

Analysis on the Investment Environment of Modern Service Industry in Guangxi Province*

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Abstract—Based on 49 indicators from 31 provinces and cities in China and 36 indicators in 14 cities in Guangxi province, the factor analysis method was used to systematically study the status of investment environment of modern service industry in Guangxi province, and the situation of investment environment of modern service industry in cities of Guangxi province. From the perspective of provincial comparison, Guangxi modern service investment environment ranks low, especially the urban environmental factors, which has a large gap compared with the provinces outside the region. In Guangxi province, the modern service industry in Nanning city has the highest investment environment, followed by Liuzhou city and Guilin city. The coastal cities along the Beibu Gulf have not shown a clear advantage in attracting investment in modern services.

Keywords—investment environment; modern service industry; factor analysis; Guangxi province

I. INTRODUCTION

With the intensification of the global economic service, the modern service industry plays an increasingly important role in the economic growth and industrial upgrading of a region. The modern service industry covers a wide range of industries, and the factors affecting the investment environment of modern service industries are more complicated. At present, there are two main methods for academic research to evaluate and study investment environment. One is to establish a regression analysis model to investigate the investment environment factors that affect the development of modern service industry. For example, Li Juan [1] attempts to empirically demonstrate the impact of industrialization, informatization, urbanization, marketization and internationalization on the development of China's modern service industry through the regression model of time series data; Liu Zhanwei [2], Zha Guiyong [3] and other scholars use regression analysis to investigate the factors affecting modern service industry in different regions. The other method is to establish a more complex evaluation system. Through the analytic hierarchy process, principal component analysis, factor analysis and other dimensionality reduction methods, the complex index system is synthesized

into a single composite index to make the investment environment of different subjects have clear comparability. Under the premise of constructing a certain index system, Shan Xiaoya, Ni Lin, Zha Qifen et al [4] [5] [6] use factor analysis method to comprehensively evaluate the investment environment of modern service industry in different regions.

Both analytical methods face a common problem. In the case of limited samples, the model can contain a limited number of variables. For example, when analyzing the investment environment of modern service industry in the cities of Guangxi province, under the condition of cross-section data, there are only 14 prefecture-level cities in Guangxi province, and the number of samples per variable is only 14. When the model contains more than 14 variables, the parameters of the cross-sectional regression model cannot be estimated. The factor analysis method can accommodate more variables than the regression equation. However, it still cannot overcome the multicollinearity problem [7]. When the number of variables exceeds the number of samples, the positive definiteness of the correlation coefficient matrix cannot be guaranteed. The panel data can increase the sample size. When using the factor analysis, the factor analysis results of different years are not comparable because the common factors extracted in different years have different meanings.

In order to overcome the problem of insufficient variables, this paper intends to achieve the purpose of accommodating more variables through two factor analysis. The first is to establish a secondary indicator system for evaluating the investment environment of modern service industries, and group the secondary indicators according to the primary indicators. Secondly, factor analysis is performed independently for each group of secondary indicators. After obtaining the scores of each factor, the weighted summary is used to obtain the factor comprehensive score of the group. Thirdly, factor analysis is performed again for the factor comprehensive scores of each group, and the weighted summary is used to obtain the comprehensive score of the modern service industry investment environment. According to the above calculation, we can obtain the overall evaluation of the investment environment of the modern service industry in each region. At the same time, the analysis on the scores of each factor group can be used to understand the specific performance of

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different regions on the investment environment of the modern service industry.

II. INDICATOR SYSTEM AND DATA

The investment environment of modern service industry is a very complicated system. For investors, the economic development factors will affect the investment decisions. And social factors, environmental factors, terms of trade, technology base and technology investment will have an impact on the investment decisions. By sorting out the existing literature, according to the specific requirements of the investment environment competitiveness evaluation, combining with the quantitative indicators published by the state, Guangxi statistical departments or relevant functional departments, the indicator system of investment environment of modern service industry in China province and Guangxi city is determined as shown in "Table I". The entire indicator system is divided into two levels, and the second-level indicators are grouped by first-level indicators. Considering the principles of systematicness, objectivity and

comparability of the index system, the first-level indexes in the provinces of China are similar to those in the cities of Guangxi province. However, due to the different availability of data, the second-level indexes in the cities of Guangxi province are slightly less than the second-level indexes in the provinces. The development of the modern service industry is mainly in the city. The indicators of density refer to the density of the built-up area.

