Comprehensive Evaluation of High Quality Development of Sharing Economy in 16 Cities of Anhui Province

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Abstract: The article constructs an evaluation index system for the high-quality development of the sharing economy from three dimensions: infrastructure, economic development, and social progress, and comprehensively evaluates the high-quality development level of the sharing economy in 16 provincial-level cities in Anhui Province. The results indicate that the overall development level of the sharing economy in the sixteen cities of Anhui Province is not high, and there is an imbalanced and insufficient development situation where the development level in the central region is high and the two ends are low. Among the 16 prefecture level cities, only Hefei, Lu'an, Wuhu, and Fuyang have a comprehensive factor of sharing economy development level greater than 0, and the comprehensive factor score of sharing economy development level in various prefecture level cities in the central Anhui region is relatively high, followed by the northern and southern Anhui regions. Finally, the article summarizes and proposes countermeasures from three aspects: infrastructure construction, diversified business models, and market norms.

Keywords: Sharing economy; High quality development; Factor analysis

1. Introduction

In recent years, as an emerging economic form, the sharing economy has utilized internet platforms to optimize and redistribute scattered and idle social resources. Through innovation in new models such as consumption patterns, supply channels, and employment forms, it has improved resource utilization efficiency, facilitated people's daily lives, and increased their income and some employment issues. The sharing economy mainly requires effective integration in three aspects: the first is the idle resources that can be utilized; The second is an online trading platform for the sharing economy, providing flexible and convenient trading channels for both demand and supply ends; The third is that both parties in the supply of resources need to actively participate and work together to optimize the allocation of idle resources.

As an important part of promoting Chinese path to modernization and implementing the new development concept, the sharing economy is an important way to promote the common prosperity of all people in China. On the one hand, the sharing economy can promote the level of social resource allocation and improve social productivity by gathering and re optimizing the allocation of resources, revitalizing idle resources; On the other hand, the sharing economy can solve the employment problem of some residents through the Internet platform, and expand the work and wage income channels of some residents, thus driving the third redistribution of wealth, thus creating a social atmosphere of mutual help, so as to promote common prosperity. Therefore, it is of great practical significance to scientifically evaluate, understand, and grasp the development level of a regional sharing economy, in order to promote the balanced and comprehensive development of the regional sharing economy through a combination of fiscal and monetary policies for macroeconomic regulation [1].

Through reading a large amount of literature, we can see that most scholars at home and abroad

have less involvement in the evaluation of the development of the sharing economy. Li G. (2022) attempted to explore how the sharing economy promotes high-quality rural development and assists in rural revitalization [2]. Song F.T. et al. (2018) proposed targeted measures such as reforming traditional statistical surveys and constructing relevant statistical indicator systems [3]. Fan J.P. et al. (2021) measured the level of China's sharing economy using the NDEA method and found that the sharing efficiency of each province and the overall region is at a low level, and continues to be at a low level [4]. Hu X.F. (2018) used the index regression method to measure the development index of China's sharing economy from three levels: basic industry, activity level, and development effectiveness, while also measuring the development scale and economic contribution [5].

In summary, most scholars have less discussion on the high-quality development of the sharing economy in Anhui Province, and they mostly focus on countries and provinces. Few scholars have conducted detailed discussions on the sixteen cities in Anhui Province. Therefore, this article takes prefecture level cities as the research object and uses factor analysis method to scientifically evaluate the development level of sharing economy in sixteen cities in Anhui Province based on three dimensions. It aims to provide decision-makers and relevant parties with some policy decision-making data basis, while expanding the research ideas and directions of sharing economy and promoting the development of sharing economy.

The innovation of this article mainly lies in the construction of an indicator system for measuring the development level of the sharing economy in sixteen cities in Anhui Province, and the use of factor analysis method for statistical measurement. Based on the measurement results, the development levels of sixteen cities were compared and analyzed, in order to provide policy basis for the government and relevant decision-makers as much as possible. At the same time, the research content in the field of sharing economics was expanded, attempting to make a marginal contribution to the academic field of sharing economics.

