

Study on Hotspots and Frontiers of Urbanization in Guangxi Based on CiteSpace and VOSviewer

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Abstract: Based on the analysis of the literature on Guangxi urbanization in the CNKI database from 1985 to 2018, SATI, Ucinet and information visualization analysis software CiteSpace and VOSviewer are used to publish the authorship, author and institutional cooperation, research theme evolution and frontiers of Guangxi urbanization research field. Hotspots for bibliometrics and scientific knowledge map reveal the characteristics of the core author group, the situation of institutional cooperation, and the current research hotspots, research field evolution and academic frontiers in the process of urbanization in Guangxi, providing certain conditions for the development of urbanization in Guangxi.

1. Introduction

Urbanization is the only way to modernization, as well as a strong support for the rural revitalization and regional coordinated development. The National New Urbanization Plan (2014-2020) clearly points out that the core content of China's modernization construction is the synchronous development of urbanization and industrialization, informatization and agricultural modernization. This conclusion fully clarifies the importance of urbanization in the process of modernization. With the upgrading construction of CAFTA, the promotion of the "The Belt and Road" initiative and the implementation of "Western Development" strategy, the level and quality of urbanization in Guangxi continue to improve. However, by the end of 2018, the urbanization rate in China was 59.58%, while that in Guangxi was 50.22%, which still lagged behind the national average of 9.36%. It is against the background of the coexistence of opportunities and challenges that it is particularly urgent to clarify the current situation of urbanization in Guangxi and to study the new trend of urbanization development evolution in the future for realizing the leap-forward development of urbanization in Guangxi.

Over the past 30 years, the research on urbanization-related issues of Guangxi has attracted the attention of local governments and scholars. Many related scientific research achievements have emerged. Although Zhang Xiekui and other scholars (2013) have studied the current situation and development countermeasures of urbanization in Guangxi, those were the research results of five years ago. After 2013, it was an important period of urbanization development in China. What are the hotspots and key points of urbanization research in Guangxi now? What are the research frontiers emerging at present? What is the trend of urbanization in Guangxi in the future? Presumably, such problems are also the concerns of most scholars. Therefore, this paper mainly uses the scientific knowledge map which centers quantitative analysis, with the help of information visualization analysis software Citespace and VOSviewer, to clearly and intuitively shows the hotpoints and research frontiers in the field of urbanization in Guangxi, and to reveals the development trends, inherent evolution laws and development trends in this field.

2. Data Source and Analysis Method

Literature comes from the CNKI database with the subject retrieval of "Guangxi + Urbanization". The source journals are limited to SCI, EI, core journals and CSSCI. A total of 1365 papers were retrieved. After excluding newspapers, conferences, draft invitations and other topics, 1110 effective papers were obtained (up to October 18, 2018).

This paper mainly explores the research hotspots in the field of urbanization in Guangxi by using the keyword co-occurrence analysis function of CiteSpace, the keyword density map function of VOSviewer and then the keyword clustering time zone map function of CiteSpace to analyze the research theme evolution of urbanization in Guangxi from the time dimension, and explore the research frontiers in combination with the keyword average time visualization function of VOSviewer.

3. A Survey of Urbanization Research in Guangxi

3.1 Annual Distribution of Literature Publication

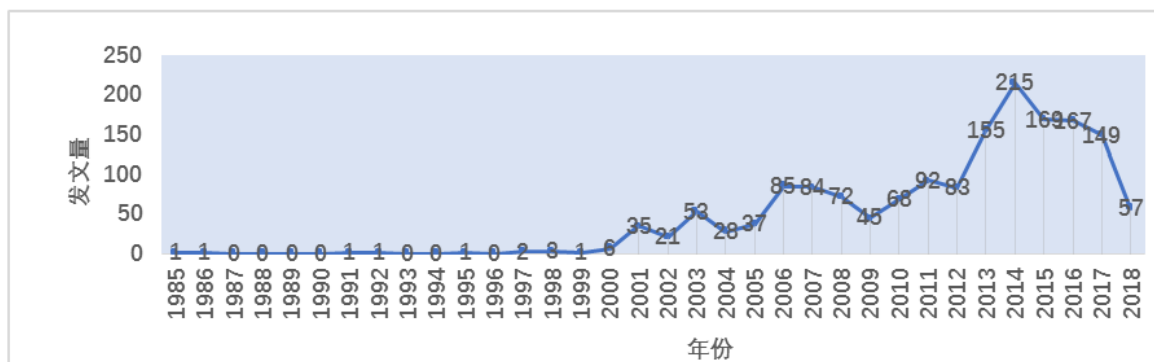


Figure.1 Literature Publication of Guangxi Urbanization in the CNKI Chinese Database up to September 18, 2018

