

A review of urban shrinkage in China from the perspective of spatial governance

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ABSRTACT: with the urbanization of our country entering the second half, the economic growth rate slowing down and the population negative growth era gradually coming, the phenomenon of urban contraction has become an important issue worth paying close attention to in the course of our country's modernization. Based on the review of the relevant research progress since 2010, the author believes that the understanding of urban development paradigm in China should be deepened under the background of population contraction, and from the basic research, Space Research, planning research and other aspects of space governance perspective of China's urban contraction needs to be concerned about the important issues, it is expected to provide reference for the theoretical research and practical exploration of urban shrinkage in China in the new era.

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Review and Prospect of Urban Shrinkage in China from the Perspective of Spatial Governance

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Abstract: With China's urbanization entering a mature stage, economic growth slowing down, and the gradual arrival of the era of negative population growth, urban shrinkage has become an important issue worthy of high attention in China's modernization process. This paper proposes that spatial governance is an important perspective for the study of urban shrinkage in China. Based on the review of relevant research progress since 2010, this paper argues that it is necessary to deepen the understanding of China's urban development paradigm in the context of

population contraction, and discusses notable issues in China's urban contraction phenomenon from the perspective of spatial governance, including basic research, spatial focus research, planning and governance research. The purpose is to provide reference for the theoretical research on urban shrinkage phenomenon and the practical exploration of spatial governance in China in the new era.

Key Words: URBAN SHRINKAGE in China; research review; research issues; spatial governance

1 urban shrinkage in China and spatial governance

The phenomenon of urban contraction is an inevitable objective trend when urbanization develops to a certain historical stage. Trends in population mobility in the process of urbanization are reflected not only between urban and rural areas, but also between regions and between cities, owing to differences in the attractiveness of different cities and regions, causing different degrees of urban expansion and contraction ^[1]. As a global and multi-dimensional phenomenon in the process of urbanization, urban contraction has gradually become a hot topic in the world since the 1980s ^[2-4]. Compared with the background of rapid development of urbanization in recent decades, the research on urban contraction started late in China. In 2012, the book "Shrinking City", which was prefaced by Mr. Wu Zhiqiang and others, was published, introducing the concept of "Shrinking city" systematically in China for the first time ^[5-6]. The China Shrinking Cities Research Network (SCRNC) was launched in 2014 and the first China Shrinking Cities Symposium was held in 2016, raising domestic concerns about urban shrinkage in China. In recent years, with the slowing down of economic growth in our country, the depth and breadth of the phenomenon of urban contraction in China are obviously expanding. For the first time, the state has included "Shrinking small and medium-sized cities" in the policy system for optimizing the pattern of urbanization, in the "Key tasks for the construction of new urbanization in 2019", requiring such cities to be thin and strong, change the inertia of the incremental planning thinking, strict control of incremental, activate the stock, guide the population and public resources to the urban concentration ^[7].

Spatial governance is an important perspective in the study of urban shrinkage in China. Urbanization is the only way for the development of a country's modernization. In the past 40 years, the urbanization of our country has shown the characteristics of rapid and stable overall, the state has taken active intervention policies to solve the problems of unbalanced regional development, widening urban-rural gap and uncoordinated development of large, medium and small cities. In particular, since the 18th National Congress of the party, the central working conference on urbanization and the Central Working Conference on cities have been held one after another, and the regional coordinated development strategy, regional major strategy, the main function area strategy, the new urbanization strategy and so on as the optimization national space system important strategy, the aim is to ensure the healthy and sustainable development of urbanization. Urban contraction has a significant negative externality, there are a series of economic, social and environmental problems, such as weak regional economic growth, increasing urban construction land, idle public service facilities, population ageing and urban built environment aging. Objectively speaking, it is impossible to cure the problem of urban contraction, just as the urban problem and the process of urbanization go hand in hand. Strengthening the capacity of public intervention in space governance and reducing negative

externalities caused by urban shrinkage will undoubtedly become a major issue in China's modernization drive and the strength of the Chinese system.