2. Research Design

2.1. Construction of Indicator System

This article draws on the research of Fan Z.F. et al. (2020) and constructs an evaluation index system for the high-quality development of the sharing economy in sixteen provincial-level cities in Anhui Province from three dimensions: infrastructure, economic development, and social progress [6].

Infrastructure is the material foundation and prerequisite for the development of the sharing economy, an important foundation for promoting the rapid development of the sharing economy and the internet economy, and a necessary condition for promoting value creation. Therefore, this article chooses infrastructure as the first key indicator, among which the number of mobile phone users at the end of the year, the number of internet broadband access users, and telecommunications business income can better reflect the construction of electronic information infrastructure in the region. At the same time, it can also reflect the basic conditions for residents to participate in the value creation of the sharing economy through internet platforms, and it is also a high requirement for indicators due to the networking characteristics of the sharing economy. The revenue indicators of postal services can reflect the level of postal services in the region, as well as the frequency and scale of local residents using information platforms such as the Internet for consumption and transactions [7].

With the high-quality development of the sharing economy, it will greatly promote the value creation of the social economy, as well as the increase in per capita GDP income and average wages of residents. At the same time, it will also promote the rapid development of the tertiary industry. Therefore, this article selects per capita GDP, the proportion of added value in the tertiary industry to GDP, and the average wages of employees as the tertiary indicators. On the one hand, these three indicators can better reflect the income situation of residents in the region. When residents participate in the development of the sharing economy, it will further increase their income and expand their income channels. On the other hand, social progress is a key factor reflecting a country's economic development level, achieving optimized distribution and reducing the lack of social welfare [8].

Due to the fact that the sharing economy mainly relies on internet platforms for resource reuse and allocation, it provides residents with various real-time and scattered jobs to increase their per capita income and reduce unemployment rates. And the sharing economy is mainly reflected in industries such as leasing, accommodation, and catering. Therefore, this article selects the proportion of employees in the tertiary industry, the number of employees in the accommodation and catering

industry, and the unemployment insurance coverage rate as the third level indicators. (Table 1)

Table 1: Evaluation index system of high-quality development of sharing economy

Target layer	Guidelines layer	Metrics layer	Variable	Metric properties
High-quality development of sharing economy	Infrastructure	Number of mobile phone subscribers at the end of the year (10,000 households)	X_{11}	Positive
		Number of Internet broadband access users (10,000 households)	X_{12}	Positive
		Postal business income (million yuan)	X_{13}	Positive
		Telecommunications business income (million yuan)	X_{14}	Positive
	Economic development	Per capita GDP (yuan)	X_{21}	Positive
		Average salary of on-the-job employees (yuan)	X_{22}	Positive
		Proportion of added value of tertiary industry to GDP (%)	X_{23}	Positive
	Social progress	Number of employees in the accommodation and catering industry (10,000)	X_{31}	Positive
		Proportion of employees in the tertiary industry (%)	X_{32}	Positive
		Unemployment insurance participation rate (%)	X_{33}	Negative

2.2. Research Methods

This article uses exploratory factor analysis and cluster analysis to conduct relevant research. Due to the uncertainty of how many factors are at play behind the existing independent variables, this article chooses to use exploratory factor analysis. Exploratory factor analysis mainly utilizes the idea of dimensionality reduction to aggregate complex and diverse independent variables into several independent factors through relevant data analysis and mathematical modeling, while minimizing or minimizing the loss of original sample data information. These factors can represent and reflect the numerous information originally contained in the sample.

2.3. Sample Selection and Data Sources

This paper divides the sixteen prefecture level cities in Anhui Province into three regions: northern Anhui, central Anhui, and southern Anhui. Northern Anhui mainly includes six prefecture level cities: Bengbu, Huaibei, Fuyang, Huainan, Suzhou, and Bozhou. Central Anhui mainly includes four prefecture level cities: Hefei, Lu'an, Anqing, and Chuzhou. Southern Anhui mainly includes six prefecture level cities: Wuhu, Mount Huangshan, Tongling, Xuancheng, Chizhou, and Ma'anshan. The central Anhui region also includes both the western and eastern regions of Anhui. For the convenience of discussion and analysis, it is summarized in the central Anhui region.