The change of the number of papers in a certain time domain is an important index reflecting the research progress in this field. Because the number of papers retrieved in 2018 does not cover that of the whole year, it is indicated by dotted lines. According to the graph of literature distribution (as Figure 1), from 1985 to 1999, there were 11 papers in this period, accounting for 0.67% of the total amount. It was the initial stage of research in this field. From 2000 to 2011 was the stage of slow fluctuation growth. The total amount of research literature in this stage was 626, with an average annual growth rate of 7.8. The slow fluctuating growth of annual literature reflected that more researchers have begun to pay attention to the development of urbanization in Guangxi. From 2012 to 2014 was a period of rapid growth. The annual literature volume reached its peak in 2014 (215papers) with an average annual increase of 66. From 2015 to 2018, the slow decline stage, the research fever decreased.

3.2 Analysis of Authors' Cooperation

Authors with frequency (≥ 4) were selected by SATI3.2, a statistical tool for bibliographic information. A 75*75 co-word matrix of authors' cooperation has been constructed. A network graph of authors' cooperation has also been completed with the help of Ucinet. The size of nodes is displayed according to their frequency. In the network of authors' cooperation, the degree centrality of a point is equal to the sum of cooperation intensity between an author and other authors.

From Figure 2, we can see that there are eight authors' cooperation groups in the urbanization research in Guangxi. Among them, there are only one three-person cooperation group in high-frequency scientific research cooperation groups (there are at least four times of cooperation). They are Ning Guoyong, Yang Gongyu and Liu Wenhua, among whom Ningguoyong and Yang Gongyu focus on border urbanization research. The rest is two-person high-frequency scientific research cooperation groups. Wang Xinzhe and Chen Tian's cooperation field is mainly urbanization in border areas or border ethnic areas. Yang Congcong and Li Qiang focus on the coordinated development of new urbanization and new industrialization. Yuan Dan and Li Huihui mainly study urbanization and urban-rural integration from the perspective of industry. Cai Zaoming and He Lingling pay attention to the peasant groups in the process of urbanization with the main research area of population urbanization. Wei Shan hao and Zheng Zhaosu stress the study of

urban spatial pattern. From researches, we can find that, on the whole, the authors' cooperation groups researching urbanization in Guangxi are scattered, and there is no close cooperation among authors. In addition, scholars in the high-frequency scientific research cooperation group in the field of urbanization in Guangxi generally have the commonality and consistency on a specific related research topic, that is, the higher the frequency of scientific research cooperation, the more consistent the joint research areas.

Figure 2 Network of Authors' Cooperation with High Frequency Based on Ucinet

3.3 Analysis of Institutional Cooperation

Through the analysis of institutional cooperation network, the distribution of research power in this field can be found. Figure 3 shows the cooperation network of various institutions in the field of urbanization in Guangxi drawn with Citespace. The map and figure reflect that the institution with the largest node and the highest frequency is the College of Economics and Management of Guangxi Normal University. From the connection strength of institutional nodes, institutions with stronger connection strength are Guangxi Normal University and Guangxi University, Guangxi Normal University and Guangxi Academy of Social Sciences, etc. From the perspective of institutional cooperation, there are six pairs of nodes reflecting institutional cooperation. At most, there are six scattered nodes in a pair, among which the independent nodes are smaller and more. As a whole, the research institutions in the field of urbanization in Guangxi are very scattered, and more of them are independent. Although institutional cooperation is relatively broad, the degree of cooperation is low. From the term of categories, the institutions in the field of urbanization in Guangxi mainly come from universities in Guangxi followed by local government research institutions. While the cooperation between local government institutions and universities still needs to be strengthened. The study of urbanization in Guangxi involves multi-disciplinary and cross-disciplinary research, which is a comprehensive and strong research topic. It is of great necessity to carry out a cross-regional, cross-disciplinary and institutional cooperation in light of the actual situation of the region.