Review of urban contraction in China

2.1 overall research progress

The domestic concern about urban shrinkage began mainly after 2010, and related research results came from urban and rural planning, economics, geography, building science and engineering and other scientific fields, in terms of the number of papers published and the content of the research, it can be roughly divided into two stages. The first stage is deeply influenced by the theories of shrinking cities abroad. The research focuses on the connotation and case analysis of the concept of international urban contraction, which is mainly confined to urban and rural planning, regional economy and other fields, by observing and studying the urban contraction phenomenon in the United States, Japan, Germany, Canada and other developed countries ^[8-10], we hope to sum up the causes of urban contraction and transformation strategies, to provide enlightenment and policy suggestions for the possible shrinkage phenomenon in the process of urbanization development in China. In the second stage, China's unique phenomenon of urban contraction began to receive widespread attention since 2015^[11-13], and the number of publications increased significantly, including the concept of China's urban contraction and characteristics, types and spatial distribution, causes and mechanisms, using remote sensing, big data and other new technology analysis methods ^[14-15], the research object gradually expands from the highly concentrated northeast area to the rapid urbanization areas such as the Pearl River Delta, the Yangtze River Economic Belt and the less-developed cities in the west, the spatial object changes from the city to the community, the building, the idle land and so on.

2.2 conceptual understanding and formation mechanisms

Population loss is the most important feature of the urban contraction phenomenon, and the early studies mainly refer to the concept proposed by the International Research Network (SCIRN) in 2007 (Table 1), forming a representative high-cited literature [3-4,20-22], including both narrow and broad contractions ^[3,23]. The change rate of resident population has been widely accepted and widely used in the academic circle. The follow-up study ^[24-26] gradually extends to the multi-dimensional perspectives of economy, space, employment, geographical landscape and so on. There are currently different perspectives on the conceptual understanding of the phenomenon of urban contraction, 27 and it is generally accepted that the process of urban contraction is often accompanied by social problems such as economic recession, declining employment rates and the outflow of labour force, with apparent negative externalities ^[28-29]. Some scholars also point out that urban contraction can provide new development opportunities for urban transformation and development ^[17], not a single dimension of the performance of the recession. There is growing concern about a conceptual understanding based on localization, with a trend of contraction similar to that of Western countries, there are also unique urban contractions such as overdraft contractions caused by large-scale new area development and adjustment contractions that local governments take the initiative to deal with ^[30].

The phenomenon of urban contraction is the result of multi-dimensional factors. It is generally considered that globalization, deindustrialization, suburbanization and population structure change are the main causes of urban contraction [3]. In addition to the above factors, there are obvious differences in the driving mechanism of urban contraction between China and foreign countries, the changes of natural geographical environment, the adjustment of industrial structure, the depletion of resources, the siphon effect, the adjustment of administrative division and the path dependence are considered to be the important factors influencing the urban contraction in China. However, the actual shrinkage of various regions in various countries shows more complexity, such as suburbanization is the main factor leading to the decline of the population of central cities in Western countries, the process of generalized suburbanization in China promotes the co-development of cities and suburbs [37].

In order to better explain the causes of urban contraction in Chinese context, some scholars try to construct a theoretical analysis framework of urban contraction in China [4]. For example, based on the "Government-market" perspective of urban growth and contraction of the theoretical analysis framework [11]. Based on the interaction theory of "Space-behavior", a three-level spatial mismatch analysis framework of "System-policy-behavior" should be constructed at macro, Meso and micro levels [38]. Integrating the external development environment, the internal development effect and the factor flow cost, this paper makes an empirical analytical framework to analyze the factors and mechanism of urban contraction in different levels, regions and scales [39].

