

Study on the Level Measurement and Spatial Differentiation of New-Type Urbanization in Shaanxi Province

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Abstract: Based on the review of the research on regional urbanization level measurement and the definition of the connotation of new urbanization, this paper constructs an index system to measure regional urbanization level, which includes 19 indicators from four aspects of regional economic development, social development, ecological environment and technological innovation using Analytic Hierarchy Process (AHP) and the principle of system cluster analysis, and using SPSS19.0 statistical analysis software to complete data analysis processing, urbanization and level of 10 cities in Shaanxi province and space differences make the comprehensive quantitative evaluation according to the difference between cities in Shaanxi province can be divided into four classes: namely high is higher General and low level area The new-type urbanization in Shaanxi province generally shows a trend of higher in the middle and higher in the northwest and lower in the east and west. Each prefecture-level city in Shaanxi province develops related industries according to its own advantages and makes urbanization development strategies according to local conditions, so as to achieve the purpose of improving the new-type urbanization level.

1 INTRODUCTION

With the continuous expansion of city in our country, the urbanization level enhances unceasingly but compared with other developed countries and regions, the urbanization level, there is obvious difference also exposed the extensive economic growth in China environmental damage gap between urban and rural areas is larger under this background, the concept of new urbanization arises at the historic moment new means of obtain employment of urbanization is a way of life space of public service area social governance as well as the living environment of beautification, urbanization is a high quality high level of urbanization, but also the sublation of the urbanization and the theory and practice of small towns and beyond In recent years, the research on new type of urbanization increased rapidly, mainly focused on the analysis of the connotation of urbanization and promote new strategy research (Song, Jin 2016, Zhu, Liu 2017, Dong, Yang, Liu 2017) construction of evaluation index system for new urbanization. Evaluation of new urbanization level in specific regions (Economic Geography 2010) and research on related issues under the background of new

urbanization (Zhang 2015) as the new starting point of the Silk Road and the gateway of northwest China, along with the Belt and Road The research on the strategy of new-type urbanization in Shaanxi province facing 2035, issued by Shaanxi Province and is the 14th year of Shaanxi province. This study combines the connotation requirements and stage characteristics of the current national and Shaanxi's high-quality urbanization development, puts forward the value orientation and overall goal of Shaanxi's high-quality urbanization development, as well as the basic ideas and key tasks of Shaanxi's urbanization development in the next stage although Shaanxi province has made a lot of efforts in promoting new-type urbanization, how about the level of new-type urbanization? Although there are many scholars' researches, most of them are mainly carried out for economic regions or city clusters, and few people have made a comprehensive quantitative analysis on the new-type urbanization level of 10 prefecture-level cities in Shaanxi Province through in-depth research on the connotation of new urbanization, this study determines the evaluation index system of new urbanization, and uses relevant data to measure and analyze the level of new urbanization of 10 prefecture-level cities in Shaanxi province.

2 THE CONNOTATION OF NEW URBANIZATION

New urbanization has become the main trend of urbanization development in China. Like traditional urbanization, it also increases the proportion of non-agricultural population along with the expansion of urban scale. However, the connotation of new urbanization is more than this, compared with the pursuit of quantity in traditional urbanization, new urbanization pursues more quality improvement (Zhang,2015). Shimou Yao (Yao, 2014) believes that in the process of urbanization development, it is important to emphasize the importance of resource conservation, focusing on quality and efficiency and narrowing the gap between urban and rural areas (Zhu, Liu 2017). In recent years, the theoretical research and practical discussion of new urbanization, such as the meaning and extension of new urbanization, the construction of evaluation index system and the measurement of new urbanization development level, have become hot topics in the research field of new urbanization in China. For example, Shenglian Song and Yuehua Jin (Song, Jin 2016) compared the new urbanization with urbanization and small towns, and believed that the new urbanization is the urbanization of life style, employment style, public service space, regional social governance and the optimization of living environment; Zhancang Zhang (Economic Geography 2010) systematically analyzed the theoretical perplexities faced by the new urbanization in the theoretical perplexities and innovative directions of China's new urbanization; Zhongchao Du used cluster analysis method to classify the new urbanization of Xian yang City in Shaanxi province and deeply analyzed the development level of the new urbanization of Xian yang City (Du, Yang 2014).Based on the above viewpoints, the connotation of new urbanization can be summarized in the following aspects : The new urbanization first emphasizes the economic development as the driving force, thus emphasizing the transformation of the role of the government; Secondly, the intensive utilization of resources, avoid the infinite expansion of city scale and environmental protection to make matting new urbanization emphasis on urban and rural areas as a whole at the same time, the income of urban and rural in the gap between public facilities construction, in order to achieve the goal of a fair and harmonious. The new urbanization to emphasize the people-oriented, requires consideration of the

needs of the residents in urban and rural construction, in health education medical housing and other aspects to meet their needs, while emphasizing the optimization of the environment, to achieve a beautiful living environment.

