Developing Xiong'an New Area

A new regime for space production in China's national technopole?

Song, Yun; de Jong, Martin; Stead, Dominic; Liu, Zhaowen

DOI
10.1007/s43508-023-00076-z

Publication date
2023

Document Version
Final published version

Published in
Global Public Policy and Governance

Global Public Policy and Governance (2023) 3:292–308
https://doi.org/10.1007/s43508-023-00076-z

RESEARCH ARTICLE

Developing Xiong'an New Area: A new regime for space production in China's national technopole?

Yun Song[1] · **Martin de Jong**[2,3] · **Dominic Stead**[4,6] · **Zhaowen Liu**[5]

Received: 6 April 2023 / Accepted: 4 October 2023 / Published online: 13 November 2023

Abstract
Xiong'an New Area is not only a newly emerging and nationally endorsed technopole, it is also regarded as a test-bed for novel forms of governance and financial management in China. Although it is currently only in its starting phase, Xiong'an demonstrates that various institutional features are very different from those found in traditional technopoles, such as National High-tech Industrial Development Zones (NHTIDZs). How such institutional innovation affects feasibility and viability of the construction and maintenance of new high-tech metropolises is under-studied. This article develops a conceptual framework based on the theory of space production and identifies two types of space production, global industrialization and local urbanization, which are then applied to the NHTIDZs. Analysis of the situation in Xiong'an leads to the conclusion that Xiong'an represents a mode of strong state-led space production within China's governance modernization. This not only opens the door to a reconsideration of current land finance and social management systems but it also implies that the transferability of its institutional innovations is limited to other cities where imposing greater social control through technologies is possible.

Keywords Xiong'an · Technopole · Governance modernization · Land finance · China

1 Introduction

Advanced science and technology have become a strong engine of economic development as well as an important symbol of national power around the globe since early 1980s. This is certainly the case in China. In 1988, the former reformist leader Deng Xiaoping claimed that: "science and technology are primary productive forces (*keji shi diyi shengchanli*)" (People.cn, 2017). Science and technology parks or technopoles have been developed in the last three decades, starting with attempts to create National High-tech Industrial Development Zones (NHTIDZs), provincial development zones, and city-level industrial parks. A trend has emerged where

Extended author information available on the last page of the article

science and high technology are combined with urban expansion and regional collaboration. The current mode of NHTIDZs as a specifically Chinese style of building technopoles is regarded as the creation of exclusive spaces by the national and local governments with preferential policies and management privileges. Though the construction of NHTIDZs makes a significant contribution to China's high-tech development, its spatial form has also been criticized as being strongly disconnected from the urban context (Li & Kong, 2020). As a special form of urbanization in China, NHTIDZs are also influenced by the trend of property-led development, which is not necessarily conducive to an innovation-driven atmosphere (Wang & Leng, 2012).

Established in 2017, Xiong'an New Area represents a new generation of science and high technology driven urban development in China. Directly established by the State Council and the Central Committee of the Communist Party of China, Xiong'an has become one of the most important development zones and urban projects, following in the footsteps of the famous Shenzhen Special Economic Zone (SEZ) and the Pudong New Area in Shanghai. With its ambitious slogan of "Millennium Plan, National Event", Xiong'an has four main objectives: (1) to absorb the non-capital administrative functions of China's capital city Beijing for its administrative restructuring; (2) to develop as a regional pole and improve the regional spatial structure of the unbalanced Jing-Jin-Ji metropolitan zone; (3) to explore a new development mode for densely populated areas; and (4) to create a new engine for innovative development especially for science and high technology. Xiong'an is developed as a test lab for technology innovation and green urbanization, and it has received high-profile political endorsement from president Xi Jinping (Noesselt, 2020). As such, Xiong'an can be regarded as a new national-level initiative embraced by the political leadership and aiming to develop an incubator for innovative high-tech development and futuristic urban governance in China.

The idea of developing a regional development pole with innovative technology resembles the concept of a technopole, a term used by Castells and Hall (1994: 1, 8–9) to describe collaborative development led by governments, universities, and private companies with the objective of promoting technology innovation and industrial production. One of the defining functions of a technopole, according to Castells and Hall (1994) is to create the basic materials for an information economy. Industrial complexes such as Silicon Valley can be included under this definition by Castells and Hall because of the crucial role governments and universities played in them even though these initiatives were not deliberately planned. Thus, technopoles (both top-down state-led and bottom-up private-sector-led) can be regarded as growth poles driven by science and high-tech industries. While Xiong'an is another example of a state-led technopole initiative in China, it is institutionally very different from any existing science and technology initiatives in terms of land development financing and social management (Liu et al., 2020). This article aims to understand the extent to which Xiong'an represents a new approach for developing and governing technopoles, and the possible implications for employing a similar approach in other locations. To do so, this article examines the features of institutional innovation in Xiong'an from an urban governance perspective. Section 2 outlines the conceptual framework based on the theory of space production which is used to analyze different regimes of global industrial space

production and local property-led space production as imposed on NHTIDZs. Section 3 analyzes the land management and finance arrangements. Section 4 provides an in-depth analysis of the current implementation status of Xiong'an. Section 5 discusses Xiong'an's particularities in applying high technology in urban administrative and social management as a new style of technopole in China. The empirical data comes from official documents, urban conceptual and master plans, policy papers, and articles published by state media. The analysis sheds lights on the specific characteristics of contemporary technopole developments in China and the underlying ambitions of the state in applying technologies in urban development to achieve social management and control.

