and chaotic [24]. At zone level, a rising trend of operating industrial and urban projects through public-private partnerships (PPPs) was advocated following the public-private partnership guidelines that were issued by the Chinese government in 2014. An increasing number of professional estate agents began to participate more deeply in the construction and operation of local development zones around cities, while committees within and between the development zones were also starting to transform themselves into companies to improve the economic efficiency of the zones and attract social capital [100,101].

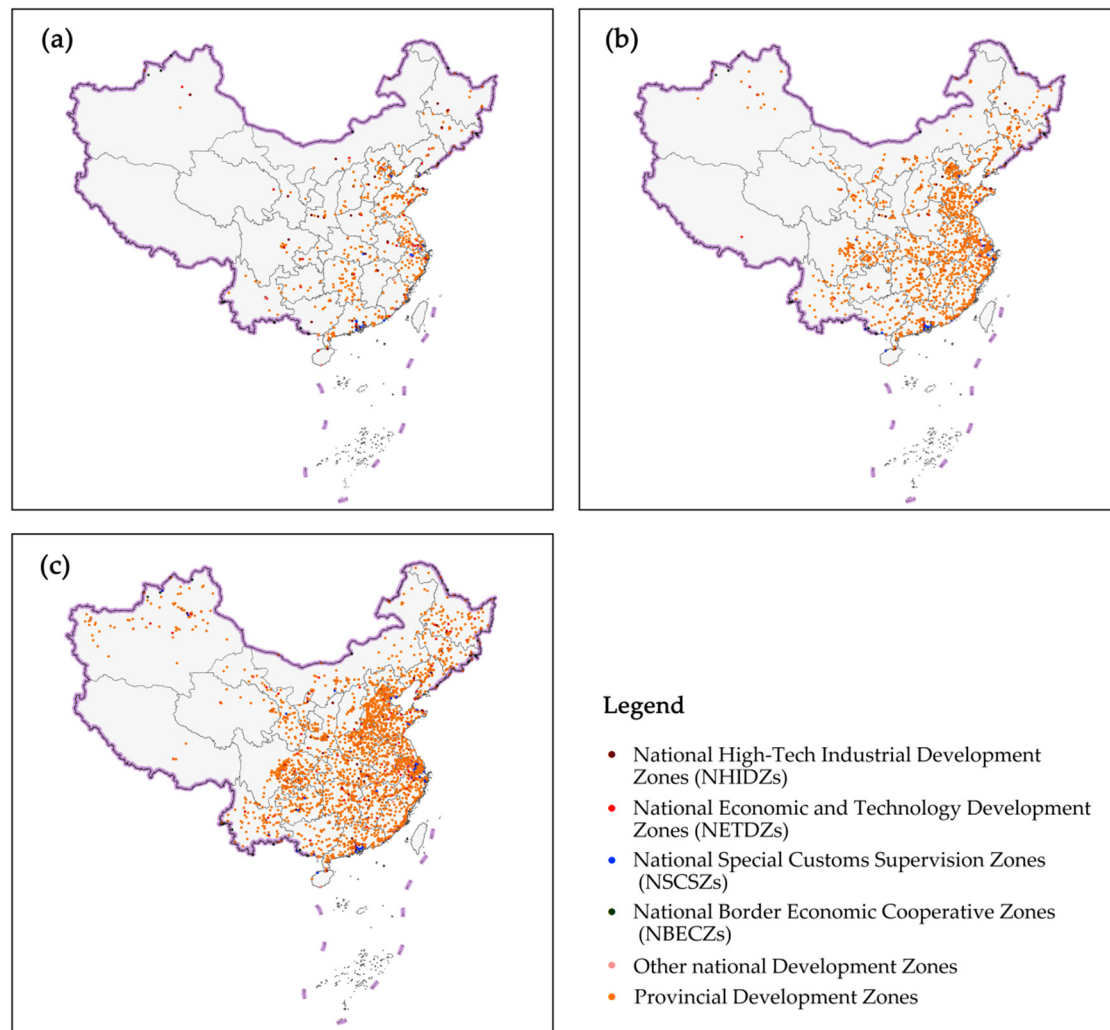
Based upon changing industrial priorities, China's development zones inevitably developed into a species of multi-functional syntheses that grew from the requirements for innovative activities that promoted spatial diversity and geographical proximity. For example, in its plan for 2004, Suzhou High-technology Zone adjusted its development goals to "A first-class R&D innovation highland and eco-city integrating technology, environment, humanities and innovation". In 2012, the duty of development zones was referred to by the Chinese Department of Commerce as a combination of "three tasks, two priorities and one goal" to support the transition of development zones to "multi-functional comprehensive zones". Basic units of innovative activity shared a common space, and through the proximity of innovative enterprises high-technology incubated enterprises, national laboratories, technology service centers, financial centers, education institutions, talent recruitment agencies and commercial service facilities, which came to replace the conventional isolated arrangement of single- and larger-scale industrial and residential areas (Figure 3c). Development zones moved towards a new identity as world-class innovation centers in terms of financial services, environmental protection, education, science and technology, health and other social factors that were considered to have been falling behind [11,102]. In 2020, the Research and Development expenditure of development zones in Jiangsu reached almost \$50 billion, 7% of the province's total GDP, far exceeding the relevant expenditure of the 27 EU member states (2.10%). A total of 1200 incubators and 48,000 maker spaces were created, with a high-technology output value of \$0.6 trillion.

Functionally integrated layouts became the technical focus of land use policy during this period, placing greater emphasis on a more integrated, high-quality use of land. However, the overwhelming majority of inefficient land that had been sold at low prices meant that development zones had to obtain growth room by exchanging property rights with enterprises, changing the nature of land use and reassigning it as building space [103]. This was referred to in official policies as brownfield land redevelopment, and the phenomenon has become a topical subject for current urban studies in China. In some coastal cities, the scale of land redevelopment in development zones is gradually approaching, or even exceeding, the scale of newly added urban residential areas [42].