3 CONSTRUCTION OF NEW URBANIZATION LEVEL EVALUATION SYSTEM

3.1 Determine the Evaluation Index

The urbanization in our country is based on people-oriented, pushing agricultural transfer of population urbanization, lead the population flow, and guided by the concept of ecological civilization, improve the urban and rural living environment, intensive use of resources of the new urbanization includes many factors, involving many aspects, such as social economy, all aspects should be considered on the basis of constructing evaluation index system in many aspects (Wang, Xie, Huang, 2013). Based on the analysis of existing studies and according to the scientific, feasible, comprehensive, typical and systematic principles of the new urbanization measurement index system (Frieman.J,2006), a new urbanization measurement index system is constructed, which takes economic development, social development, ecological environment, scientific and technological development as the first-level index.

3.2 The Standardization of Data

In this paper, the relevant data of 19 typical indicators of 10 prefect-level cities in Shaanxi province in 2018 were adopted, and the z-Score standardization method was used for data standardization with the help of Spss19.0. The standard Z-score has the following properties: In a group of quasi-Z-score scores, the average of the standard Z-score is equal to zero and the standard deviation is L; If the fractions are equidistant, the addition and subtraction operation can be carried out. The fractions with the same standard deviation are equidistant, and the fractions with different standard deviations are not equidistant, which is only comparable, but not additive. If the original score distribution is normal, the z-score range is roughly -3 to +3 and when you use it you have to have negative zeros and positive numbers and the normalization steps are as follows:

(1) Calculate the arithmetic mean (mathematical expectation) X_i and standard deviation S_i of each variable (index);

(2) Standardized treatment:

$$Z_{ij} = (X_{ij} - X_i) / S_i$$

Notice: the value of the variable after standardization and the value of the actual variable.

(3) Switch the signs in front of the inverse index.

After standardization, the value of the variable fluctuates around 1. Greater than 1 means higher than the average level, and less than 1 means lower than the average level.

(4) Non-negative processing of data.

As the standardized results of the Z-Score standardization method of Spss19.0 will appear some negative numbers under normal circumstances, it is necessary to carry out non-negative processing of the standardized data and shift it according to the specific negative cases.

3.3 Determine Index Weight

With the help of Analytic Hierarchy Process (AHP) (Georgel,2007) to determine the weight of the selected index, the general steps are: 1. Establish the structure model of analytic hierarchy process; 2. Calculate the weight after constructing the judgment matrix; 3. Analyze the calculation results and calculate the weight of each indicator; 4. Sum and calculate the weight of the four variables, as shown in Table 1.

Table 1: Weight of new urbanization development level evaluation index.

Destination Layer	Element Layer	Weight	Index level
The development level of new urbanization	Economic Development (A_1)	0.19	X_{11} Per capita Disposable Income of Urban Residents(Yuan); Total retail Sales of Consumer Goods (100 million Yuan); X_{13} Budget Revenue of Public Finance (ten thousand yuan); X_{14} GDP per capita (Yuan)
	Social Development (A_2)	0.24	X_{21} Number of health workers by municipality ; X_{22} urban registered unemployment rate; X_{23} Gas penetration rate ; X_{24} Water penetration rate; X_{25} The urbanization rate
	Ecological Environment (A_3)	0.36	X_{31} Urban sewage treatment rate; X_{32} Harmless disposal rate of domestic garbage; X_{33} Greenery coverage of urban area; X_{34} Park green area per capita; X_{35} Forest coverage rate
	Technological Innovation (A_4)	0.21	X_{41} Number of students in regular institutions of higher learning; X_{42} City radio and television coverage; X_{43} Number of invention patent applications; X_{44} Hi-tech Industries; X_{45} Public Library

3.4 Result

The new urbanization level measurement model (Chen 2018) is:

$$U_i = 0.19A_{i1} + 0.24A_{i2} + 0.40A_{i3} + 0.22A_{i4}$$

In the above equation, U_i is the urbanization development level of the first city in Shaanxi province; A_{i1} 、 A_{i2} 、 A_{i3} 、 A_{i4} are the scores of indicators of economic development (A_{i1}), social development (A_{i2}), ecological environment (A_{i3}) and technological innovation (A_{i4}) of the index score. After the score of economic development index, social development index, ecological environment index and technological innovation index is obtained, the comprehensive index score of new urbanization development of 10 cities in Shaanxi province can be obtained by formula, as shown in Table 2.