Figure 3 Institutional Cooperation Network of Urbanization in Guangxi Based on Catespace

4. Research Trend of Urbanization in Guangxi

4.1 Research Hotspots

In the Citespace operating interface, the time slice is selected from 1985 to 2018, and the time zone interval is 1. The node type is keyword and Top N equals 50. In order to make the visualization results more intuitive and the structure clearer, a path-finding algorithm is used to prune the map. After operation, the nodes that have nothing to do with or repeat the research topic are selected, such as countermeasures, autonomous regions, influencing factors, etc., adjust the appearance of map, and show the keyword co-occurrence analysis in Figure 4. The figure of keywords with high frequency (≥ 7) is drawn, as shown in Table 1.

In order to understand more intuitively the research hotspots of urbanization in Guangxi, the author draws the density map with Vosviewer software, as shown in Figure 5. Density colors are chosen as Rianbow category in visual layout interface. Different colors represent different element densities in which red marking area has high element density and blue marking area has low element density.

The centrality of keywords reflects the importance of nodes in the visualization map. The greater the weight, the more attention paid to this topic and the more important it is. As shown in Table 1, the degree centrality of keywords is industrialization (0.35), urbanization (0.33), urbanization process (0.3), citilization (0.27), urbanization construction (0.27), rural area (0.27), Beibu Gulf Economic Zone in Guangxi (0.24), industry (0.18), urbanization rate (0.17), urbanization level (0.16), rural urbanization (0.11), new urbanization (0.08), coordinated development (0.07), industrial structure (0.07), ethnic minority areas (0.07), sustainable development (0.05), etc.

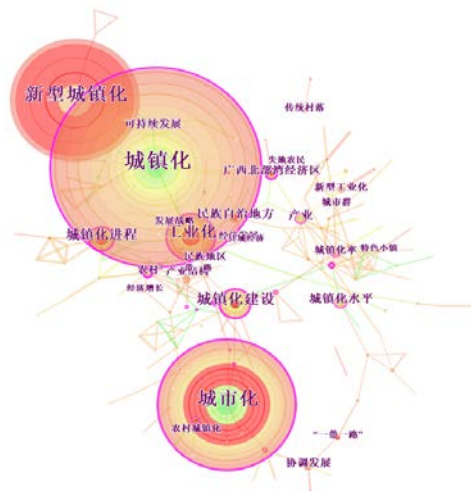


Figure 4 Keywords of Urbanization in Guangxi based on Catespace

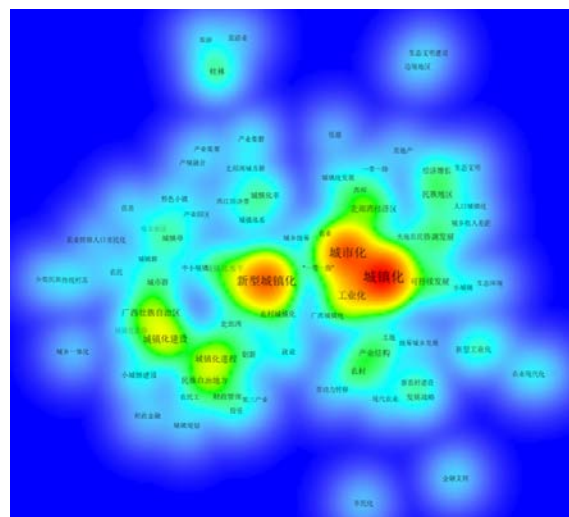


Figure 5 Density of Urbanization in Guangxi Based on Vosviewer

By observing two kinds of visualization maps, excluding the generic terms of urbanization, citilization, construction, process and level of urbanization and so on, it can be seen that the research hotspots and focuses of urbanization in Guangxi in the past 30 years mainly focused on topics like industrialization, industry, Beibu Gulf Economic Zone in Guangxi, rural urbanization, new urbanization, industrial structure, coordinated development, sustainable development, urban agglomeration.