Table 1 conceptual analysis of urban contraction

Table. 1 Concept analysis of urban shrinkage phenomenon

作者	主要观点
Philipp Oswalt(2005) ^[21]	在50年时间内总人口不小于10万人且累计减少10%的城市为收缩城市
收缩城市国际研究网络组织(SCIRN)(2007) ^[6]	超过2年时间内经历人口持续流失,并且经历以某种结构性转机为特征的经济转型
Joseph Schilling & Jonathan Logan(2008) ^[22]	经历持续的人口流失,即在40年间流失超过25%的人口,空置与废弃的住宅、商业与工业建筑不断增加
收缩城市项目(SCP)(2015) ^[23]	暂时或永久性失去大量居民的城市,流失人口占总人口的10%或年均流失超过1%
徐博(2014) ^[10]	狭义收缩:具有普遍永久性流失特征的城市人口流失 广义收缩:人口、经济、社会、环境和文化上的全面倒退
龙瀛,等(2019) ^[33]	利用大数据重新定义实体城市及识别变化,结合人口普查数据等指标综合定义收缩
张明斗(2020) ^[23]	广义收缩:采用人口总量与经济规模两个指标衡量城市收缩

2.3 study of measurement methods and types

Measurement methods and typologies are the focus of shrinking cities research. The change of resident population is the key index to measure urban contraction, because the standard of urban-rural division and the system of population statistics are not perfect in our country, there are some problems such as the mismatch between urban population statistics and human-land space of "Urban entity region"^[17,40], and the "Urban scope" as the object of study of urban contraction is not consistent with the statistical scope of population and economy, etc., often lead to many related research concepts confusion. In order to make up this shortcoming, many studies identify the urban contraction phenomenon with the help of multivariate data, such as

Baidu migration data ^[15] , luminous image, urban impervious surface data ^[4] , etc. , taking into account the complexity of urban contraction, the index of urban contraction is expanded from socio-economic index to spatial statistical index and Geographical Landscape Index.

Domestic scholars have many methods to classify the types of shrinking cities, such as spatial form, shrinking degree, shrinking dimension, shrinking cause and so on. Specifically, based on the classification of urban spatial morphology, it can be divided into perforated and doughnut types ^[41] . Based on the degree of contraction, it can be divided into severe contraction (urban population decrease of more than 25%) , obvious contraction (urban population decrease of 10% -25%) and slight contraction (urban population decrease of less than 10%) . The evaluation dimension based on contraction can be divided into single dimension contraction of population, economy and society, and double dimension contraction of population-economy, population-society and economy-society, and the population-economy-society contraction and so on ^[43] . Based on the causes of contraction, it can be divided into structural crisis contraction, underdeveloped county-level city contraction, remote border city contraction, resource-exhausted contraction, data-adjusted contraction and so on ^[1] . At the regional scale, it can be divided into three types: the constringency city, the constringency city, the constringency city, and the constringency caused by the adjustment of administrative division in our country.

2.4 governance strategies for urban contraction

Although Europe and the United States for many years on the contraction of the governance effect is not significant ^[3] , drawing on international experience is still an important perspective of China's urban contraction strategy research, it is mainly composed of three aspects, namely, welfare governance, form control and attractiveness enhancement, 44 which require the introduction of resources from multi-level governments, action arrangements for urban decay and vacancy, and improvement of the quality of urban life, responding to urban decay through smart shrinkage ^[45] . Because of the background and system difference of Chinese characteristics, it is necessary to discuss the local problems for the countermeasures of urban contraction. Through government intervention combined with market-driven ^[11] and administrative, policy and planning governance, stimulate economic prosperity and ensure that the quality of urban space and economic development does not suffer a marked decline as a result of population outflow ^[46-47] . Taking full advantage of the opportunity that the process of urbanization has not been completed and the economic growth is still in a relatively fast range, giving full play to the active and effective intervention capacity of the government, and promoting the transformation of the value orientation of urban development, to match the spatial redistribution of population, the strategy of co-ordination of people-land-welfare should be implemented in a larger scope, and the flexible and contractible urban spatial structure should be shaped, through urban renewal, urban dual repair to actively respond to urban contraction, urban planning and construction for sustainable operation ^[11] . However, due to the complexity of urban contraction and the lack of a large number of empirical research as a support, the current research has not yet formed a practical guiding theoretical framework and paradigm.