In accordance with the priorities and policy preferences of different periods, the restructuring of China's development zones has undergone three phases since 1978. Throughout these phases, the restructuring policies have always kept abreast of China's political, eco-



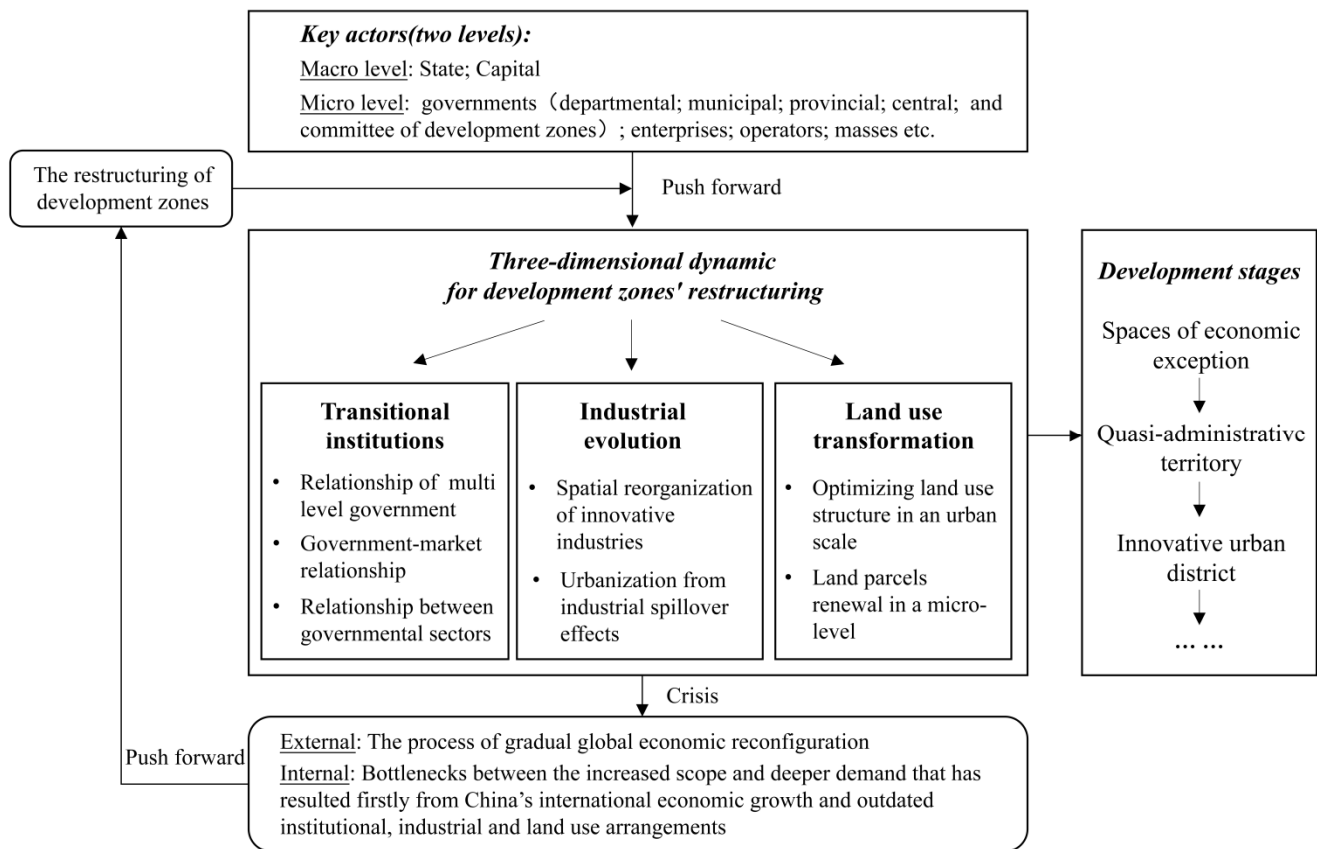
conomic and land use reforms both internally and externally. The design of the restructuring was influenced by China's post-1978 macro reform, and at the same time it served as an effective tool in terms of implementing reforms as an integral part of the zones themselves. Meanwhile, the zones' growth was manifested not only in their internal transformation, but also by the continuing increase in their numbers. In the 1980s, development zones were mainly concentrated in China's 14 largest coastal cities, but by 2000, they had become more widely scattered around the country's coastal and key inland cities, and had even begun to grow in small and medium-sized urban areas. Numerous development zones are now found in every corner of China's more developed lowland areas (Figure 4).



**Figure 4.** Establishment and distribution of China's development zones. (a) Distribution of development zones nationwide in 2000; (b) Distribution of development zones nationwide in 2008; (c) Distribution of development zones nationwide in 2018. Source: Prepared by the authors.

#### 4. Development Zone Restructuring Mechanisms: A Multi-Perspective Overview

In summary, we can establish a dynamic framework to interpret the restructuring process of China's development zones (Figure 5). By reviewing available academic studies, this section elaborates on restructuring the mechanisms to reveal a finer-grained description of the transitional mechanisms of development zones.



**Figure 5.** Dynamic framework for restructuring of development zones. Source: Prepared by the authors.

4.1. Three Dimensions of Transitional Institutions in Development Zones

After 1984, the organization, transmission and implementation mechanisms of state power and the division and deployment of state spaces for development zones were formed to build material and policy conditions that would attract global capital. This became the critical tool that guided the restructuring of Chinese development zones in accordance with the changing responsibilities and duties of developed global economics. Two decades after the Second Transition in 2001, studies on the institutional transition of development zones can be analyzed from three aspects.

4.1.1. Rescaling of State Power

Firstly, partial studies consider development zones to be the result of the rescaling of state power between vertical levels of state, with the promotion of decentralization and recentralization. By delegating or withdrawing power in both bottom-up and top-down directions, and by controlling the use of state power at different levels, development zones were built to reflect the capacities that matched their development tasks. Recent research reveals that in order to respond to the excessive delegation of power and emerging innovations in industry, the authority of development zones was gradually reconfigured and scaled up to regional and city levels. On one hand, with the increase of innovation activities and industrial clusters in cities, the regional level gradually became a key organizational platform for development zones. New forms of zones—such as intercity co-construction parks and provincial science innovation parks, as well as zone-based cooperation projects, such as innovation corridors and national innovation regions—began to grow [29,32,97,104]. This encouraged the reconfiguration of zonal administrative systems between different cities, promoting inter-zonal cooperation and the incubation of critical industrial clusters through top-down and bottom-up policies, and a regional interactive structure took shape to govern the development zones. Meanwhile, in urban areas, the institutional form of

development zones also underwent extensive reorganization. In the earliest periods, different development zone formats, approved by national or provincial governments in cities, were governed at the administrative authority's discretion, but gradually, in the context of increasingly fierce industrial competition, administrative authority became centralized to city governments to improve the scale effects of industrial evolution. In essence, development zones became a mix of discrete spatial areas under a common label operated under a unified platform (generally, an urban investment company) by the city or higher-level government [5,24,76]. For example, in Shanghai's Zhangjiang High-technology Park and the urban development zones of southern Jiangsu (which stand at the leading edge of development zones in China) unified municipal operating companies, rather than the development zones themselves, have become the main agents of operation. With extensive cooperation between governments and institutions, a state entrepreneurial system was formed, which recent literature considers highly efficient and flexible [4].