2 Conceptual framework

The extent to which Xiong'an represents a new approach for developing technopoles under a different urban governance regime is examined using a conceptual framework that focuses on the processes of space production. Based on the theory of the production of space, a city cannot simply be understood as an agglomeration of people and things in space: it has the practice of making its own space. According to Lefebvre (1992: 26), space can be also seen as a product, a means of control and domination of power. As such, the analysis of underlying social relations and social forms is central to understanding processes of space production. These underlying social relations and social forms can be examined with reference to regimes which, according to Stone (1989: 4), refer to a stable group with institutional resources for governing decision-making. Compared with direct command power of the state, a regime is formed as formal or informal basis for coordination without all-encompassing structure of command.

From this perspective, technopoles (NHTIDZs specifically) in China can be regarded as processes of space production with China's pursuit of modernity and high technology industrial development. On the one hand, NHTIDZs are exclusive spaces produced by the state, along with market forces, for the development of national high technology and competition at the global market (Li & Kong, 2020). Being placed in the suburban areas of cities, these development zones are comparatively detached from a city's historical developmental context (Clark, 2014; Oh, 2002). On the other hand, at the background of rapid urbanization processes in Chinese cities, NHTIDZs are affected and re-created by the local urban pro-growth policies. Enthusiasm among local states for property-led development also (re)creates spaces within NHTIDZs. Hence, two different regimes regarding China's technopole space production can be identified in terms of (1) global industrialization and (2) local urbanization.

2.1 Space production of global industrialization

Despite the emphasis on high technology, NHTIDZs share characteristics similar to other development zones regarding global industrialization in the process of space production. The 'development zone fever' in the 1990s refers to an early stage in China's economic reforms giving way to the global market with the establishment

of a large group of national and local industrial and high-tech development zones, in which NHTIDZs and National Economic and Technological Development Zones (NETDZs) were the major types of national development zones (Yang, 2009; Yang & Wang, 2008). As a special type of development zone, NHTIDZs are created by the central state taking the advantage of cheap land and labor, providing infrastructure, and preferential policies to attract foreign and domestic capital and high technology investment (Wang et al., 1998; Zhuang & Ye, 2020). In terms of the process of space production, NHTIDZs resemble other kinds of development zones as globalized industrial space which are created as homogeneous, replicable, and interchangeable spatial products for global production and capital circulation. We identify this regime dominating the process of space production as a regime for global industrial production (see Fig. 1). Moreover, the process of space production is accompanied by a massive amount of farm land conversion and development, eviction and relocation of residents, and migration of workers, which brings significant change to social networks and structures as well as to cultural and demographic landscape of recipient cities (Kong & Chen, 2016). The literature names such industrial space production a Chinese "enclosure movement" (Li & Kong, 2020), referring to historic land enclosure and privatization processes during the British industrialization during eighteenth to nineteenth century.

The exclusive nature of globalized industrial space is a process of deconstructing and then reconstituting the ensemble of local relationships, context, and organization, altering them to meet the new needs of globalized industrial production (Deleuze & Guattari, 1987). Li and Kong (2020) state that the practice of NHTIDZs in general demonstrates the phenomenon of "isolated industrial islands", reflecting the difficulty of integrating NHTIDZs within broader local and regional development. The current literature also portrays social isolation in high-tech and industrial

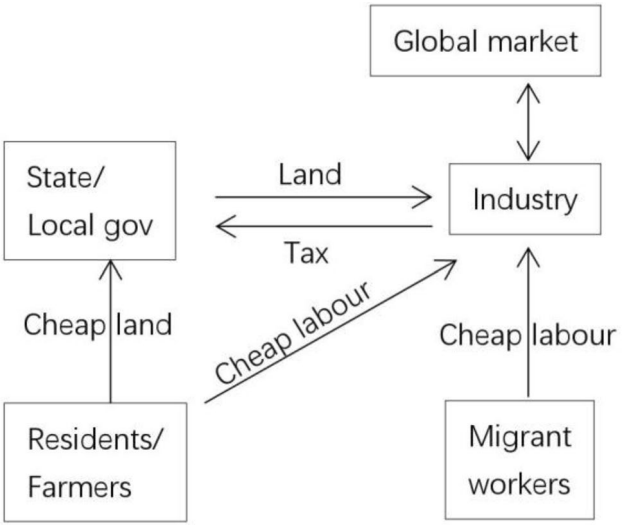

Fig. 1 Regime for global industrial production

zones as local resistance to globalization in the cases of Durban industrial zone of South Africa (Scott, 2003), and Hsinchu Science Park of Taiwan (Tsai, 2015).

In practice, the NHTIDZs during the past two decades have shown a clear spatial shift from being geographically widely and evenly distributed in the early stages (Wang et al., 1998) to extremely unevenly distributed and located primarily in the developed coastal regions where foreign direct investment (FDI) and export-oriented development zones are concentrated (Wei, 2015; Zhuang & Ye, 2020). The preferential policies for high technology development are increasingly expected to be phased out (Wang et al., 1998), since they are regarded as more suitable for industrialization than for innovation (Zhuang & Ye, 2020). Additionally, one major debate in the current literature on technopoles is whether the advantages of physical proximity for partners in traditional industrial parks, complexes, and platforms still matter with the rise in importance of information and communications technologies (ICTs) (Miao et al., 2015), thereby drawing into question the assumed rationales and roles of NHTIDZs.