Due to the short writing cycle and considering the actual situation, this article selected urban development data from 16 cities in Anhui Province in 2019 for empirical analysis. The focus of this article will mainly be on exploratory factor analysis and the application of ArcGIS10.7 maps. The theoretical exploration of this article is relatively shallow. If there is an opportunity in the future, the theoretical part of the article will be enriched and enriched.

The data in this article is sourced from the "2019 China Urban Statistical Yearbook", which takes into account the actual situation and conducts reverse indicator processing on the number of residents participating in unemployment insurance, while standardizing the data.

3. Result Analysis

3.1. Factor Analysis

To eliminate the impact of order of magnitude on the results, min-max standardization was performed on the data of various indicators. The KMO test value of the model is 0.659 (between 0.6 and 0.7), and the P-value of the Bartlett sphericity test obtained is 0.000 (<0.05), thus meeting the basic prerequisite of factor analysis method. After selecting three common factors, the cumulative variance interpretation rate can reach 88.94% (>85%), so three common factors can be extracted, as shown in Table 2.

Table 2: Principal component extraction analysis results for total variance interpretation

Ingredients	Rotate the variance before interpretation rate			Variance interpretation rate after rotation		
	Feature root	Variance Explanation Rate (%)	Cumulative variance explained rate (%)	Feature root	Variance Explanation Rate (%)	Cumulative variance explained rate (%)
1	5.673	56.73	56.73	416.897	41.690	41.69
2	1.956	19.558	76.23	276.746	27.675	69.36
3	1.265	12.652	88.94	195.753	19.575	88.94
4	0.676	6.761	95.70			
5	0.335	3.352	99.05			
6	0.067	0.666	99.72			
7	0.025	0.254	99.97			
8	0.002	0.017	99.98			
9	0.001	0.007	99.99			
10	0.001	0.003	100			

The above table 2 is an explanatory table for total variance. We mainly observe the cumulative variance explanatory rate after rotation. If it is too low (such as below 60%), we need to adjust the number of factors. The variance interpretation rate, feature roots, variance interpretation rate, cumulative variance interpretation rate of rotated factors are used to solve the principal component formula. When the number of factors is set to 1, the variance interpretation rate of a single factor does not support rotation, so the variance interpretation rate after rotation is empty.

In the variance explanation table, when the principal component is 4, the characteristic root of the total variance explanation is less than 1. Therefore, a total of 3 principal components are extracted. It can be seen that when the principal component is 3, the cumulative equation interpretation rate reaches 88.94% (>85%), which also reflects that these three common factors can better and comprehensively reflect the information content contained in the indicator system constructed in the article.

Table 3: Table of factor load factors after rotation

Variable	Factor load factor after rotation			Co-commonality (common factor variance)
	Factor 1	Factor 2	Factor 3	
X_{11}	0.975	0.106	0.150	0.985
X_{12}	0.97	0.190	0.123	0.991
X_{13}	0.881	0.432	0.128	0.979
X_{14}	0.938	0.289	0.171	0.993
X_{21}	0.274	0.830	-0.184	0.797
X_{22}	0.100	0.866	0.225	0.810
X_{23}	0.452	0.368	0.315	0.439
X_{31}	0.489	0.112	0.853	0.979
X_{32}	0.036	-0.065	0.981	0.968
X_{33}	-0.303	-0.927	0.026	0.952

The above table 3 is a component matrix table, intended to illustrate the factor score coefficients (principal component load) contained in each component, used to calculate the component score and obtain the principal component formula.

Table 4: Factor Weight Results

Name	Explanation rate of variance after rotation (%)	Cumulative variance explained rate after rotation (%)	Weight (%)
Factor 1	41.690	41.690	46.874
Factor 2	27.675	69.364	31.116
Factor 3	19.575	88.940	22.010

The above table 4 shows the principal component weight analysis based on information such as load coefficients for factor analysis. The calculation formula is: variance interpretation rate/cumulative variance interpretation rate after rotation. The weight calculation results of factor analysis show that the weight of factor 1 is 46.874%, the weight of factor 2 is 31.116%, and the weight of factor 3 is 22.01%. The maximum weight of the indicator is factor 1 (46.874%), and the minimum weight is factor 3

(22.01%).