Table 1 List of 40 Keywords with High Frequency

Order	Frequency	Centrality	Year	Keyword	Order	Frequency	Centrality	Year	Keyword
1	228	0.33	2001	Urbanization	13	12	0.27	2010	Rural Area
2	153	0.27	1998	Citilization	14	12	0.17	2012	Urbanization Rate
3	141	0.08	2012	New Urbanization	15	12	0.02	2010	New Industrialization
4	62	0.35	2001	Industrialization	16	12	0.07	2012	Ethnic Minority Area
5	40	0.27	2001	Industrialization Construction	17	9	0.03	2016	“The Belt and Road”
6	30	0.3	2002	Urbanization Process	18	9	0.11	2000	Rural Urbanization
7	18	0.16	2001	Urbanization level	19	8	0.02	2014	Traditional Village
8	16	0.18	2003	Industry	20	8	0.02	2003	Development Strategy
9	16	0.24	2007	Beibu Gulf Economic Zone in Guangxi	21	8	0.05	2010	urban Agglomeration
10	14	0.05	2003	Sustainable Development	22	7	0.02	2012	County Economy
11	13	0.07	2011	Coordinate Development	23	7	0	2012	Landless Peasant
12	12	0.07	2007	Industrial Structure	24	7	0.03	2014	Characteristic Town

4.2 Research Theme Evolution and Analysis of Frontiers

According to the network structure and the clarity of clustering, Citespace takes modularity (Q value) and Silhouette (S value) as the criteria to evaluate the effect of map drawing. When Q value is generally in the interval [0,1], $Q > 0.3$ indicates that the community structure is significant. When S value is 0.7, clustering efficiency is convincing. When $S > 0.5$, clustering is generally reasonable. Figure 6 shows that the modular value (Q value) of clustered time-zone view is 0.7806 and the average contour value (S value) is 0.6245, which indicates that the map structure is reasonable.

The time-zone map gathers nodes in the same time zone and focuses on representing the evolution process of knowledge domain from the time dimension. It clearly shows the literature update and mutual influence. From the time-zone map (as shown in Figure 6), we can see that the early 1990s was the initial stage of urbanization research in Guangxi. At the beginning of the new century, more papers were gathered and more achievements were published in this period. The research perspectives began to diversify, including the exploration of rural urbanization, urbanization and industrialization, and the construction of small towns, which ushered in the first wave of urbanization research in Guangxi. In the period of 2012-2014, the focus of scholars turned to the study of new urbanization. The literature in this time-zone increased dramatically, and there were many influential achievements published. In the time-zone map, there are relatively more nodes connecting between the two time-zones of 2000-2003 and 2012-2014, which indicates that the inheritance relationship between these two time-zones is strong. The period of 2012-2014 can

also be called an important transitional stage of urbanization development in Guangxi. It began to transform from traditional urbanization to new urbanization and transform from traditional industrialization to new industrialization. It also paid attention to the fields of agricultural modernization, urban-rural integration, landless peasants in urbanization development and border urbanization in Guangxi. This reflects the thinking of urbanization research in this period turned from the single route of urbanization to the coordinated development of urbanization and industrialization, and the planned/coordinated/integrated development of urban and rural areas. In the period of 2015-2018, there are more and more nodes, which reflects that there were more papers gathered in this period, and the amount of published documents was increasing with abundant research results. The emergence effect of some nodes, such as “The Belt and Road” and “new urbanization”, reflects the key areas and frontiers of current research. However, the nodes of ecological environment, traditional villages, migrant workers, financial support and coordinated development were gathering, which is also the focus of current attention. At the same time, the time-zone map also shows the nodes associated with key research areas, such as ecological civilization, ecological environment construction, ethnic minorities, Beibu Gulf urban agglomeration, border areas, population urbanization and other nodes, which generally run through the process of new urbanization research.