The data of this study is compiled from the 2015 China Statistical Yearbook and the 2016 Guangxi Statistical Yearbook. Provincial analysis involves 31 provinces, municipalities and autonomous regions in China. The analysis scope of Guangxi municipal administrative area involves 14 prefecture-level cities in Guangxi province. Before using factor analysis, the data was subjected to z-score normalization to eliminate dimensional effects. The factor analysis uses the principal component method to extract the factor load, and the maximum variance method is used to orthogonally rotate the common factor. The specific calculation is done by using IBM SPSS Statistics 23.

TABLE I. EVALUATION INDEX SYSTEM OF INVESTMENT ENVIRONMENT OF MODERN SERVICE INDUSTRY IN THE PROVINCES OF CHINA AND CITIES OF GUANGXI PROVINCE

First-level indicators	Second-level indicators of provincial evaluation in China	Second-level indicators of municipal evaluation in Guangxi province
Economic factors	Per capita GDP (yuan), GDP growth rate, total GDP (100 million yuan), total social fixed assets investment (100 million yuan), secondary industry added value ratio, tertiary industry added value ratio, per capita local fiscal revenue (yuan), the total labor productivity of industrial enterprises (yuan/person year), the contribution rate of total assets of industrial enterprises above designated size, the level of household consumption (yuan), and the end-of-year balance of per capita RMB savings deposits of urban and rural residents (10,000 yuan)	Per capita GDP (yuan), GDP growth rate, total GDP (100 million yuan), total social fixed assets investment (100 million yuan), tertiary industry added value ratio, per capita local fiscal revenue (yuan), the total labor productivity of industrial enterprises (yuan/person year), the contribution rate of total assets of industrial enterprises above designated size (including interest), per capita cash consumption expenditure of urban residents (yuan), end-of-year balance of per capita RMB savings deposits of urban and rural residents (10,000 yuan)
Social factors	Urban registered unemployment rate, proportion of local fiscal public security expenditure, proportion of government social security expenditure, number of medical practitioner (mediatinus) (person/10,000 people), proportion of local financial expenditure on medical and health care, and number of service organizations in 10,000 people community (number)	Urban registered unemployment rate, proportion of government social security and employment expenditure, the number of medical practitioner (mediatinus) per 10,000 people, and the number of service organizations in 10,000 people community
Urban environment factors	Urban gas penetration rate (%), per capita park green land area (person/square meters), green coverage rate of built-up area (%), employment density in the catering and accommodation industry above designated size (person/square kilometers), employment density in wholesale and retail industry above designated size (person/square kilometers), density of art performance groups (person/square kilometers), density of public library institutions (person/square kilometers), per capita urban road area (person/square meters)	per capita park green land area (person/square meters), employment density in the catering and accommodation industry (person/square kilometers), employment density in wholesale and retail industry (person/square kilometers), number of stadiums (number), the number of theaters (number), the number of books in public libraries (books), per capita urban road area (person/square meters)
Urbanization factors	the proportion of built-up area (%), the proportion of urban population (%), public transport vehicles per 10,000 people (vehicles/10,000 people), total telecommunications business (ten thousand yuan), Internet penetration rate (%)	the proportion of built-up area (%), the proportion of urban population (%), public transport vehicles per 10,000 people (vehicles/10,000), total telecommunications business (ten thousand yuan)
Foreign trade factors	the throughput of major coastal ports (10,000 tons), the total import volume of the business unit (thousands of US dollars), the number of foreign-invested industrial enterprises and industrial enterprises invested by Hong Kong, Macao and Taiwan, and the total fixed assets of foreign-invested industrial enterprises and industrial enterprises invested by Hong Kong, Macao and Taiwan (100 million yuan), total investment by foreign-invested enterprises (10 million US dollars)	the throughput of main ports (10,000 tons), total export-import volume (thousands of US dollars), actual foreign investment (US dollars), actual amount of foreign investment in the current year (yuan)
Technological development factors	the transaction volume of technology market (100 million yuan), the full-time equivalent of R&D personnel of industrial enterprises above designated size (person/year), the proportion of local financial science and technology expenditure (%), the number of professional and technical personnel of public enterprises and institutions (person), R&D expenditure (10,000 yuan), domestic patent application authorization amount (item)	the proportion of local financial science and technology expenditure (%), R&D personnel (person)