2.2 Space production of local urbanization

Apart from the production of global industrial space, NHTIDZs have also played a key role in the overall processes of urbanization. Zhuang and Ye (2020) discovered that the new surge of NHTIDZs is accompanied by rapid urbanization as NHTIDZs provide industries, technologies, and fast conversion and production of development land and space. Meanwhile, Gao et al. (2018) report that the (re)development process of China's urban industrial land is full of inconsistencies, with tensions and conflicts between central and local governments and broad societal resistance. The mechanism of China's rapid urban growth is often explained with the institutional decentralization in 1990s and included the so-called tax-sharing reform and the establishment of markets for land, the combination of which made local authorities more entrepreneurial (He & Wu, 2009; Tao et al., 2010; Wu, 2018). Hsing (2010) illustrates the shifting agenda of the local authorities from industrial production to property-led space production and she stated that urban construction has already dominated local development agendas (Hsing, 2010, p.114). Based on the current literature, we identify a regime for producing local urbanization, in which a government-led growth coalition with interest groups including developers is formed based on land value capture (see Fig. 2) (He & Wu, 2009; Qian, 2007; Zhang, 2002).

The current literature identifies two main ways in which high-tech zones such as NHTIDZs are affected by the local property-led space production. First, the merger of development zone committees and district level governments has opened a window for integrated urban development of development zones while also offering opportunities for property-led development under the local urbanization regime. For example, Qian (2007) reports that a local government-led growth coalition emerged as a result of Hangzhou's NHTIDZ which then resulted in new dynamics of resource allocation. Second, district level governments can use neighboring NHTIDZs for attracting businesses and promoting local urban growth. Wang and Leng (2012) report that Yangpu district government of Shanghai used the Zhangjiang NHTIDZ

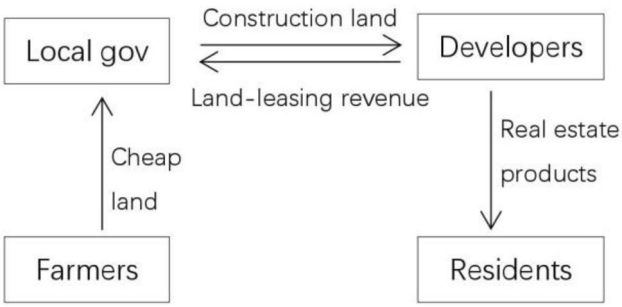

Fig. 2 Regime for property-led space production

as a means of city branding for developing local commercial and residential property development. In both ways, the real estate sector made headways into high technology development zones for property-led space production. There is even a special term for this type of development, "technology property" (*keji dichan*), which means developing real estate in development zones and science and technology parks (2017b; Xinghua News, 2017a). The development of the real estate sector is regarded as more successful than that of technological innovation in the case of Shanghai's NHTIDZ (Wang & Leng, 2012). Booming real estate and a regime in which local urban growth prevails have created an environment where it is difficult for small and medium-sized innovative enterprises to thrive as they are forced to escape escalating rents and land prices and suffer from a lack of venture capital (Zhou, 2007). Despite having an image of fast modernization and urbanization, the growth mechanism as it exists in Chinese cities has been criticized in the literature. Wei (2015) argues that local governments in China are less committed to controlling urban growth and land expansion while they encourage the promotion of development zones and projects. But still the fever in urban projects and growth overall has not only led to high levels of local debt but also to wasteful development, corruption and social unrest. This has brought in view limitations to the current mode of building technopoles, administrative reforms, and policy change may be due to create new forms of urban space production.

2.3 Toward a new regime?

NHTIDZs can be understood as a product of space where different kinds of regimes, including the regime of global industrial production and the regime of property-led space production, contest with and are superimposed on each other, shaping and reshaping the space of NHTIDZs with multiple rounds of development. Although NHTIDZs have made possible remarkable achievements in China's technological, economic and urban development, the existing types of regimes limit the future development of NHTIDZs in various ways. Chinese cities keep introducing and experimenting with new types of high-tech urban projects, such as science and technology parks, university towns, and smart and innovative cities. However, as most of the city-level planning experiments cannot generate any paradigmatic change in

the current regimes, Xiong'an New Area can be seen as one of the most important national experiments in decades for developing new forms of economic development, urban planning, and governance and has the potential to address the issues mentioned above.

The key objective of this paper is to examine whether Xiong'an's practice reflects a new form of regime in producing high technology urban space. Examining Xiong'an in terms of regime theory can help demonstrate the key difference between Xiong'an and other NHTIDZs, cities, and national new areas. Second, analyzing and comparing different regimes can show whether and how Xiong'an's new regime can be transferred to other cities. Third, this paper also aims to study whether Xiong'an's new regime represents the direction of policy change and institutional reform in future or just a special case.

3 Xiong'an as a new model?

3.1 Historical context

Xiong'an New Area is a city "born with a golden spoon in its mouth". On 1 April 2017, the State Council and the Central Committee of the Communist Party of China (CCCP) announced the project of Xiong'an as a national new area after Shenzhen special economic zone and Shanghai Pudong New Area (2017b; Xinhua News, 2017a). Located in Hebei province, 105 km Southwest of Beijing, 105 km West of Tianjin, and 50 km east of downtown Baoding, Xiong'an New Area is established at the confluence of three counties, Xiong, Anxin, and Rongcheng with a total population of 1.4 million in 2017 (see Fig. 3). On 21 April 2018, the official planning guidelines for Xiong'an were published specifying its long-term goal for the mid-twenty-first century: building a high-quality socialist modernized city with characteristics of sustainable development, innovative base, regional integration, and a global center for opening-up (Xiongan.gov, 2018).