Table 2: Evaluation results of new urbanization development level.

City	Economic development score	social development score	ecological environment score	technological innovation score	Composite index score	Ranking
Xi'an	0.67	0.65	0.66	0.77	0.68	1
Baoji	0.31	0.39	0.78	0.36	0.51	2
Yan'an	0.29	0.40	0.63	0.32	0.44	3
Xianyang	0.29	0.37	0.56	0.38	0.43	4
Yulin	0.44	0.28	0.54	0.29	0.41	5
Tongchuan	0.18	0.37	0.51	0.18	0.35	6
Weinan	0.18	0.34	0.45	0.27	0.34	7
Hanzhong	0.16	0.22	0.47	0.30	0.33	8
Ankang	0.15	0.30	0.47	0.24	0.32	9
Shangluo	0.13	0.28	0.44	0.24	0.30	10

Source: Shaanxi Statistical Yearbook 2018 National Statistical Yearbook 2018

Combining the weight and the standardized value of each indicator, we can see the new urbanization level of each city and the score of each sub-level (see Table 2). It can be seen that the city with the highest comprehensive development level of new urbanization in Shaanxi province is the provincial capital Xi'an, and the lowest is ShangLuo. There is a big difference between the two cities. The mean value of comprehensive development level of new-type urbanization in Shaanxi province is 0.40, among which xi'an, Baoji, Yan'an, Xianyang and Yulin are above the average level, while the other five cities do not reach the average level. On the other hand, the urbanization level of most prefecture-level cities in Shaanxi province is relatively low.

4 LEVEL TYPES AND SPATIAL DIFFERENTIATION OF NEW-TYPE URBANIZATION IN SHAANXI PROVINCE

The Shaanxi province is located in the hinterland of China and the middle reaches of the Yellow River, with a total area of 205,600 square kilometers and a permanent population of 38,7621 million. Shaanxi is the birthplace of the Chinese nation and Chinese civilization, and it is also an important economic province in China. Since the area along the initiative put forward actively involved in Shaanxi area construction, all the way to build trade logistics center international cooperation capacity of science and technology education center international tourism center and financial center in the region and building talent exchange platform, promote optimized development environment, enhance the comprehensive carrying capacity of the new city and sustainable development ability.

4.1 Spatial Distribution of New Urbanization in Shaanxi Province

In this paper, ArcGIS10.2 platform was used to cut out the geographic base map of 10 prefecture-level cities in Shaanxi province, and the administrative

code of each city was used to link the attribute table, and the economic development index score, social development index score and ecological environment index score of the 10 cities in Shaanxi province were obtained science and technology innovation index scores and comprehensive scores input (George L,2006) best natural fracture method, the cities scoring from high to low is divided into four types, determine the critical value of each type, as manual division, based on the last new urbanization development level of Shaanxi province by means of manual grading space differentiation figure (Figure 1).

4.2 Refine Results

We can see from the table, Shaanxi province new higher level of urbanization area includes YuLin and yan 'an in the north Shaanxi province, in central Shaanxi area of BaoJi and XianYang, the four places in the development of new type of urbanization process, each have a obvious location advantages with its abundant energy mineral resources in YuLin city, as is the construction of the national energy base the area along the way. Under the economic development strategy, Yulin city has become the most influential resource city on the New Silk Road. Since the reform and opening up, Yan 'an city has formed an energy system based on oil and coal