First-level indicators	Second-level indicators of provincial evaluation in China	Second-level indicators of municipal evaluation in Guangxi province
Labor factors	end-of-year permanent resident population (10,000 people), the full-time wage employees of urban units (10,000 people), the ratio of pupils to teachers, the ratio of junior high school students to teachers, the ratio of teachers to ordinary high school students, the ratio of ordinary college students to teachers, the number of students enrolled in ordinary universities (people), the average wage of employed persons in urban units (yuan)	the total population of household registration at the end of the year (10,000 people), the ratio of junior high school students to teachers, the ratio of teachers to ordinary high school students, the ratio of ordinary college students to teachers, the number of students enrolled in ordinary universities (people), the average wage of employed persons in urban units (yuan)

III. EVALUATION ON PROVINCIAL INVESTMENT ENVIRONMENT

First, the factor analysis is performed on each set of second-level indicators to obtain the scores for each set of common factors and their corresponding common factors.

When determining the meaning of the factor, the maximum variance method is used to perform the factor load rotation. The comprehensive scores of each group are weighted by the proportion of the contribution rate of rotation variance of each factor to the total contribution rate of each factor. The process of factor analysis calculation is shown in "Table II".

TABLE II. FIRST-LEVEL AND SECOND-LEVEL INDICATOR COMMON FACTOR GENERATION PROCESS

First-level indicator	the number of second-level indicators	Bartlett sphericity test significance	the number of common factors	Variance cumulative contribution rate	Rotation component matrix Common factor meaning
Economic factors	11	0.000	4	88.777	1. Economic scale 2. Income level 3. Economic structure 4. Economic growth
Social factors	6	0.001	4	87.458	1. Social stability 2. Medical environment 3. Health security 4. job security
Urban environment factors	8	0.000	3	82.390	1. Urban consumption environment 2. Urban humanistic environment 3. Urban greening environment
Urbanization factors	5	0.000	2	80.453	1. Degree of urbanization 2. Urbanization quality
Foreign trade factors	5	0.000	2	93.059	1. Foreign capital utilization 2. Foreign trade location conditions
Technological development factors	6	0.000	2	94.617	1. Technology research and development investment 2. Foundation of technology development
Labor factors	8	0.000	3	87.621	Workforce scale 2. Labor costs 3. Labor quality
Factor analysis on first-level indicators	7	0.000	3	87.608	1. Economic and technological development 2. Labor factor 3. Urban development

In "Table II", we can see that the cumulative contribution rate of each group of variances is above 80%. 20 factors are extracted from 49 second-level indicators, and three common factors are extracted from the seven first-level indicators. In the case of retaining most of the original information, a better dimensionality reduction effect is obtained. Each item in the column "meaning of the common component of the rotation component matrix" in the table is obtained based on the comprehensive meaning of a plurality of indicators in which the common factor has a large load value in the column corresponding to the rotated factor load matrix. For example, 4 common factors are extracted from the first-level indicator economic factors in which include 11 second-level indicators. Among the first common factors, the total GDP, the end-of-year balance of per capita RMB savings deposits

of urban and rural residents, and the load of three indicators of fixed-asset investment in the whole society are large, reaching 0.956, 0.922, and 0.913, respectively. The load of other indicators is significantly smaller than the load of these three indicators. These three indicators can describe the overall size of the economy from the perspectives of economic stock, private capital stock and capital increment. The common factor is named "economic scale." The nomination principles of other factor meanings are consistent with the above methods.

After combining the common factor scores of the seven second-level indicators, the author has made the factor analysis, and the common factors of three first-level indicators can be obtained. In the rotated factor load matrix, the indicators with large factor load of the first common

factor are technical development factors, urbanization factors, foreign trade factors and economic factors, and their loads are 0.920, 0.910, 0.892, and 0.800, respectively. These four variables represent the level of economic and technological development of each province from various aspects. The common factor is named economic and technological development. The main load of the second factor is the labor

factor, with a load of 0.945. And the second is the social factor, with a load of 0.517. The main load of the third factor is the urban environmental factor, with the load of 0.934. And the load of other indicators is much smaller than that of the indicator. The scores of the rotated common factor, and the scores and rankings of final synthesized factor are shown in "Table III".