Within the "Jing-Jin-Ji (Beijing-Tianjin-Hebei)" regional urban agglomeration system, Xiong'an aims to rebalance the region as a new development pole within Hebei province. Compared with other two major regional urban agglomerations in China, Pearl River Delta (PRD) and Yangtze River Delta (YRD), Jing-Jin-Ji is regarded as the least integrated because of the absolute dominant position of the nation's capital Beijing extraction of valuable economic and social resources from Hebei province (Lu et al., 2020). Hebei has been regarded as a "landfill" for Beijing for relocating all undesirable and heavily polluting industries and it has been plagued by one the worst levels of air pollution in China. Previous attempts to build a third development pole next to Beijing and Tianjin in the Hebei capital city of Shijiazhuang are generally regarded as unsuccessful. Thus, though the project of Xiong'an is formally administered by Hebei province, politically it is directly under the supreme national leadership of President Xi. Furthermore, Xiong'an can be understood as "the second capital" as one of its key missions is to become home to Beijing's so-called "noncapital functions". Although an exact definition of noncapital functions is missing, the purpose of this strategy is to improve the living

Fig. 3 Location of the Xiong'an New Area

environment of Beijing which has been long criticized as congested and overpopulated. Previous attempts to outsource noncapital functions to Tongzhou district as Beijing's second administrative center in 2015 showed limited results, as Tongzhou enjoyed low attractiveness and can simply be seen as just another commuter town (*shuicheng*) within Greater Beijing. Hence, the high-profile project of Xiong'an is aimed at fulfilling this task.

3.2 New features of the urban development approach

The original narrative behind Xiong'an reveals a strong motivation to create a new approach for urbanization and away from the dominant government-led but pro-growth oriented regime based on land value capture. On 2 April 2017, just one day after the news on the Xiong'an project was officially released, the real estate market reacted very quickly with local property prices skyrocketing to 11,000 yuan per square meter from the previous 4000–8000 yuan (BBC Chinese, 2017). Large groups of people from Beijing lined up at bus stations to visit the existing counties of Xiong'an and planned to buy properties there in advance to make profits out of its future development (NetEase, 2017). Within 48 h, the central government froze the property exchange market there, and one county official was even arrested for making profit based on insider information (BBC Chinese, 2017). One year later, the official planning guidelines of Xiong'an specified its land and property development strategies as "strictly prohibiting large-scale real estate development" (Xiongan.gov, 2018). The principle of land development in

Xiong'an is "no land finance (*buyao tudi caizheng*)", which refers to the mode in the existing regime in which local governments rely on one-time land-leasing revenues to cover the costs of infrastructure construction and complement local government expenditure on municipal services. Until November 2020, three and a half year after its release, there had been 29 land deals completed in Xiong'an with total 25.07 km^2 of residential and commercial land. All but one was made with direct transfer, only one through an auction in the land-leasing market. All 29 parcels were obtained by the City Development and Investment Corporation of Xiong'an Group, a fully state-owned company functioning as the local government's financing platform for urban and infrastructure development (NetEase, 2020). Hence, thus far, Xiong'an has not yet opened its land market to the private sector and the development of the city is heavily, if not fully, reliant on public funding. Although the land market of Xiong'an is still frozen, its objective is to test innovative land policies for the future reform of China's land management. The planning guidelines specify several strategies in land supply and exchange: (1) transferring land to infrastructure constructors, usually transit providers, as public capital investment for infrastructure development; (2) renting land, or "first rent, then transfer" policy (Xiongan.gov, 2018). The land rental system suggests an experiment of public ownership in land development.

Xiong'an also aimed to create innovation to the social management system with information and communication technologies (ICTs), also known as 'digital governance' (Idzi & Gomes, 2022; Jia & Chen, 2022), especially regarding to the establishment of China's social credit system. Although Xiong'an still follows the current household registration system (*Hukou*) and temporal resident permit system as the main access to public services, it has shown the ambition to become China's first social credit system demonstration zone based on the block-chain technology and big data for the monitoring, evaluation and risk assessment of the social credits of corporations and individuals (Xiongan.gov, 2019). The social credit system for individuals will become a fundamental social management institution that not only influences access to public services but also affects nearly every aspect of their daily lives ranging from housing, employment, and mortgages to children's education. With the social credit system on the way, Xiong'an has been already testing its "scoring system" with the Poverty Reduction Program (PRP). With the famous slogan "to eliminate poverty in 2020", the PRP is President Xi's signature policy as well as a nation-wide movement to mobilize the entire population of grass-roots civil servants and let them provide economic and social assistance to the underprivileged class. The PRP scoring system in Xiong'an covers all 4850 families living in poverty in the local three counties (Xiongan.gov., 2020). With a newly developed smart phone application, grassroots civil servants will visit each family once a month and award scores on the application based on seven dimensions: living environment, family harmony, employment, education, social behavior, poverty reduction policy, and personal appearance and spirit. If it earns a high enough score, each household can exchange daily necessities at both online and offline platforms. It is not unreasonable to expect that the social credit system will play an important role in distributing social resources across groups of people, including access to housing. For example, talented and highly skilled workers that can contribute to high-tech

development in Xiong'an are likely to gain social credit advantages and obtain priority in renting or purchasing houses.