2.5 review of research

The phenomenon of urban contraction in China not only embodies the historical law of urbanization development, but also has more distinct "Chinese characteristics". First, there are differences in the stages of development. The phenomenon of urban contraction in foreign countries mainly appears in the mature stage of urbanization. The urbanization in our country is still in a rapid development cycle, and has the characteristics of space-time compression. The second is the complexity of spatial characteristics. In addition to differences in the urbanization environment and economic development stages in different regions, there are also factors such as climate resources, industrial development background, and so on, the background of the formation and development of urban contraction is more complex and diversified than that of the western context. The third is the uniqueness of the institutional environment. Compared with the leading market mechanism of deindustrialization, suburbanization and economic recession in foreign countries, the phenomenon of urban contraction in our country is often marked by urban-rural system and government regulation. On the one hand, the urban-rural dual structure system and the urban administrative grade influence the massive population and factor flow between urban and rural areas and between different grade cities; On the other hand, the government has the ability and advantage to intervene in the regional and local development actively, but it also has the problem of the unbalanced development caused by the blind urban expansion under the leading of the political achievement view, these are all different from the driving mechanism of urban contraction in foreign countries.

Domestic scholars have carried out a series of theoretical and empirical studies on the phenomenon of urban contraction in China, and made considerable progress, but there are still some limitations and areas to be further studied. First, the western research framework provides a reference for the study of shrinking cities in China, but in terms of concept definition, type model, formation mechanism, etc. , the understanding of the formation mechanism of urban contraction in China and its complexity and regional differences still needs to be deepened. Second, the existing results focus on the macro-level analysis and induction, for the typical regions and cities of empirical research is relatively small, the phenomenon of urban contraction in China is not fully understood the law and trend. Third, the limitation of the urban and rural statistical system, because our country lacks the standard of defining the urban entity region and the corresponding population and economic statistical unit, the contradiction causing the mismatch of economic and social data, especially the human-earth space, has not been solved, although the existing scholars use the multi-source data such as night-light to replace, however, there are still obvious defects in the research precision and the fusion with other data, which has become the bottleneck of the study of urban contraction.

Thinking and research on urban contraction in China

3.1 China's urban development paradigm in the context of population contraction

After more than 40 years of high-speed development since the reform and opening up, the growth-oriented urban development environment is reversing and facing the challenges of multiple trends. First, negative population growth and demographic changes. The national population has already reached its peak, falling for two consecutive years since 2022, along with the acceleration of population ageing and the decrease in the number of children, a

phenomenon that has not occurred during the process of urbanization in the past 40 years, this will pose a serious challenge to the urban development environment. The second is the second half of urbanization and economic restructuring. The slowdown in the growth of the urbanized population and the changes in population distribution have far-reaching implications. The shift in population flows between urban and rural areas has been dominated by inter-urban population flows, exacerbating regional and inter-urban growth and contraction differentiation (Table 2) , compared with the size advantage of mega-cities, a large number of small and medium-sized cities will face a long-term shrinking trend. The third is the end of rapid spatial expansion and stock optimization. The rapid expansion of land use has been the main feature of urban growth in the past, and the slowing population growth and economic restructuring will intensify the pressure of urban development mode transformation, how to make good use of the urban stock space and promote the economic and social vitality of the city has become the main goal.

With the background of population contraction and multiple trends, the future urban contraction in China will not be a local problem, but a universal problem from national to local. The types of urban contraction will be more diverse, both between regions and between cities, reflecting differences in regional development environments and between large, medium and small cities, as well as between urban and rural areas and within cities, such as between urban and suburban counties, and between different subdivisions within cities. The phenomenon of urban contraction reflects the change of urban growth motive force, which also requires the government to respond positively to the transformation of urban development mode, government-initiated regulation will lead to more shrinkage.

Therefore, the study of urban contraction in China should be placed in the cognitive framework of the paradigm transformation of urban development under the background of population contraction, and deepen the study of the concepts and measurement methods, types and formation mechanisms based on the characteristics of Chinese localization, at the same time, from the perspective of space governance to strengthen the multi-scale urban contraction phenomenon and impact of understanding, to promote the Chinese characteristics of planning and governance capacity-building. It includes the following topics: first, the basic issues of China's localization of the concept of urban contraction, physical geographical definition, etc. Third, planning governance issues with Chinese characteristics, including planning governance models, regulatory means, and so on.