#### 4.1.2. Reconfiguration of Governmental Sectors

Secondly, we need to examine the transition and structural establishment of government roles. Since China's economic reform began, the Chinese state has played a dual role as a provider of social services and talented entrepreneurs, while, at the same time, social services sectors were established in conjunction with entrepreneurial growth to address both roles. Early development zones were typically launched as special economic spaces with unique economic management capacities. For instance, the Sunan Model in China was based on the supremacy of economic authorities in the development zones of southern Jiangsu Province after these areas shook off their outdated social shackles during the process of economic reform. The rapid growth of these zones soon became out of control because of the arbitrary use of economic power, which resulted in conflict between zones and administrative jurisdictions [18,105]. Later, a zone-government integration strategy was encouraged by the state to solve this problem through the disentangling of the relationships between the sectors and the integration of more straightforward powers. Township governments were merged with development zone committees through co-location, while economic and social sectors were integrated to form quasi-governmental administrative organizations based on the "One label, two teams" concept [57,106]. In recent years, development zones have once again shifted to become separate social and economic sectors to meet the diverse requirements of the innovation economy, enhancing the status of economic development. Unlike the earlier stages, this process is now more strongly based on the activities of economic agents, and many development zones have established investment companies of their own to take responsibility for economic growth through relevant market-oriented activities. Suzhou Industrial Park completed this reform process as early as 1994. Meanwhile, administrative committees have shifted focus to concentrate on industrial supervision and social services. Against this backdrop, the pattern of governance for development zones has gradually become a focus of academic research, and various classification methods have emerged [8,107].

#### 4.1.3. Recalibration of Government-Market Relationship

Thirdly, patterns of cooperation have been recalibrated to permit the joint involvement of government and the market. During the period of industrial evolution, development zones became increasingly reliant on the participation of market forces to obtain funds, management experience and external knowledge. Early cooperation between the government and the market showed a growing tendency to collect land rents from the capital market by providing land resources for rent-seeking market capital, a process referred to as "Land Finance" [1,8]. In recent years, the rapid consumption of surplus land resources has left some development zones facing fiscal crises. In the meantime, the passing of laws and the enactment of policies, such as the Property Law and "Housing Expropriation and Compensation Regulations on State Owned Land", promulgated by the Chinese state, has further restricted the local level administrative rights of government. In this context, it has

become increasingly hard for the government to complete development activities without help and support. After the launch of the “Guidance on Public–private Partnership” initiative in 2014, growing amounts of market capital were invested in the operation of industrial parks in equity participation or contracting, reshaping the cooperation patterns and the geographies of development zones from mutual benefit policies in various activities to joint participation in projects. Typically, operators based primarily in state-controlled companies chose to adopt the pattern of contracting the entire park’s development based on the strategy of “development first and investment later”. Examples of this include the Lingang New Area of Shanghai, which is run by the Lingang Group [16]. The scale of privately run parks is usually smaller, with their main pattern based on land parcel development. Operators will often solicit investment first before developing the plots to attract enterprises to settle. A typical case of this pattern is China Fortune Group’s Gu’An new industry town [101].

In general, the goal of institutional transition in development zones is meeting needs that are driven by the flow of various capital factors in different periods. Currently, most academic studies on the institutional arrangements of development zones examine the evolution of a single aspect and analyze its role in shaping spaces [5,18,32,97,101,104]. Few studies consider the broader, but equally crucial, impact of different capital factors on institutional transition, and most ignore the mutual impact that the three aspects discussed here have upon each other.

#### 4.2. *The Dual Logic of Industrial Evolution in Development Zones*

After the global financial crisis of 2008, academia followed two policies based on the spatial reorganization of innovative industries and urbanization from industrial spill-over effects to address the dynamics of, and paths for, the transition of development zones.

##### 4.2.1. Industrial Innovation

As early as 1994, in their study on global technology park complexes, Castells and Hall pointed out that large-scale urban projects serving high-technology industries constructed under the joint leadership of governments and enterprises would dominate the development of the technological industry in the twenty-first century [108]. Although the innovation capacity of early development zones was questioned at first [61,109–112], researchers in recent studies have verified the efficacy of development zones in enhancing the efficiency of innovation from the aspects of internal agglomeration and regional innovation systems (RISs), encouraging development zones to shift from centralized industrial spaces to spaces of innovation, based on multi-functional integration [33,40,45]. On one hand, the spatial forms of development zones provided conditions for knowledge spill-over, and innovation was thus accelerated in three distinct areas. Firstly, development zones offered well-planned industrial clusters, advancing the centralized layout of enterprises, colleges and research institutions, incubating technological intermediaries and increasing the frequency of interaction within, and outside, the industry, thus facilitating the spill-over of knowledge [25,28,33,113]. Secondly, they provided hardware and software for innovation by offering shared production facilities, service institutions, internal product markets and support from governmental funds and financial policies, thereby reducing the material and transaction costs of innovation [25,62]. Thirdly, the zones pooled technology and creative strata, enabling entrepreneurs, intellectual elites, patent holders and skilled workers to match and learn from each other, enhancing their interactivity and promoting the creation, accumulation and dissemination of knowledge [33].

On the other hand, innovation activities are never confined within a specific local area, and the latest academic literature also includes studies on regional innovation systems [33,45]. In fact, different development zones are now interconnected by regional and extra-regional “pipelines” that facilitate the flow of knowledge. Some of these pipelines take the form of government activities, such as intercity co-construction parks and innovation corridors. Through these, the government successfully promotes the exchange of

knowledge, the division of labor and market sharing between development zones. This enhances the exchange frequencies between inter- and extra-regional zones via entrepreneurs, research institutions, colleges and bodies, thereby shaping and supporting regional innovation networks [114]. Other pipelines are created as a result of innovation activities, including backward and forward supply chain connections, the sharing of research facilities, enterprise relocation, labor flows, personal social networking and transportation and information networks between development zones [33,45,115,116]. The pooling of these activities raises the status of regions in global production networks.

#### 4.2.2. Urbanization

As well as industrial innovation studies, researchers have also realized the role of development zones in simulating urbanization [35,36,93]. Recent studies tend to regard the spatial (re)organization of industries and urban areas in development zones as linked entities governed by shared logic. In dynamic terms, the coordinated layout of enterprises and functional residential areas was driven by the expansion of industry, which accelerated the growth and aggregation of urban elements. These elements are composed of an aggregation of population to promote the coordinated development of a core settlement of skilled workers and the urbanization of local residents, along with the aggregation of producer services and consumer services.