Xiong'an shows state strong involvement in the application of the latest ICT technologies including artificial intelligence (AI) and block-chain in its urban, infrastructure and social management systems. The main strategy is to establish a so-called "national team" of technology innovation platforms with the involvement of top Chinese internet-based companies. They are invited to invest and test their latest technologies in Xiong'an's urban development and management process. For example, the first four national AI innovation platforms were released by the end of 2017: (1) a smart traffic system in collaboration with Baidu on driverless car development; (2) an urban cognition and simulation system in collaboration with Ali Cloud for the benefit of an AI public management system; (3) an AI medical imaging system developed by Tencent; and (4) an automatic speech recognition technology developed by iFlytek (Sina finance, 2017). These innovation platforms are more than mere research centers as they are granted permission to apply their technologies in Xiong'an's public infrastructure development and public management systems. iFlytek's speech recognition technology has already been applied to the local judicial system as a part of a project to develop Chinese "smart courts". Underlying the AI public management system developed by Alibaba Group's Ali Cloud is the objective to build Xiong'an's smart infrastructure for city simulation, risk management, and real-time monitoring based on the company's technological knowledge base in cloud computing, big data, smart logistics and e-commerce.

4 Current development of Xiong'an

Today, 6 years has passed since the establishment of the Xiong'an New Area, it is necessary to review and summarize the implementation of the construction and development of the project. In this section, we will focus on reviewing three aspects of implementing Xiong'an in terms of investment and financing, business and enterprise development, and talent attraction.

First, Xiong'an New Area has completed quite impressive achievements in terms of infrastructure construction and urban development, but its urban development model is heavily relied on state-led financing approaches, such as development finance and direct government investment. Currently, 240 key infrastructure and urban projects have been planned which expect a total investment of more than 800 billion CNY. Until 2023, about 660 billion CNY has already invested in the construction of the 38 km^2 Xiong'an starting area (People.cn, 2022). Three main financing approaches can be identified: (1) direct government investment from the central government and Hebei provincial government; (2) direct development finance through state development finance institutions such as the China Development Bank; (3) market financing tools such as public–private partnership (PPP). Direct development finance is the major financing approach accountable for most infrastructure and urban development. However, unlike other cities where development finance is operated through special bonds and local governmental finance vehicles which seek returns from land-leasing and land-related revenue of later development,

Xiong'an has ruled out the regime of property-led production at the very beginning. With the absence of a clear alternative financial mechanism in Xiong'an, its development finance is operated by the credit of the central government, which can be seen as another form of government investment. Hence, the practice of Xiong'an has not proposed any alternative regime of land finance for other cities. Relying on government investment and government credit suggests that Xiong'an's development model has very limited transferability to other cities.

Second, the current business development model in Xiong'an is led by state power and is heavily relied on state-owned enterprises. Currently, 4 central state-owned enterprises (CSOEs) and 150 subsidiary SOEs have already (re)located in Xiong'an (Xinhua News Agency, 2023). Clearly state power has shaped the business development model in this phase in the name of "accepting the noncapital function from Beijing", which is the current major objective of the Xiong'an project. SOEs may be enthusiastic to invest in Xiong'an as they often see it as a political mission. Using political power and administrative order to shape business development may have a short-term flourish, because SOEs often do not consider the return of investment out of political power, which may lead to excessive debt in future. Additionally, excessive reliance on SOEs may create an overly single business environment, which is not conducive to technology innovation. This may bring challenges to Xiong'an as it aims for developing into a key technopole in future.

Third, the political objective of transferring noncapital functions from Beijing to Xiong'an also requires the transfer of the talented and highly skilled workers, but due to the institutional privileges of Beijing, Xiong'an is facing challenges in attracting talents. A key institutional barrier is the Beijing *hukou*, because Beijing *hukou* is not only a place of household registration, but also a passport to the best resources in the country, including public services, education, medical care and etc. If the talented and highly skilled workers are reluctant to give up their Beijing *hukou* and transfer to Xiong'an, then Xiong'an is upmost a working place for them. Even with tough political orders, it may be effective in transferring organizations from Beijing to Xiong'an, but when it comes to transferring the talents, there are many soft resistances. For example, in March 2023, 4 universities in Beijing are requested to move to Xiong'an. They are China University of Geosciences, Beijing Jiaotong University, University of Science and Technology Beijing, and Beijing Forestry University (sohu News, 2023). The original plan was to fully relocate these 4 universities by the end of 2035. However, all 4 universities have stated that they will still retain their old campuses in Beijing while opening a new campus in Xiong'an. It can be seen that Xiong'an will face great challenges in attracting talents from Beijing. If the future development of Xiong'an is still limited to accepting noncapital functions from Beijing, it will face the dilemma of not being able to retain talents.

5 Discussion: a new-style technopole?

There are currently 157 National High Technology Industrial Development Zones (NHTIDZs) in China, but very few of them are considered as successful national bases for technological innovation, with the possible exceptions of Zhongguancun

NHTIDZ in Beijing, the Zhangjiang NHTIDZ in Shanghai and the Suzhou Industrial Park in the province of Jiangsu. The successful ones tend to have more intensive collaboration with local universities and research institutes. However, high level education and research resources are extremely unevenly distributed in China, as most of the research power and innovation and high-tech companies are located in the most developed regions like Beijing, Shanghai, and Shenzhen. Taking the AI innovation base as an example, 28 out of 50 of the AI unicorns in China are located in Beijing and 21 of them located in the Haidian district where Zhongguancun NHTIDZ and Tsinghua University are located (Aiera, 2019). Thus, most of the remaining NHTIDZs, especially those in Central and West China, actually operate as development zones for global industrial production. The differences between these NHTIDZs and other export-oriented development zones such as NETDZs are not obvious. As nearly every major city in China has established its own NHTIDZ and concomitant preferential policy to attract high technology industry and research institutes, the competition among NHTIDZs is so fierce that corporations consider many other factors beyond the NHTIDZ itself. A city's overall development conditions tend to come more strongly to the fore including factors, such as economic performance, business environment, regional and international transportation accessibility, as well as supporting factors, such as social equality, stability, the built environment, and living standards. Hence, high technology space production is obviously interwoven with local urban development processes.