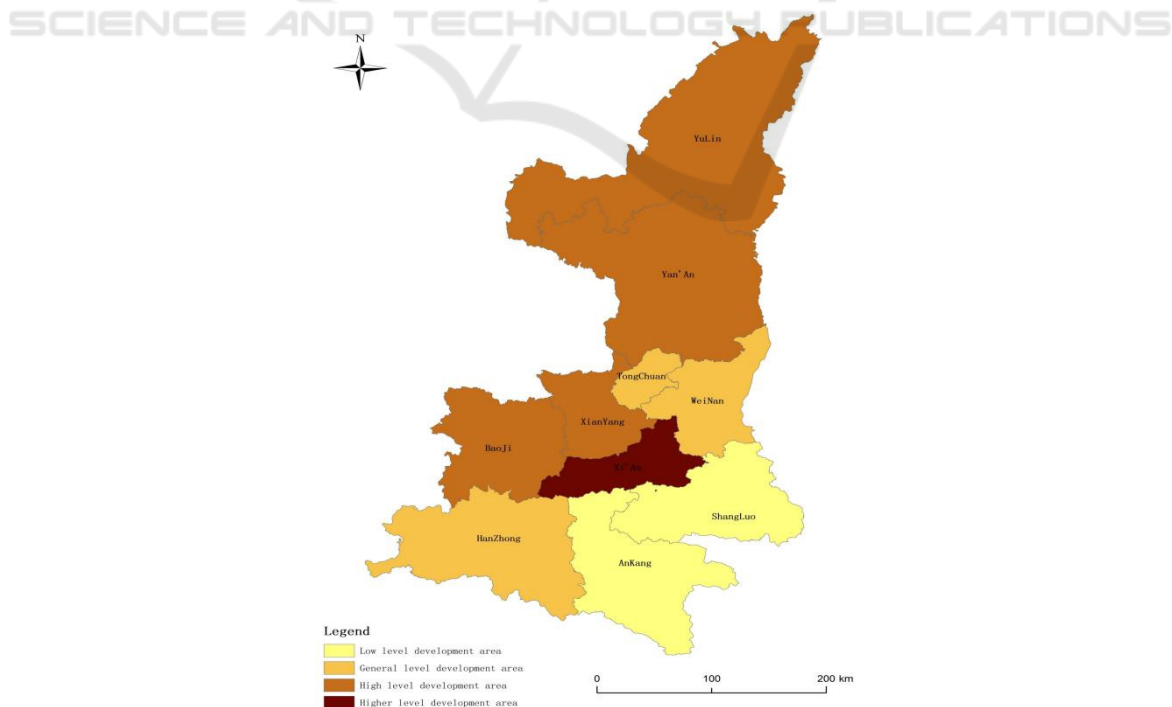


Figure 1: Level types and spatial differentiation of new-type urbanization in Shaanxi Province.

industry with the advantage of mineral resources, which has driven the rapid economic growth of Yan 'An and Baoji city and Xianyang City in central Shaanxi Plain (Chen 2018), one is the hometown of emperor Yan, the other is the first imperial capital of China, and also the city of light industry and heavy industry. However, due to some shortcomings in the development process, there is still room for improvement in the level of new urbanization. The general level development area of the new urbanization in Shaanxi province includes three prefecture-level cities, namely Tongchuan City, Weinan City and Hanzhong City. These cities have the potential of economic development, but the overall conditions are not outstanding enough and they have obvious resource shortfalls. Low level areas of new urbanization include Ankang and Shangluo. Although some areas are rich in natural resources, there are some problems in industry or agriculture, which makes the overall level of new urbanization low.

5 CONCLUSION AND RECOMMENDATION

As a leader of economic and social development in western China, Shaanxi province is in an important period of deepening new-type urbanization and a key period of realizing the rise of western China and revitalizing Shaanxi province. Since 2014, Shaanxi province has continuously improved its development thinking and formulated its development plan. In the process of actively exploring the development path of new urbanization, remarkable achievements have been made in the process of urbanization. Among them, the urbanization level has been constantly improved, the strength of in central Shaanxi formed. In the process of urbanization, attracting a large number of rural labor force into the city employment, promote the sustainable and healthy development of provincial economy, urban and rural production factors allocation efficiency improved significantly, improve living standards of urban and rural residents, but in the process of urbanization, still faces some prominent issues and challenges. For example, a large number of agricultural population transfer in cities, urbanization process lag; Unreasonable urban spatial distribution and scale structure; And the system mechanism is not yet sound, hindering the healthy development of urbanization and other problems. So scientific and reasonable evaluation of Shaanxi province new urbanization development

level, summarizes its development present situation, analysis put forward new problems existing in the urbanization process of Shaanxi province, and put forward the present and the future development of the overall train of thought and strategy, the new health and innovation and development of urbanization in Shaanxi province has a certain practical guiding significance. In the future, the study of new urbanization in Shaanxi province should fully consider the improvement of residents' living quality, the sustainable opening and cooperation of economy and the protection of ecological environment.

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