Meanwhile, this article comprehensively evaluates the high-quality development of the sharing economy in 16 cities in Anhui Province, and analyzes and discusses it through Table 5.

Table 5: Comprehensive evaluation and ranking results of high-quality development of sharing economy in 16 cities in Anhui Province

Region	City	Comprehensive score	Ranking
Northern Anhui	Suzhou	-0.526	12
	Huaibei	-0.424	10
	Bengbu	-0.417	9
	Fuyang	0.065	4
	Huainan	-0.124	6
	Bozhou	-0.597	13
Central Anhui	Hefei	3.936	1
	Luan	1.003	2
	Chouzhou	-0.424	11
	Anqing	-0.410	8
Southern Anhui	Huangshan	-0.328	7
	Wuhu	0.370	3
	Maanshan	-0.071	5
	Tongling	-0.652	15
	Xuancheng	-0.602	14
	Chizhou	-0.799	16

From Table 5, it can be seen that the overall high-quality development of the sharing economy in the sixteen cities of Anhui Province is imbalanced, and the overall level is not high. Among them, only four prefecture level cities, Hefei, Lu'an, Wuhu, and Fuyang, have a comprehensive factor score greater than 0, while the remaining 12 cities have a comprehensive factor score less than 0. At the same time, there is a serious imbalance in the high-quality development level of the sharing economy in the sixteen cities of Anhui Province. The development level of Hefei far exceeds that of Lu'an, which ranked second in the same period. Among the 14 cities after the top two, the development level of the sharing economy is below 1, showing a significant difference. In addition, 16 cities in Anhui Province have significant spatial heterogeneity. Although the overall level of central Anhui is good, the development level of sharing economy in Chuzhou and Anqing is still at a low level. There is also a certain degree of spatial heterogeneity within central Anhui. At the same time, the urban development level in southern and northern Anhui is generally not high, but also has a certain degree of spatial heterogeneity. And it was found that the development levels of Fuyang, Hefei, and Wuhu in the three regions were the best in their respective regions, which to some extent reflects that the economic development levels of the three cities are in a good and rapid development stage.

4. Conclusion and Suggestions

4.1. Conclusion

The overall development level of the sharing economy in the sixteen cities of Anhui Province is not high, and the development level in the central region is high, with low development levels at both ends, and uneven and insufficient development. Among the 16 prefecture level cities, only Hefei, Lu'an, Wuhu, and Fuyang have a comprehensive factor of sharing economy development level greater than 0, and the comprehensive factor score of sharing economy development level in various prefecture level cities in the central Anhui region is relatively high, followed by the northern and southern Anhui regions.

4.2. Suggestions

Strengthen infrastructure construction and promote the comprehensive development of the sharing economy. Although China has made significant progress in poverty alleviation and regional coordinated development in recent years, it can still be seen that the regional differentiation trend in the development of China's sharing economy is still quite complex, and the problem of uneven regional

development of the sharing economy still exists. It requires long-term efforts to comprehensively address the issue of uneven and insufficient regional development in the sharing economy field. China's relevant departments should increase policy support, improve and promote the construction of soft and hard infrastructure in the sharing economy field, provide material support and financial assistance for the comprehensive and high-quality development of the sharing economy, support and assist leading enterprises in the sharing economy field, target excellent foreign enterprises, and promote China's enterprises in the sharing economy field to become bigger and stronger.

Promote the diversified development of the sharing economy and shape new drivers of regional economic growth. The competition is becoming more intense, and the expansion and innovation of diversified business models are more important. Enterprises should continuously innovate their business models for the sharing economy, promote the diversified development of the sharing economy, promote high-quality regional economic growth with the high-quality development of the sharing economy, promote flexible employment and income growth for residents, and shape new driving forces for regional economic growth [9].

Optimize market norms and promote sustainable development of the sharing economy. Currently, China's sharing economy platform enterprises face new challenges in data security governance. Relevant parties should strengthen the further improvement of laws and regulations related to the sharing economy, and protect the privacy and network security of Chinese residents in the sharing economy field through policy formulation and institutional design. At the same time, further standardize market behavior, increase supervision and punishment efforts, further curb market chaos, and promote the healthy and sustainable development of China's sharing economy market.

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