From the perspective of building a technopole, Xiong'an New Area has shown a much higher degree of integration between high technology space and overall urban project development and governance. In comparison with regular space production in NHTIDZs, segmentation between development zone space and urban space can be avoided in Xiong'an. The major difference between Xiong'an and the currently successful examples of NHTIDZ such as Zhongguancun in Beijing is that Xiong'an can function as a real-world test-bed agglomeration for the application of high technology solutions toward an integrated smart city development and management. Being granted access to the public administrative and management systems, high technology giants are not only attracted to try their latest technologies, but also examine the prospects for their future wider application to other Chinese cities. However, the current development of Xiong'an has also revealed that the business and enterprise development is highly driven by state power and limited to transferring central state-owned enterprises. This is actually not surprising since Xiong'an has been a highly politicized urban project from the start.

On the other hand, Xiong'an's new approach in land development and finance forestalls the dominance of property-led development in urban space production. However, the current implementation of Xiong'an has also shown that its urban and infrastructure development are heavily relied on government direct investment and development finance backed by state credit. Since Xiong'an has not yet proposed an alternative regime of land finance, this not only limits the transferability of the development of Xiong'an to other cities, but also has rather limited contribution to the institutional reform of the regime of property-led production dominated in other cities.

Xiong'an can certainly be analyzed and examined as an emergent technopole, but its ambition levels go far beyond the scope of a technopole alone in the sense that it has high political significance. Xiong'an's regime provides a new approach to producing high technology space exceeding the current space production for global industrialization and local urbanization. Its space production is in fact based on highly concentrated state power and resources. When reviewing the implementation process and the changes in governance mode in Xiong'an, its current development is highly dependent on direct investment and development finance from the central government. There is not yet in place a new economic model or regime that can replace the existing one. Consequently, Xiong'an is under normal circumstances not a space production model that can be universally and directly transferred to the every city in China at the moment. It represents a model for the future situation that local governments no longer need the current regime of property-led production to promote urban development. Such situation can most likely appears in those advanced megacities when their urban expansion process peaks and seek alternative model for specific target-oriented development instead of general property-led development.

What Xiong'an can claim to become is a model for the integration of high technology, urban physical infrastructure and social management. It is still too early to tell what type of new technopole Xiong'an will represent as it will take decades to see if this area can develop into a genuine technopole of global impact. A key consideration will be whether Xiong'an will prove able to generate a propitious environment for small and medium innovative business to thrive: this has been an important characteristic of successful technopoles like Silicon Valley. Otherwise it is more likely to evolve into a socialist ideal monument city with high-tech characteristics.

6 Conclusions

Xiong'an is of great importance in Jing-Jin-Ji's regional development as its third development pole in Hebei ready to receive and host all outsourced noncapital functions from Beijing. While most cities in China compete to attract qualified migrants for local economic development, Beijing is one of the cities trying to curb its population growth. This is not an easy task, given that very few people will voluntarily leave the nation's capital and access to the highest quality of public services. With the construction of the interconnected high-speed transit network, Xiong'an aims to provide a built environment and living conditions including affordable housing as well as job opportunities that may be up to this tremendous job.

Xiong'an New Area can indeed be regarded as a national project to build a whole new city. With the name "new area" instead of "city", Xiong'an links back to China's history of national development zones, especially regarding the Shenzhen Special Economic Zone and Shanghai Pudong New Area. Shenzhen is the milestone of Deng Xiaoping's Reform and Opening-up era, and Shanghai Pudong marks China's headways into the global market after joining the WTO. Apparently, Xiong'an, on the other hand, represents China's latest achievement under Xi Jinping as it

demonstrates the comeback of strong state power and state-led business development with SOEs.

Xiong'an also seeks to develop new approaches in land development, establishing new forms of social relations and space production reflecting the regimes for industrial production and property production. On the one hand, the regime for globalized industrial production in traditional NHTIDZs has its limitations in the development and application of high technologies due to its exclusive use of industrial space for labor-intensive production for the global market. On the other hand, the regime for property-led space production and urban development shows an increasing reliance on the land-driven economy and property-led development which poses risks for urban overdevelopment and local debt accumulation, as well as social inequity, conflict and polarization. Xiong'an's new regime not only indicates a strong ambition to integrate high-tech production with urban space, but also introduces strong control mechanisms on the land-driven economy, emphasizing social distribution and restraining market speculation. However, Xiong'an's new regime is heavily relied on the political and administrative power of central government which indicates that it will have rather limited transferability to other cities in the production of high technology space. Therefore, Xiong'an can be regarded as a special city case rather than a model of urban governance reform.

Seen as an incubator for high-tech innovation, Xiong'an certainly has characteristics allowing it to evolve into a technopole. With progressive institutional adjustments adjudicated to land development policies, housing policies, and social management policies, Xiong'an has shown a novel type of space production that departs from global industrial space production in existing NHTIDZs and local property-led space production undertaken by entrepreneurial local governments. Stronger state involvement and a stronger position of the state vis-à-vis market players can also be observed. The state also aims to take the lead in conceiving and applying high-tech information technologies on Xiong'an. In cooperation with the Chinese Artificial Intelligence giants, Xiong'an has established innovation platforms where the latest information and communication technologies can be deployed to its urban infrastructure development and social management system to test the effects of integrated smart city solutions. Facial recognition, big data, and 5G in combination with a new social credit system have been the first steps in installing mass social surveillance. It is not far-fetched to claim that Xiong'an, beyond being just a technopole for a new era in space production, is also an attempt at introducing a new economic governance regime where the public sector is the brain and private sector the hands of economic production and consumption, and a future urban governing style with which governments are capable of managing every single citizen with the latest achievements of high technology and infrastructure development.