With increased globalization and industrial evolution, the value of industries has gradually shifted from manufacturing to the productive service sector, and such industries are marked by outsourcing in the division of labor and simultaneous improvement in the productivity of manufacturing and production services [85]. Meanwhile, the settlement of a large workforce in a given location promotes the growth of consumer services and enriches commodity spaces, retail enterprises and entertainment industries within development zones [35,93].

The structural and geographic links between industrial areas and urban areas are also affected by ongoing changes in leading industries. In the early period, development zones were usually situated away from central urban areas, and their associated urban spaces were seen as dormitory towns serving the industrial area. In recent years, however, development zone-oriented suburban areas have taken greater shape to form new urban districts, with their own centralized functionality [2]. Examples of such areas are the Huangdao New District of Qingdao City and the Xinwu District of Wuxi City. These areas have gradually become integrated into the geographies of the broader metropolitan area, speeding up the spatial (re)organization of multi-center economies in those areas [93]. This change is credited not only to the enrichment and diversification of the urban function of development zones derived from their industrial evolution, but also to the government's visionary planning.

In fact, in official policies and the actual geographies of industry, innovation and urbanization have now become two interdependent facets of the restructuring of development zones, instead of the alternative choice of path they once were [44]. High-quality urban services are a necessary prerequisite for pooling the intellectual strata and promoting the exchange of knowledge, while modern Chinese cities have gone beyond the concept of human settlements and now serve as complexes that integrate science, technology, production and living. Scholars such as Gao have also pointed out that the innovation economy encourages the reproduction of industrial value to become temporally fixed, and urbanization and spatial (re)organization mean that capital is also fixed in both temporal and spatial senses [6]. The dual logic of industrial evolution has played an integral role in this restructuring.

#### 4.3. Two Scales of Land Use Transformation in Development Zones

The spatial (re)organization of development zones is also considered to be a process of changing land use. In disciplines related to land resources, the mechanisms for restructuring



development zones are interpreted in the dynamics of land use structure pattern and land parcel redevelopment (brownfield land redevelopment).

#### 4.3.1. Land Use Structure

At the urban scale, traditional land resource research focuses on the efficiency of land use, while the restructuring of development zones is deemed, in essence, to be a process of optimizing land use structure to improve land output [40,42]. Recent research and our findings indicate that integrated units (generally of between 10 and 50 hectares) that include a variety of land types, such as industrial, residential and Research and Development land, have become an efficient strategy for growth, and the organic combination and planning of these basic units has reorganized the spatial form of development zones [117]. As discussed above, the view that land use structures, based on increasingly compact and diversified industries, are influenced by industrial innovation has become self-evident, and the endogenous logic and mechanisms supporting this view have been extended to a broader field in more recent research [6,17,37,38,40,42,65,68,83,118]. Land use structure based on units is affected by the joint influence of market mechanisms, industrial evolution and changing land use policy.

Firstly, since the transformation and re-transformation of China's development zones, previously unused parcels of land in cities, with low profit efficiency, were acquired through urban capital investors at lower cost, and these parcels were used for projects that would offer higher unit value premises, such as apartments, office buildings and entertainment centers, forming an integrated and compact layout alongside high-technology enterprises with higher bidding abilities [31,37]. Secondly, as previously noted, land use structure and industrial structure are closely interdependent, and innovations in geographical proximity have increasingly promoted the functional requirements of integrated land use [40]. Thirdly, the roles of market mechanisms and industrial evolution are considered to have become typecast by changes in China's land use policies. Governments have learned from feedback on their policies and have updated strategies and technical tools to promote any necessary restructuring. Previously, governments adopted an expansionary land use strategy extensively to promote homogeneous industrial development, resulting in the inefficient use of land in the long term, as well as an overall mismatch between shrinking older industrial areas and growing modern urban ones [27,87]. After 2008, the state began to promote more intensive use of land (Figure 2) [30,42]. At the same time, local governments formulated and enacted a series of new land use policies to control land use activities, such as promoting new types of mixed land combinations including Research and Development, commercial and residential, as well as offering flexible leasing policies to encourage innovation [117,118].

#### 4.3.2. Land Parcel Redevelopment

In recent years, land parcel redevelopment (brownfield land redevelopment) has become a popular process in the micro-level restructuring of development zones, and has been considered as a process of negotiation or a "game" centered around land property rights transactions and asset swapping for enterprises [37]. The motivation for corporate asset swaps in enterprises can best be analyzed from the perspective of the actors involved, and covers two main aspects: surplus value exchange between manufacturing enterprises and urban commercial and residential capitalists [37], and the role of government entrepreneurs [31,119]. Research by Gao et al. discussed this gaming process in detail in the case of Nanjing [37]. Manufacturing enterprises cannot usually afford land rent surpluses and tend to reach agreements with rent-seeking capital owners hoping to share land rent surplus dividends by swapping their original land parcels in the city for larger parcels of land in the suburbs. The redevelopment of land parcels is a game played between the two sides. Governments in China at various levels are considered as vast monopoly enterprises with immense land capital and administrative power [120]. Property transactions and benefit exchanges between enterprises—such as allotting new land parcels in the suburbs,

land buybacks and storage—must be achieved through government intermediaries, using procedures, such as adjustments to urban planning. In fact, city governments often play a more active role in advancing urban growth. As well as enacting land use policies [118], local officials also take active measures to coordinate cooperation between stakeholders in the redevelopment of brownfield land parcels [26,37,38], the redesign and renovation of buildings and the advancement of land listings and land finance [30,100,103].

Based on the above analysis, transitions in the three dimensions discussed actually form a process in which each dimension affects the others, and even the same phenomenon may involve different relevant mechanisms. For example, the inter-city industrial parks and innovation corridors mentioned above not only represent integral components in the reform of institutions, but also important tools for the government to advance the development of innovative industries within the zones. Meanwhile, bottlenecks in industrial evolution and land use provide the driving force for changing institutional approaches. Industrial evolution is guided and regulated by institutions and determines the changes in land use patterns, and land use involves the (re)organization of geographies under the combined impact of changing industry and institutions. Putting the restructuring of development zones into the interactive framework of these three dimensions therefore helps us to fully understand the significance of the restructuring.