Table 2 changes in the number of urban contractions in China based on population dimensions

Table. 2 Changes in the number of urban contractions in China based on population dimensions

时段	类别	指标/(个/个)	东部地区	中部地区	西部地区	东北地区	全国
2000—2010年	常住人口	城市收缩数量/总量	41/213	56/178	42/203	37/91	176/685
		县收缩数量/总量	116/292	174/379	323/720	57/90	670/1481
	城镇人口	城市收缩数量/总量	13/213	13/178	24/203	31/91	81/685
		县收缩数量/总量	7/292	5/379	38/720	17/90	67/1481
2010—2020年	常住人口	城市收缩数量/总量	65/213	66/178	53/203	76/91	260/685
		县收缩数量/总量	182/292	303/379	447/720	88/90	1020/1481
	城镇人口	城市收缩数量/总量	10/213	14/178	15/203	50/91	89/685
		县收缩数量/总量	20/292	17/379	45/720	54/90	136/1481

Note: (1) the cities and counties in the table are based on the 2020 administrative territorial entity of the People's Republic of China, county-level unit includes county, Autonomous County, banner, autonomous banner and so on; (2) population data according to the five-census, six-census, seven-census county data collation.

3.2 basic research topics

3.2.1 scientific definition of urban-rural boundaries and improvement of relevant statistical systems

The Ministry of Natural Resources has officially issued the regulations for the determination of the urban area, and for the first time, completed the results of the urban area delimitation of 683 cities nationwide. The system of urban and rural settlements is continuous, and it is only part of the work to delimit the urban areas of 683 cities with cities, and pay more attention to rural areas. Based on the definition of urban-rural boundary, to further improve the corresponding demographic and economic and social statistics system, this is a basic work to deepen the study of shrinking cities in China.

3.2 definition and dynamic monitoring of urban contraction in China

In view of the diversity and dynamics of urban contraction, it is necessary to deepen the concept and type research, and establish a dynamic monitoring system. The construction of CSPON, which is being carried out by the Ministry of Natural Resources, plays a very important role in supporting the dynamic control of shrinkage.

3.3.3 the framework of theoretical understanding of urban contraction in China

Based on the background of our national conditions and the development road of new-type urbanization, set up a global vision, strengthen the understanding of the laws of urbanization and urban development in China, and promote the integration of urban and rural planning with geography, demography and economics, this paper constructs a multi-scale and multi-dimensional framework for the understanding and interpretation of urban contraction in China, and explores the theoretical understanding of urban contraction and the path of spatial governance.

3.3 issues of space research

3.3.1 strengthen macro-level research on urbanization trends at the national level and prospects for regional differentiation

The urbanization rate of our country is over 60% , and the agglomeration and diffusion of spatial economic activities will further aggravate the differentiation of regional development, including regional pattern, urban system and urban-rural relationship. On the one hand, it is necessary to strengthen the research on the macro-forecast and impact of urbanization, and form a general understanding and scientific judgment on the population distribution, the change of population structure and the trend of shrinking regions. On the other hand, from the perspective of regional differentiation, for the eastern, Central, western, northeast and other different regions, as well as agricultural production areas, key ecological function areas, urban areas and other different policy areas, we should strengthen the research on the phenomenon of urban contraction and its formation mechanism under the urbanization environment of different regions, deepen the understanding of the types and problems of regional differentiation, and provide the basis for the formulation of regional coordinated development policies at the national level.

3.3.2 the mesoscale scale strengthens the typology of urban-rural relations and urban contraction within a given region

Contraction not only occurs in underdeveloped and marginal regions, but also in relatively developed regions. To strengthen the research on the spatial relationship between the growth and contraction regions from the inside of the region, and to grasp the concrete form of the urban contraction phenomenon as a whole, we should pay attention to the contraction problem brought about by the adjustment of the industrial structure of the central cities, we should also pay attention to the shrinking trend faced by small towns, as well as the impact of urban-rural population mobility and changes in urban-rural systems and the trend of population ageing, etc. , from the perspective of sustainable development of the local economy and society, we should explore new ways of urbanization that suit local conditions.