Acknowledgements The first author received research funding from the China Scholarship Council. We would like to acknowledge feedback from the workshop "Governance and Emerging Technological Change in China" held by the University of Duisburg-Essen, Germany in November 2020.

Data availability The author confirms that all data generated or analysed during this study are included in this published article. Primary and secondary sources and data supporting the findings of this study were all publicly available at the time of submission.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

Aiera. (2019). *'2019 Zhongguo rengong zhineng baipishu'['2019 White Paper on AI unicorns in China'].* http://www.cbdio.com/image/site2/20190916/f42853157e261ee994f501.pdf

Castells, M., & Hall, P. (1994). *Technopoles of the world: The making of twenty-first-century industrial complexes*. Routledge.

BBC Chinese. (2017). *'Zhongguo xuanbu de Xiongan xinqu shi zenme yihuishi?'['What is going on with China's newly released Xiong'an New Area?'].* https://www.bbc.com/zhongwen/simp/chinese-news-39478216

Clark, J. J. (2014). Siting 'scientific spaces' in the US: The push and pull of regional development strategies and national innovation policies. *Environment and Planning C: Government and Policy, 32*(5), 880–895. https://doi.org/10.1068/c1271r

Deleuze, G., & Guattari, F. (1987). *A thousand plateaus capitalism and schizophrenia* (B. Massumi (Ed.)). Continuum.

Gao, J., Chen, W., & Liu, Y. (2018). Spatial restructuring and the logic of industrial land redevelopment in urban China: II. A case study of the redevelopment of a local state-owned enterprise in Nanjing. *Land Use Policy, 72*, 372–380. https://doi.org/10.1016/j.landusepol.2018.01.006

He, S., & Wu, F. (2009). China's emerging neoliberal urbanism: Perspectives from urban redevelopment. *Antipode, 41*(2), 282–304. https://doi.org/10.1111/j.1467-8330.2009.00673.x

Hsing, Y. (2010). *The Great Urban Transformation*. Oxford University Press.

Idzi, F. M., & Gomes, R. C. (2022). Digital governance: Government strategies that impact public services. *Global Public Policy and Governance, 2*(4), 427–452. https://doi.org/10.1007/s43508-022-00055-w

Jia, K., & Chen, S. (2022). Global digital governance: Paradigm shift and an analytical framework. *Global Public Policy and Governance, 2*(3), 283–305. https://doi.org/10.1007/s43508-022-00047-w

Kong, X., & Chen, D. (2016). The influence of suburban development zones on deconstruction of placeness of the host regions: A case of Changsha economic and technological development zone (Chinese literature). *Human Geography, 31*(4), 26–32.

Lefebvre, H. (1992). *The production of space*. Wiley-Blackwell.

Li, Y., & Kong, X. (2020). Production of space and multi-dimension segmentation characteristics of China's hi-tech parks (Chinese literature). *Studies in Science of Science, 38*(5), 806–812.

Liu, Z., de Jong, M., Li, F., Brand, N., Hertogh, M., & Dong, L. (2020). Towards developing a new model for inclusive cities in China—The case of Xiong'an New Area. *Sustainability, 12*(15), 6195. https://doi.org/10.3390/su12156195

Lu, H., de Jong, M., Song, Y., & Zhao, M. (2020). The multi-level governance of formulating regional brand identities: Evidence from three Mega City Regions in China. *Cities, 100*, 102668. https://doi.org/10.1016/j.cities.2020.102668

Miao, J. T., Benneworth, P., & Phelps, N. A. (2015). *Making 21st Century Knowledge Complexes: Technopoles of the world revisited*. Routledge.

NetEase. (2017). *Pictures of crowds visting Xiong'an for property purchase*. https://money.163.com/photoview/251H0025/30198.html?from=tj_xgtj#p=CH1MSCMU251H0025

NetEase. (2020). *'Xiongan xinqu churang de tudi douzai zhelile, quangbu bei zhejia gongsi nale'['All of transferred land of Xiong'an obtained by this company'].* http://mp.163.com/article/FQJ05UJP0517QRHO.html

Noesselt, N. (2020). A Presidential Signature Initiative: Xiong'an and Governance Modernization under Xi Jinping. *Journal of Contemporary China*. https://doi.org/10.1080/10670564.2020.1744378

Oh, D. S. (2002). Technology-based regional development policy: Case study of Taedok Science Town, Taejon Metropolitan City, Korea. *Habitat International, 26*(2), 213–228. https://doi.org/10.1016/S0197-3975(01)00044-3

People.cn. (2017). *'Kexue jishu shi diyi shengchanli'['Science and technology are primary productive forces']*. http://cpc.people.com.cn/n1/2017/0119/c410539-29036094.html

People.cn. (2022). *Xiong'an has planned 240 key projects for a total investment of 800 billion CNY*. http://www.rmxiongan.com/n2/2022/1122/c383557-40205396.html

Qian, Z. (2007). Institutions and local growth coalitions in China's urban land reform: The case of Hangzhou High-Technology Zone. *Asia Pacific Viewpoint, 48*(2), 219–233. https://doi.org/10.1111/j.1467-8373.2007.00341.x

Scott, D. (2003). "Creative destruction": Early modernist planning in the South Durban Industrial Zone, South Africa. *Journal of Southern African Studies, 29*(1), 235–259. https://doi.org/10.1080/03057070320000060458

Sina finance. (2017). *'Rengong zhineng "guojiadui" xiongan dengchang jiang zheyang gaibian nide shenghuo'['AI "national team" of Xiong'an will change your life like this']*. http://finance.sina.com.cn/china/dfjj/2017-11-30/doc-ifyphxwa7201680.shtml

Sohu News. (2023). *Transfer of four Beijing universities to Xiong'an*. https://www.sohu.com/a/662786576_203914

Stone, C. N. (1989). *Regime politics: Governing Atlanta, 1946–1988*. University Press of Kansas.