## **5. Understanding the Restructuring of Development Zones by Conceptual Framework: Two Empirical Case Studies**

In this section, two cases that have been repeatedly discussed in previous studies have been chosen and studied again to verify the validity of the conceptual framework used in this framework and our survey. In addition, we have critiqued the shortcomings of existing studies on these two cases. The cases focus on the processes and patterns of restructuring of development zones at both metropolitan and regional levels, which is of great importance to our understanding of the restructuring of development zones.

### *5.1. Regional Level: The North–South Intercity Co-Construction Parks of Jiangsu Province*

A recent case in Jiangsu Province has highlighted how governments at various levels promote the setting and restructure of new types of development zones at the regional level, through reconfiguring the power between multiple scales of government, industrial evolution and land use transformation. Jiangsu Province, located at the mouth of the Yangtze River, is a global manufacturing center and a high point of innovation built by the Chinese state, with a GDP of \$1803.7 billion in 2021, the second-largest in China. North–South Intercity Co-construction Parks (NSCP), Jiangsu’s latest development zone policy, was launched in 2006 and now includes a total of 53 zones [121].

The North–South Intercity Co-construction Park is a product of China’s domestic industrial re-location, which was created in the context of the crisis in both land and industry caused by the accumulation of domestic capital in the early twenty-first century [32,97]. On the one hand, the “Zone fever” of the 1990s drove the Chinese state to amend the Land Management Law in 1998 to control land quotas for local development. The developed area of southern Jiangsu was one of the first regions in China to open up and promote the establishment of development zones. The inefficient use of land resources by rural private enterprises under the Sunan Model led to an urgent need for city governments in southern Jiangsu to acquire land from other cities in order to vacate labor-intensive industries and attract urban capital and high-technology enterprises in their place, thereby achieving the goal of transformation to new urbanization and innovative development. On the other hand, this was also partly related to the fact that Jiangsu Province is one of the most socio-economically polarized regions in China. In 2006, the ratio of GDP per capita between southern and northern Jiangsu reached 4:1 [32,121]. The excessive accumulation of capital for export processing in southern Jiangsu became a bottleneck for further development, while northern Jiangsu was comparatively undeveloped, raising the provincial government of Jiangsu’s concerns for change. In 2006, the Jiangsu government issued the “Notice

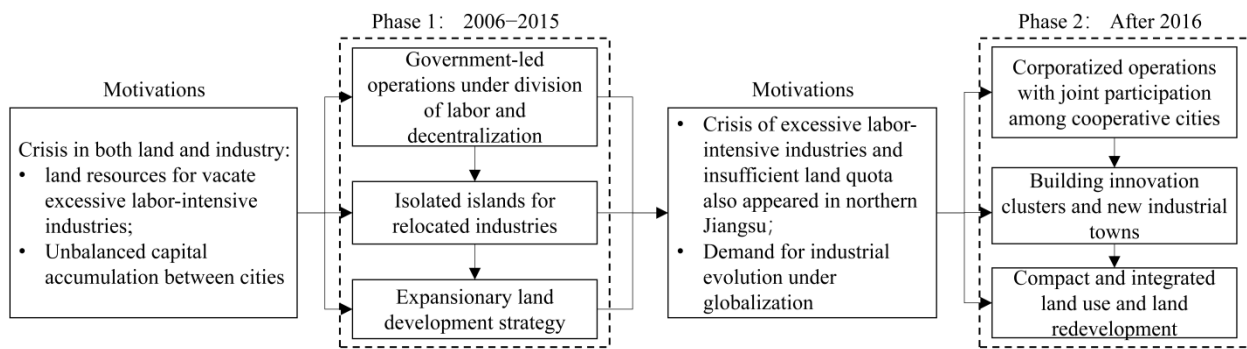
on Policies and Measures to Support the North–South Intercity Co-construction Park”, encouraging cooperation between city governments to jointly develop and co-construct industrial parks in northern Jiangsu. Administrative authority at provincial level, including taxation and approval, were delegated to these industrial parks, promoting and enabling a government-led development model in which the southern cities of Jiangsu focused on economic development and the northern cities focused on social services. Between 2006 and 2007, the first 10 parks were completed under the guidance of the Jiangsu government and the spontaneous cooperation of the cities concerned, which became the new growth model for cities, accommodating the relocated labor-intensive industries and adopting an expansionary land development strategy.

After 2016, cities in northern Jiangsu, were also confronted by a crisis of excessive labor-intensive industries and insufficient land quotas because of catch-up development, and the restructuring of the co-construction parks born out of the land and industrial crisis also took place. “The Notice on Policies and Measures to Support the High-quality Development of North–South Intercity Co-construction Park”, issued by the Jiangsu Provincial Government in 2016, drove the development and related policies of the co-construction of development parks. Institutionally, the Jiangsu government took the upgrading of development zone to provincial level as an incentive, as the process implied a higher level of empowerment than local co-construction parks. The process also promoted corporatized operations with joint participation between cooperating cities instead of governmentalized operations characterized by control under the division of labor and encouraged the introduction of market capital to participate in operations. As one local park head remarked in an interview:

*“The park has introduced the cooperation of a university’s research platform and two technology companies over the past two years who are responsible for the operation of the industrial park, and introduced more high-tech enterprises through their networks, which are currently under continuous and rapid development.”*

In terms of industries, the role of co-construction of parks has shifted to the localization of building regional innovation clusters and promoting the integrated development of production and residential areas. In terms of land use, co-construction parks have also shifted from the earlier approach of sprawling urban land use that was more applicable to labor-intensive industries to compact and integrated land use and an associated push for land redevelopment.