3.3.3 strengthen research on paradigm shift of specific shrinking cities at micro-scale

Shrinking cities are also facing a series of resource misallocation problems, such as economic downturn, vacant public services and housing, oversupply of infrastructure, and increasing financial pressure, challenges to traditional growth-oriented thinking and the paradigm of urban development. Therefore, it is necessary to adjust and change the concept and mode of urban development. On the one hand, it should be guaranteed on the basis of improving the quality of life of residents, and pursue a people-centered and all-age-friendly way of social resource allocation, on the other hand, we should actively explore sustainable urban renewal models, promote the optimal use of stock space, improve the efficiency of urban operation, and enhance the social cohesion and development vitality of cities through community reconstruction and social participation.

3.4 planning research topics

Modern urban planning, as an active public intervention, was born in response to urban problems brought about by urban growth since the Industrial Revolution, facing the problem of urban contraction in the post-industrial era, it is necessary for urban planning to respond in theory and method. At present, our country is pushing forward the reform of territorial space planning system. It should be an important task to deal with the problem of urban contraction in China.

3.4.1 establish a dynamic adaptive planning intervention mechanism

The phenomenon of urban contraction is different and dynamic, which needs to break the thinking of blueprint, we also need to pay attention to the real challenges caused by urban contraction from the perspective of local problems. On the one hand, we should correctly understand that urban contraction, urban contraction does not mean urban decay, nor does it mean the disappearance of urban vitality and happiness, the so-called smart contraction, it's about following the rules and solving the social problems that come with it. On the other hand, based on the regional difference of the formation mechanism of contraction phenomenon, we should carry on the classification guidance, through the policy classification and the stage evaluation, make clear the optimization task with the problem-oriented, and strengthen the adaptability of planning and regulation, establish a dynamic adaptation of the planning intervention mechanism.

3.4.2 strengthen the leading role of“Multi-planning in one” planning

To deal with the phenomenon of urban shrinkage is a systematic composition, and land space is the carrier of economic and social activities, we should also actively promote“Multi-planning integration” of territorial and special plans and national economic and social development, at the operational level, it promotes the integration of various plans in spatial, temporal and special systems dimensions, and strengthens the design of policies and institutional mechanisms in order to optimize the pattern of territorial space development and protection, • Guiding the rational and orderly flow of population and capital.

3.4.3 strengthen the evaluation of the implementation of planning policies

Planning intervention has externalities ^[49] . On the one hand, planning intervention is needed for the formation mechanism of urban contraction and its external effects. On the other hand, it is necessary to promote the implementation of planning policy evaluation, optimize the key areas of planning regulation, the degree of intervention, through policy and management strategy innovation, improve planning regulation means.

4 conclusion

As an objective phenomenon in the process of urban development, urban contraction in China has become an important issue worthy of great attention in the process of our country's modernization. Over the past decade, the research on urban contraction in China has

accumulated rich results, revealing the complexity and diversity of urban contraction in China, however, the cognitive framework of urban contraction in China needs to be further developed.

Compared with the problem of urban contraction in the Western context, spatial governance is an important perspective in the study of urban contraction in China. On the one hand, the development environment of urbanization in our country is facing the challenge of multiple trends. On the other hand, based on the characteristics of urbanization development and the unique institutional environment of our country, we should pay more attention to the continuous impact of contraction, it is particularly important to explore the spatial governance path of urban contraction with Chinese characteristics.

Based on the above understanding, this paper puts forward that we can focus on basic research, space research, planning research and other aspects of China's urban shrinkage under the perspective of spatial governance issues. In basic research, strengthen the construction of urban-rural boundary division, dynamic monitoring methods and theoretical framework. In terms of spatial research, the study of urbanization trends and regional differentiation prospects at the national level is strengthened at the macro-scale, and the study of urban-rural relations and types of urban contraction within specific regions is strengthened at the medium-scale, at the micro-scale, focus on the paradigm shift of specific shrinking cities. In the aspect of planning research, we should establish a dynamic adaptive planning intervention mechanism, strengthen the leading role of "Multi-planning in one" and evaluate the implementation of planning policies.

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