Tao, R., Su, F., Liu, M., & Cao, G. (2010). Land leasing and local public finance in China's regional development: Evidence from prefecture-level cities. *Urban Studies, 47*(10), 2217–2236. https://doi.org/10.1177/0042098009357961

Tsai, Y.-L. (2015). Behind the economic success of Taiwan's Hsinchu Science Industrial Park: Zoning technologies under neo-liberal governmentality, ongoing primitive accumulation, and locals' resistance. *Journal of Comparative Asian Development, 14*(1), 47–75. https://doi.org/10.1080/15339114.2014.1000352

Wang, J., & Leng, T. (2012). Production of space and space of production: High-Tech Industrial Parks in Beijing and Shanghai. *Cross-Currents: East Asian History and Culture Review, 1*(1), 47–73. https://doi.org/10.1353/ach.2012.0007

Wang, S., Wu, Y., & Li, Y. (1998). Development of technopoles in China. *Asia Pacific Viewpoint, 39*(3), 281–301. https://doi.org/10.1111/1467-8373.00070

Wei, Y. D. (2015). Zone fever, project fever: Development policy, economic transition, and urban expansion in China. *Geographical Review, 105*(2), 156–177.

Wu, F. (2018). Planning centrality, market instruments: Governing Chinese urban transformation under state entrepreneurialism. *Urban Studies, 55*(7), 1383–1399. https://doi.org/10.1177/0042098017721828

Xinghua News. (2017a). *A few thoughts on the development of science and technology parks of the new era*. http://www.xinhuanet.com//money/2017-10/28/c_1121880030.htm

Xinhua News. (2017b). *'Zhonggong zhongyang, guowuyuan jueding sheli Hebei Xiong'an xin qu' ['The Central Committee and the State Council decide to establish Xiong'an New Area in Hebei province']*. http://politics.people.com.cn/n1/2017/0401/c1001-29185929.html

Xinhua News Agency. (2023). *Central State-owned Enterprises in Xiong'an*. https://www.sohu.com/a/677501221_161795

Xiongan.gov. (2018). *'Hebei Xiongan Xinqu Guihua Gangyao'[Planning guidelines of Xiong'an New Area, Heibei]*. http://www.xiongan.gov.cn/2018-04/21/c_129855813_2.htm

Xiongan.gov. (2019). *'Xiongan xinqu jiang chuangjian shehui xinyong tixi jianshe tese shifanqu'['Xiong'an new area will establish a demonstration zone for social credit system']*. http://www.xiongan.gov.cn/2019-06/25/c_1210169133.htm

Xiongan.gov. (2020). *'Xiongan xinqu zai fupin lingyu kaizhan "jifenzhi"guanli'['Xiong'an New Area uses "scoring system" in proverty reduction program']*. http://www.xiongan.gov.cn/2020-06/04/c_1210645775.htm

Yang, C. (2009). Strategic coupling of regional development in global production networks: Redistribution of Taiwanese Personal Computer Investment from the Pearl River Delta to the Yangtze River Delta, China. *Regional Studies, 43*(3), 385–407. https://doi.org/10.1080/00343400802508836

Yang, D., & Wang, H. (2008). Dilemmas of local governance under the development zone fever in China: A case study of the Suzhou Region. *Urban Studies, 45*(5–6), 1037–1054. https://doi.org/10.1177/0042098008089852

Zhang, T. (2002). Urban development and a socialist pro-growth coalition in Shanghai. *Urban Affairs Review, 37*(4), 475–499. https://doi.org/10.1177/10780870222185432

Zhou, Y. (2007). *The inside story of China's High-Tech Industry: Making Silicon Valley in Beijing*. Rowman & Littlefield.

Zhuang, L., & Ye, C. (2020). Changing imbalance: Spatial production of national high-tech industrial development zones in China (1988–2018). *Land Use Policy, 94*, 104512. https://doi.org/10.1016/j.landusepol.2020.104512

Authors and Affiliations

Yun Song[1] · Martin de Jong[2,3] · Dominic Stead[4,6] · Zhaowen Liu[5]

✉ Yun Song
yun.song.1117@gmail.com

Martin de Jong
w.m.jong@law.eur.nl

Dominic Stead
dominic.stead@aalto.fi

Zhaowen Liu
z.liu-8@tudelft.nl

1 School of Architecture and Urban Planning, Guangdong University of Technology, Guangzhou, China

2 Present Address: Rotterdam School of Management & Erasmus School of Law, Erasmus University, Rotterdam, The Netherlands

3 Institute for Global Public Policy, Fudan University, Shanghai, China

4 Department of Built Environment, Aalto University, Espoo, Finland

5 Faculty of Civil Engineering and Geosciences, Delft University of Technology, Delft, The Netherlands

6 Faculty of Architecture and the Built Environment, Delft University of Technology, Delft, The Netherlands