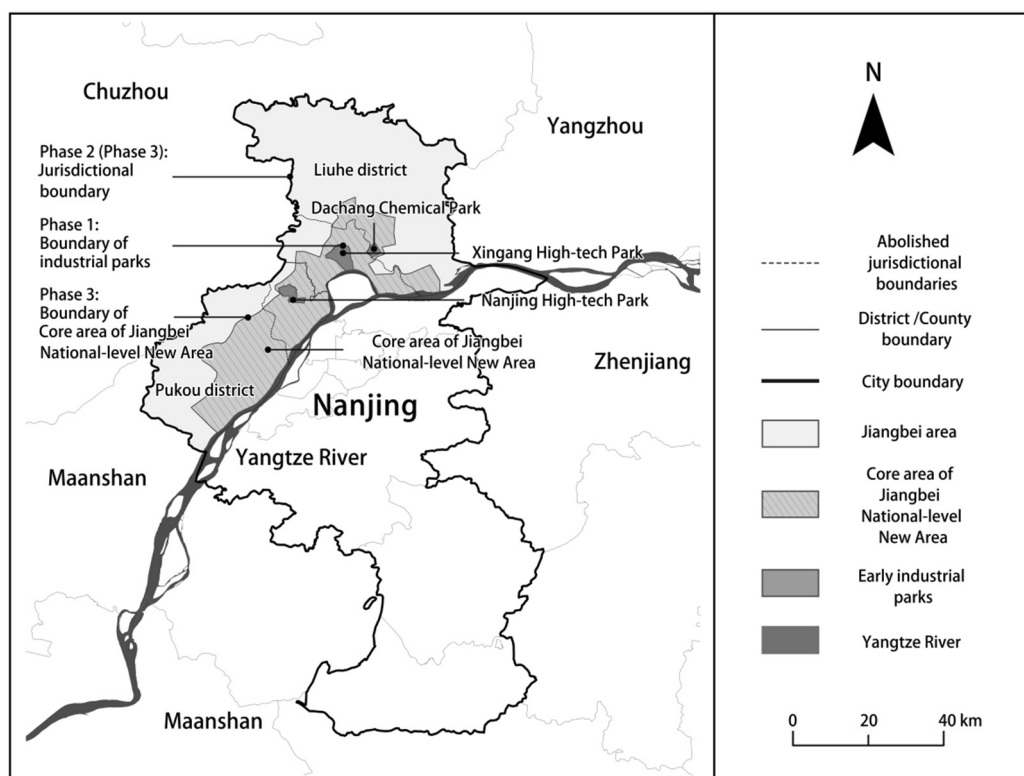
It is obvious that each institution, industry and land use pattern has been seen as both cause and effect during the emerging and ever-changing North–South Intercity Co-construction Park. Although the characteristics of the different dimensions of co-construction parks may be successively transformed at different stages, a complete set of institutional, industrial and land policies eventually emerge for the parks at different stages (Figure 6). For example, the parks used an administrative means of control under division of labor among cooperative cities to promote the relocation of labor-intensive industries and the expansion of land during the period of industrialization, with the help of the decentralized authority of the provincial government. Taking Jiangsu’s co-construction parks as a reference point, the phenomenon of Co-construction Park Fever has emerged in China and grown from southeast coastal areas into western inland provinces. In current studies, however, co-construction parks are often explored from several dimensions, including the evolution of governance models [121,122], the changing role of government [32,97], and economic performance in terms of regional resource allocation [123]. However, the development of single characteristics without the help of external forces is a myth, and the integrity and external driving forces, and the development of multiple characteristics of co-construction parks, tend to be ignored.



**Figure 6.** Evolution of multi-dimensional characteristics of The North–South Intercity Co-construction Parks of Jiangsu Province.

5.2. Metropolitan Level: Jiangbei Development in Nanjing by Development Zones

Nanjing is a megalopolis in eastern China and was the former capital of the Republic of China until 1949. The Jinling Manufacturing Bureau, built in 1865, was one of the earliest modern factories in China. Relying on its solid industrial base, the state set out a number of industrial projects in Nanjing in the 1950s, related to the steel and chemical industries and mechanical engineering, which were mainly set inside the historic Ming dynasty city wall (Figure 7) [124].



**Figure 7.** Evolution of physical layouts of Jiangbei development in Nanjing by development zones.

The development of the area north of the Yangtze River (Jiangbei) in Nanjing began in the 1990s when the market-oriented mechanism of land development began to affect the city’s manufacturing sector, raising land rents to levels that were beyond the reach of industrial enterprises. The high cost of land, the lack of space, complex property rights and aging infrastructure in the older central area limited expansion in scale and technological redevelopment of enterprises, and blocked the arrival of foreign companies [31,37]. The Nanjing municipal government began to look for new development spaces in the suburbs

to facilitate the spatial relocation of industries. As a riverside city, Nanjing has a traditional downtown area along the southern bank of the Yangtze River. Its construction land there is already saturated, but the vast area north of the Yangtze River was still in the early stages of development. This process of development has gradually become a key expansionist urban strategy for successive Nanjing municipal government leaders. In 1991, the Nanjing government built the first national high-technology zone north of the Yangtze River, and divided it into the Nanjing High-Technology Park, the Xingang High-technology Park, the Dachang Chemical Park and others. The parks were all able to share the privileges of a national high-technology zone and were managed and operated independently by a lean economic team, assigned by the municipal government, to provide production plants and equipment for enterprises, forming isolated islands with no external links or interconnections within the parks.

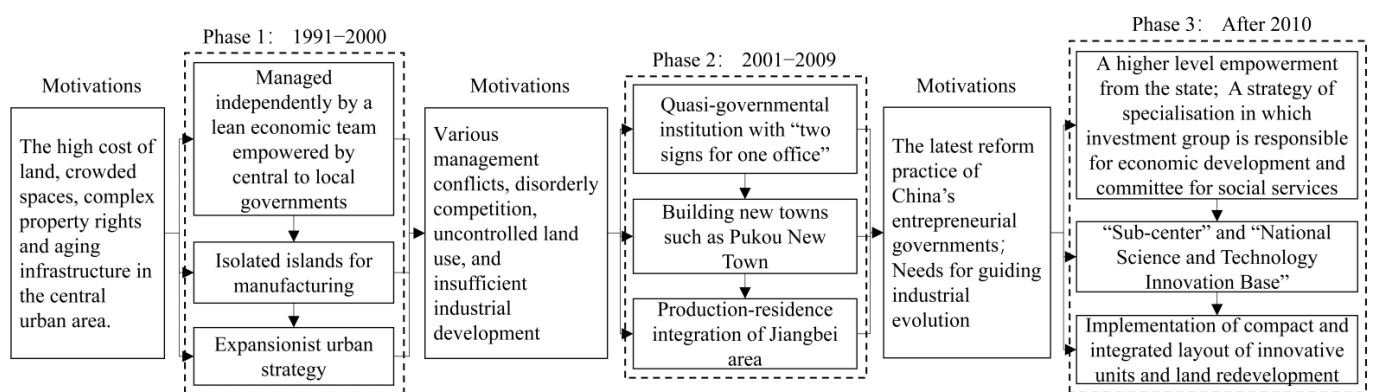
These isolated economic islands were bound to generate various management conflicts, as well as disorderly competition, uncontrolled land use, and insufficient industrial development. In 2001, when China became a member of the WTO, the Nanjing municipal government began to incorporate the development of new towns into the goals of the Jiangbei area. The release of the Nanjing municipal government's policy of "Revocation of Counties to Districts" and "Zone-government Integration" in 2002 marked the beginning of a spatial restructuring of the Jiangbei area. Nanjing's municipal government abolished the former Pukou District and Jiangpu County to establish the new Pukou District, did away with the Dachang District and Liuhe County to establish Liuhe District and gradually merged the administrative bodies of these two districts with those of the parks in the High-technology Zone. The High-Technology Zone and the administrative district were jointly headed by a single organizing group, forming a quasi-governmental institution with "two signs for one office", responsible for economic development and social services within the zone. With the land acquired by Zone-government integration and the infrastructure of the national high-technology zone in place, the strategy of building the Pukou New Town, that had been proposed by the Jiangbei area, was rapidly carried out, and new urbanization promoted quickly and efficiently.