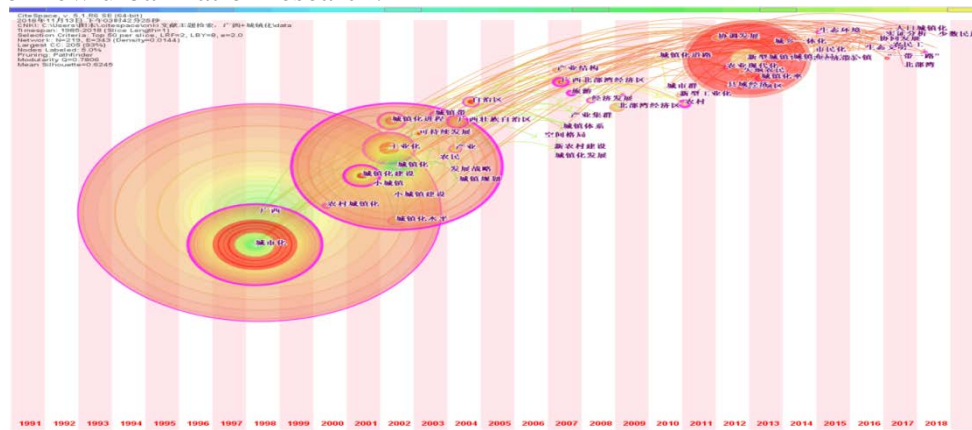


Figure 6 Time-zone Map of Urbanization in Guangxi Based on Citespace

Using VOSviewer's Overlay Visualization function, we can reveal the research frontiers and their derivative relationships in a specific time period. In the visualization map, nodes automatically change into time-based color distribution. The closer the keyword color is to yellow, the closer the focus of this research topic is to the current time period. On this basis, we study and judge the frontier issues in the field of urbanization research in Guangxi.

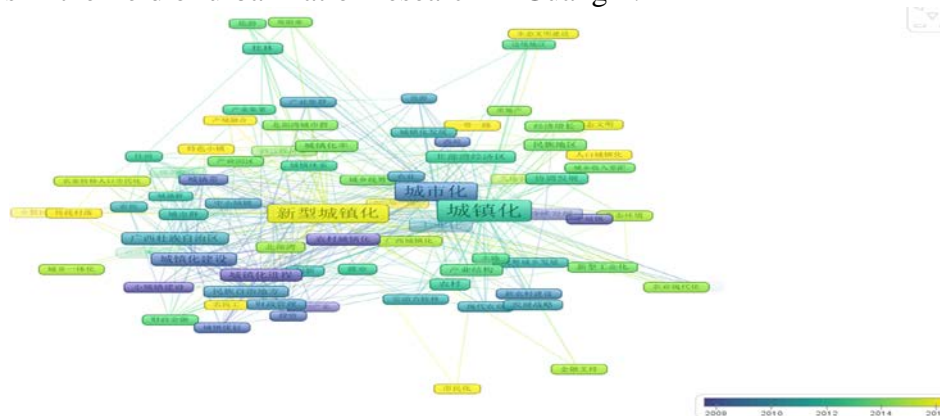


Figure 7 Visualization Map of Average Keyword Time Based on Vosviewer

Through the visualization map of the keyword average time based on Vosviewer software, the weight of keywords with high frequency in urbanization, the statistics of average years (as shown in Table 2) and the time-zone map of urbanization in Guangxi are comprehensively analyzed. Finally, several main frontier issues are identified, including the integration of production and city in the

progress of new urbanization, characteristic towns, traditional villages' construction, population urbanization and citizenization, ecological civilization/environment construction and exploration of new urbanization in ethnic minority areas, and the coordinated development between new industrialization and new urbanization, among which the author selects two emerging research frontiers to conduct a review.

Table 2 Average Annual Statistics of Keywords with High Frequency Based on Vosviewer

Keywords	Weight	Average Year
Characteristic Towns	7	2016
Traditional Village	8	2016
Integration of Production and City	5	2016
The Belt and Road	6	2016
Population Urbanization	6	2016
New Urbanization	142	2015
Citizenization of Agricultural Transfer Population	5	2015
Ecological Civilization Construction	5	2015
Citizenization	6	2015
Ecological Civilization	7	2015
Coordinated Development	7	2015
Beibu Gulf urban Agglomeration	6	2014
Landless Peasant	8	2014
Ecological Environment	6	2014
Financial Support	8	2014
Tourism	5	2014
Beibu Gulf Urban Agglomeration	11	2014
Xijiang Economic Zone	7	2014
Integration of Urban and Rural Areas	6	2014
Agriculture Modernization	8	2014