After 2010, with the support of the Nanjing municipal government, the Jiangbei National-level New Area was established (approved in 2015), and was given a higher level of administrative authority with a core area of 386 km<sup>2</sup>, including jurisdiction over 788 km<sup>2</sup>, including all areas north of the Yangtze River in Nanjing. In the revision of the Nanjing Urban Master Plan of 2010, it was designated as Nanjing's "Sub-center" and "National Science and Technology Innovation and Advanced Industrial Base". In order to integrate the capitals of the existing development zones, Nanjing municipal government created Nanjing Yangzi State-owned Investment Group as a wholly state-owned enterprise, funded by the Jiangbei National-level New Area Management Committee, which is solely responsible for the economic development of development zones, while the Management Committee is responsible for social services. This mode reflects a strategy of specialization in which different institutions perform their respective functions, according to their own strengths, promoting development efficiently [3,4]. Since 2015, the Jiangbei National-level New Area has rapidly introduced a large number of global technology companies, such as the Taiwan Semiconductor Manufacturing Company (TSMC), and promoted the incubation of unicorn companies, achieving an average annual GDP growth rate of over 20%. Land use in the Jiangbei New Area gradually came to be characterized by a compact and integrated layout of innovative units that were designed to meet the needs of innovative enterprises. In order to promote this process, the Nanjing Municipal Government issued an overall plan for the transformation of land management in Nanjing in 2012 to encourage the delineation of mixed land for scientific research. In 2016, Nanjing issued more detailed rules for the implementation of redeveloping inefficient urban land [61].

It is evident that in post-reform China, industrial evolution and land use transformation does not exactly follow natural laws, but is guided and regulated instead by multiple levels of government (Figure 8). Meanwhile, government roles and their policy instruments



play a key role in promoting urban development. Currently, many studies focus on the industrial suburbanization of Nanjing and the building of satellite towns. Yuan and Gao, for example, studied the co-location of manufacturing and production services in Nanjing, and concluded that manufacturing enterprises and producer services in Nanjing exhibit trends of gradual outward migration and centralized layouts [35]. Li and Wang first considered the phenomenon of innovative suburbanization in Nanjing. Between 2008 and 2012, new high-technology enterprises and patents in Nanjing were mainly distributed in the suburban development zones of Jiangning, Pukou and Qixia Districts [25]. However, the reasons why manufacturing and productive services are gradually moving out and co-locating, and why innovation factors are clustering in the suburbs, are thought to be imply matters of industrial geography. The decisive role of government at all levels, from central to local, and the richness of their policy instruments, should not be ignored or simplified.



**Figure 8.** Evolution of multi-dimensional characteristics of Jiangbei development in Nanjing by development zones.

## 6. Conclusion: Theoretical Contributions and Research Prospects for Restructuring Development Zones

Since the “Second Transition” was formally announced in 2001, a multi-dimensionality of the restructuring process was accepted as a consensus in academic studies. The systematization of the above research represented the starting point for the theoretical contributions made by our review. Combined with the latest practices and research, the main innovations of this review and its contributions to exploring the theoretical value, and practical significance, of development zones are proposed at three levels: the zone, the city and global. This will help promote future practice and research into China’s development zones to ensure they develop in a more scientific and comprehensive direction.

### 6.1. Zone Level: Forming a Holistic and Dynamic Conceptual Framework for Understanding the Restructuring of Growth in Development Zones

The restructuring of development zones, which was characterized by globalization and the restrictive bottlenecks associated with the zones themselves, should be understood and applied from a holistic perspective, and the three-pronged framework of our review has attempted to do this. In recent years, overcoming the barriers associated with outdated institutional arrangements, strengthening market participation, promoting high-end industrial agglomeration and breaking the bottleneck of low-efficiency land use have become themes of the times for China’s development zones. Institutional, industrial and land problems and their restructuring in development zones have been widely regarded as forming a comprehensive and complex process for development zones [22,39].

To break through the complex development bottlenecks of development zones, it is therefore necessary to fully understand what these problems are and how they affect each other. By examining transitional processes, mechanisms and case studies, this paper has

demonstrated that three key components exist in the transition of development zones, and has explained how these components interact and jointly promote the restructuring.

From the standpoint of transitional processes, we analyzed the characteristics and mechanisms of the first and second stages of the restructuring process more systematically, with the help of the conceptual framework, which is dominated by export processing industries and urbanization [21,63,64]. The characteristics and mechanisms were displayed more clearly in the three-pronged framework, and their mutual relationships were verified. Moreover, we explored the mechanisms, processes and characteristics of the third stage [65,66]. This represents cutting-edge research, based on new trends of innovative economy, and mutual verification and induction were provided, based on the latest assumptions and sub-field on the current state of development zone transformation.

In the chapter on mechanisms, we systematized the current research results, based on the conceptual framework in different fields, from the perspective of the three dimensions of transitional institutions in development zones, the dual logic of industrial evolution in development zones, and two scales of land use transformation in development zones, based on the conclusions in studies on the impetus for restructuring development zones. As a more all-round review in recent years, this paper provides a more scientific and comprehensive reference for setting research protocols, indicator selection, analysis and the discussion of future research.

In the case studies, two cases that have often been discussed in previous research were chosen and studied again, and the shortcomings of existing research were revealed to clarify the mutual relationship and common development laws governing the complex impetus of the restructuring process. Although the existing literature plays an important role in our understanding of development zones in different dimensions, such as systems, industries and land, development zones in fact reflect a holistic process that highlights the importance and significance of adopting the conceptual framework [22,67–72]. If this approach is not taken, research in sub-fields will lead to the misinterpretation or misunderstanding of development zones and the restructuring processes that govern them.

## *6.2. City Level: The Internal Laws of Urban Transition in China Epitomized by Restructuring Development Zones*

As the most important urban growth pole and the main tool for the Chinese state's promotion of urban growth, development zones are not a closed system, and have to be restructured along with China's urban transition [1,4,22,39]. The attributes of the institutions, industries and land use in development zones are inspired by the three functions they play in restructuring modern Chinese cities. Inherent laws relating to this restructuring can be found, and these laws provide references for future research into China's urban transition [1,52].

Firstly, restructuring development zones reflects the spectrum of spatial (re)organization strategies from decentralization to recentralization [5,73]. Since the launch of the Open-Door policy, the Chinese state has distributed national projects to local governments in the form of development zones, forming a hunting pack for strategizing and competing for foreign direct investment [9–15]. The competition, cooperation and learning processes between local governments make development zones the most advantageous sector in the global production network [21]. However, as we have discovered, decentralized development is conducive to a rapid expansion of the scale of labor-intensive industries, but is unfavorable to the formation of a cluster effect and an innovation environment [15,16]. At the beginning of the twenty-first century, affected by the fluctuating environment of global production, the transformation of urbanization and innovation transformation shifted the priorities of development zone strategies to make the best of the advantages offered by clustering. The innovation corridors, joint investment groups, inter-city co-construction parks mentioned in this paper represent novel strategies for development zones to promote the cluster effect within, or between, cities [4,32,97].

Secondly, restructuring development zones reflects the urban governance logic of the alternate evolution of dualization and specialization. The restructuring of development zones coincides with two basic forms of logic that have governed the behavior of city governments during the post-reform stage. These forms are born out of the dual role of the Chinese government, and are considered to represent the integration of the roles of the entrepreneur and the service provider [18,74,75]. Exchanges between these two strands of logic determine the priorities and efficiency of urban development in different stages and these two forms of logic also run through the restructuring of development zones [24,57]. Different types of capital force the governance methods of development zones to take into account social and economic administration or exclusive economic operations. During the period of developing their export processing industries, the city governments saw development zones as isolated islands connecting the global production network to provide globalized products [10,21]. Management committees specializing in economic affairs were responsible for the zones, and the jurisdictional governments were responsible for social management and services. During the period of urbanization, the “second transition” promoted the co-location of the management committees and jurisdictional governments, forming a governance entity that integrated economic and social authorities, and promoted the coordinated development of industrialization and urbanization [21,63,64]. During the period dominated by innovative urban districts, the economic and social authority of development zones were redistributed again, and professional investment groups were established to take responsibility for economic development and to overcome the inefficiency of quasi-government management, while the management committees once again focused on social management and services [4,101].

Finally, development zones embody an increasingly integrated and compact Chinese strategy of land use. Based on the laws of global science parks, such as Silicon Valley and Tsukuba, urban land use is closely related to the needs of industrial evolution [17]. Combined with research on China’s development zones, it is currently believed that highly intensive, flexible, diversified and integrated land use is not only the result of industrial evolution, but also acts as a critical policy tool for promoting industrial evolution [117,125]. In the early years, the availability of large tracts of unconstrained urban land at low prices played an important role in attracting international processing capital, but it was an inefficient and scattered land use method, not conducive to the gathering of innovative talents, and blocked the formation of innovation environments and knowledge exchange [15,16]. A compact and diversified space for innovation clusters has become a new strategy for government from central to local levels in China to attract elements of global innovation. In fact, as stated in the case study analysis, the driving force behind land use transformation to promote industrial evolution stems from government actions, and this force should be fully understood and incorporated into research in the future.

All in all, these discussions prove that the laws and internal logics that Chinese cities follow in their transition will contribute to the theoretical innovation of Chinese and global urban studies in the future.

### *6.3. Global Level: The Unique Logic of China’s Development Zones as New Nodes in Global Production Networks*

On the global stage, this paper has reviewed and systematized the research on China’s development zones in the new era, which is vital for international researchers to understand the unique logic of China’s development zones.

From the aspect of mechanism, it has been proved that China’s development zones are different from science parks in western countries, which mainly rely on local investment, technology enterprises and the domestic markets and are driven by spontaneous growth [52,54]. Meanwhile, the latest research also considers that the process of power guiding capital accumulation, has resulted in a huge shift in the production organization structure and production methods used by the state in urban spaces [1,4,5]. However, discussions on how this process is accomplished have so far been vague and unfocused. The

reform of decentralization turns local governments into monopolies with sufficient levels of empowerment to enable them to take responsibility for profit and loss [75,76]. However, few studies have combined this with China's background of political reform and government action in institutions, industries, and land use in the post-reform period, weakening understanding of the mechanisms that explain why, and how, multi-level government in China has restructured development zones. By reviewing the latest research in related fields and the construction of a conceptual framework, this paper has discussed the restructuring in a more complete and real environment, rather than viewing its development as within a utopian context.

From the perspective of growth logic, based on our research review, we propose a growth path for development zones that is different from science parks in mature capitalist countries. The classic Schumpeterian theory regards the development of western science parks as a process of gathering, interacting and expanding areas of knowledge departments and small technology enterprises, and finally forming various industrial clusters, represented by Marshallian districts [52,54]. However, although industrial parks have been promoted in the development of countries in the second half of the twentieth century, they have met with less success. This makes it difficult for developing countries to gather a sufficient number of technological enterprises and knowledge departments to form an innovative economy. Developing export processing industries, urbanization and the agglomeration of innovative elements offer the solution, representing a roundabout path provided by Chinese development zones. This process is also considered to be a variant of Harvey's capital accumulation cycle (although there is still a debate on this) [8,37,50], and replacing the long-term process of free capital accumulation with government-guided centralized development, which is considered to be an effective method for developing countries to break through technological bottlenecks.

From a practical viewpoint, as the product of the third and fourth migration of global industries, industrial parks in developing countries are increasingly being constructed using Chinese development zones as models, and it is essential to fill in the blanks in the systematic review of China's development zones. As a successful institutional practice, development zones have been promoted by the Chinese government for different projects. For example, when the Belt and Road initiative was launched in 2013, the construction of overseas co-construction parks was promoted by China as a way of utilizing excess capacity. China's management pattern for development zones, based on a Leader panel/Committee/Investment company structure has been adopted by other countries to improve the efficient cooperation between transnational governments and the market [98,99]. As of 2018, 75 overseas co-construction parks have been put into operation in the "Belt and Road" area, and this has become a hot topic in the study of global industrial parks.

In summary, this article has reviewed and summarized current literature on the restructuring of China's development zones, and has strived to form a more comprehensive understanding of frontier trends. This will help academia to explore relevant experiences and provide lessons that could also serve as references for research on China's development zones, discussions on urban transition in China and the current upsurge in building industrial parks in less developed countries [126].

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