4.3 Research Frontiers

4.3.1 Integration Development of Production and City in the New Urbanization Process of Guangxi

Industry is the basis of urban development, and city is the carrier of industrial development. Integration of production and city is an effective way to promote the construction of new urbanization. Essentially, it is the integration of production, city and people. Its core is people, oriented by people's needs, supported by production development, and carried by city construction. The key problems facing Guangxi at present are the incompatibility between industrialization and urbanization, insufficient integration, inadequate interaction, ineffective coordination and so on. Therefore, promoting the integration of production and city needs to realize the integration of people, industrial development, spatial integration and functional integration. Integration of production and city is the balanced and coordinated development of industrial structure and spatial structure, as well as an important way of urbanization. Therefore, it is of importance to pay attention to the deep integration of industrial development planning and urban construction planning. From the perspective of improving the level of integration of production and city in Guangxi, some scholars have suggested to optimize the layout of integration with the strategy of "Two High Zones and One Belt", upgrade the industrial structure system to enhance the tenacity of integration, increase the coupling of integration by increasing the stock of urban space, and expand the scope of the integration by improving the infrastructure. Some scholars have also used other urbanization development models for reference in order to seek the development path of integration of production and city in Guangxi.

4.3.2 Construction of Characteristic Towns in the Process of New Urbanization in Guangxi

In July 2016, the State issued the "Notice on the Development of Characteristic Towns"

document, which decided to carry out the cultivation work of characteristic towns nationwide. By 2020, it was planned to cultivate about 1000 characteristic towns and promote the construction of small towns nationwide. Throughout the current situation of the cultivation and construction process of Characteristic Towns in Guangxi, the main crux are insufficient endogenous power of the main body of construction, insufficient excavation of industrial characteristics, wrong role and function orientation, unclear division of labor, lack of overall planning of long-term and short-term strategic objectives, and insufficient regional personality. Academic circles have put forward different discussions on breaking the bottleneck of the development of characteristic towns in Guangxi. For example, Wang Huimin believes that “culture is the soul and towns are established characteristically” which indicates that urban construction should attach importance to implanting cultural core. The “source of characteristics” of characteristic towns comes from the “cultural gene” which can not be duplicated by the region itself and the unique resource endowment. Therefore, in the process of deep development of characteristic towns, “emphasis is laid on the in-depth exploration of their cultural elements to protect and inherit the traditional culture of small towns”. Some scholars also emphasize that the word “characteristic” in characteristic towns should be embodied in characteristic industries, characteristic industrial systems and characteristic industrial chains with obvious themes or specialties. while the “characteristic function” of characteristic towns is embodied in two aspects that are gathering people through the experience and exhibition space of cultural tourism and gathering resources through the platform of industrial elements. Combining with the current situation, some scholars put forward specific ways to realize characteristic towns in Guangxi from the aspects of characteristic industrial form, livable beautiful environment, characteristic traditional culture, public service facilities, tourist and productive tourism environment, intelligent system of information access, and the construction of system and mechanism.

5. Conclusion

Based on Bibliometrics and scientific knowledge map analysis, this study analyzes journal papers on Guangxi urbanization from 1985 to 2018, visually demonstrates authors’ cooperation and institutional cooperation, research hotspots, research topic evolution and research frontiers. The conclusions are as follows.

(1) Domestic academia’s research on urbanization in Guangxi shows a general trend of first developing and then restraining. It has been declining since 2014, reaching its lowest level in 2018.

(2) The research on urbanization in Guangxi is mainly about individual behavior. The authors’ cooperation groups are very scattered, and the scientific research cooperation among authors needs to be strengthened.

(3) The research institutions of urbanization in Guangxi are very scattered, among which universities are the main research bodies. Most carry out research independently. The situation of cross-regional, cross-domain and inter-agency cooperation needs to be formed.

(4) Over the past 30 years, the research hotspots of urbanization in Guangxi have shown divergent and diversified distribution characteristics, mainly in the fields of industrialization, industry, Beibu Gulf Economic Zone, rural urbanization, new urbanization, industrial structure, coordinated development, sustainable development and so on.

(5) The research field of urbanization in Guangxi is evolving from traditional and single urbanization to new urbanization, synergistic development of new urbanization and new industrialization, integration of production and city, regional urban agglomeration and new urbanization under the construction of ecological civilization/environment.

(6) The frontiers of urbanization in Guangxi are mainly the integration of production and city in the process of new urbanization, the construction of traditional villages in characteristic towns and ethnic areas, the urbanization and citizenization of population, the development of urbanization in Guangxi under the background of “The Belt and Road” strategy, the development of new urbanization in the context of ecological civilization/ environmental construction, and the coordinated development between new urbanization and new industrialization.

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