TABLE III. THE SCORE AND RANKING OF INVESTMENT ENVIRONMENT EVALUATION FACTOR OF MODERN SERVICE INDUSTRY IN CHINA

Province	Economic and technological development	Ranking	Labor factors	Ranking	Urban development	Ranking	Synthesis Score	Ranking
Beijing	1.64	4	-1.37	29	2.63	2	1.15	4
Tianjin	1.18	6	-1.97	31	-1.78	31	-0.08	14
Hebei province	-0.21	13	0.67	10	0.17	12	0.06	10
Shanxi province	-0.68	24	-0.11	16	0.68	6	-0.30	20
Inner Mongolia	-0.15	12	-0.90	27	-0.94	27	-0.47	24
Liaoning province	0.40	9	-0.63	22	-0.97	28	-0.09	15
Jilin province	-0.22	14	-0.83	25	-1.53	30	-0.60	27
Heilongjiang province	-0.47	21	-0.77	24	-0.98	29	-0.63	28
Shanghai	1.75	3	-1.84	30	0.85	4	0.77	5
Jiangsu province	2.19	2	0.56	12	-0.52	23	1.31	2
Zhejiang province	1.44	5	0.77	8	0.71	5	1.15	3
Anhui province	-0.40	19	0.58	11	0.49	8	-0.01	12
Fujian province	0.45	8	-0.32	19	0.41	10	0.27	7
Jiangxi province	-0.57	22	0.75	9	-0.12	16	-0.19	17
Shandong province	0.84	7	1.18	3	-0.49	21	0.67	6
Henan province	-0.42	20	1.54	2	-0.18	17	0.06	9
Hubei province	0.02	10	0.35	14	-0.50	22	-0.01	11
Hunan province	-0.31	16	0.90	7	-0.35	19	-0.05	13
Guangdong province	2.27	1	2.13	1	0.36	11	1.88	1
Guangxi province	-0.67	23	0.91	6	-0.59	24	-0.30	21
Hainan province	-0.95	28	-0.05	15	1.08	3	-0.36	22
Chongqing	-0.36	17	-0.17	17	0.49	7	-0.15	16
Sichuan province	-0.28	15	1.12	4	-0.01	14	0.08	8
Guizhou	-0.85	27	1.11	5	0.02	13	-0.25	19
Yunnan province	-1.05	29	0.46	13	0.43	9	-0.43	23
Tibet	-1.55	31	-0.87	26	2.88	1	-0.56	26
Shaanxi province	-0.15	11	-0.44	20	-0.07	15	-0.20	18
Gansu province	-1.07	30	-0.30	18	-0.48	20	-0.78	31
Qinghai province	-0.72	25	-1.15	28	-0.20	18	-0.72	30
Ningxia province	-0.74	26	-0.58	21	-0.70	25	-0.70	29
Xinjiang province	-0.38	18	-0.70	23	-0.77	26	-0.52	25

In "Table III", the provinces with the most superior investment environment of modern service industry in China are Guangdong province, Jiangsu province and Zhejiang province, and their investment environment is far superior to that of other provinces. Beijing and Shanghai are ranked fourth and fifth respectively due to lower scores in labor scores. The last five provinces in the term of investment environments of modern service industry are Jilin province, Heilongjiang province, Ningxia province, Qinghai province and Gansu province. The economic and technological development and urban development of these provinces are relatively backward, and the labor resources are not rich or the labor quality is not high. Therefore, the overall score is low. The evaluation results are highly consistent with the regional distribution of China's modern service industry development, indicating that the indicator system and analysis method selected and constructed in this paper are reasonable. The evaluation results obtained has certain guiding significance, and can be used as the basis for further research on the investment environmental assessment of modern service industry in Guangxi province.

From "Table III", we can find the following characteristics. 1. In addition to the labor factor, the southeast coastal areas have obvious advantages in the other six factors. The municipalities directly under the central government in the southeast coastal areas have high-level urbanization. Apart from Tianjin, the urban environment ranking is also very high. The developed coastal provinces in terms of economy, foreign trade and technological development have obvious advantages, and the rankings of Shandong province, Zhejiang province, Jiangsu province and Guangdong province are relatively high. 2. There are no provinces with absolute advantages in all aspects. Each province and city has its advantages and disadvantages. Beijing has obvious disadvantages in terms of economic scale and population, while Jiangsu province has disadvantages in term of the urban environment. Although Guangxi province ranks behind in the terms of other factors, it has certain advantages in labor.

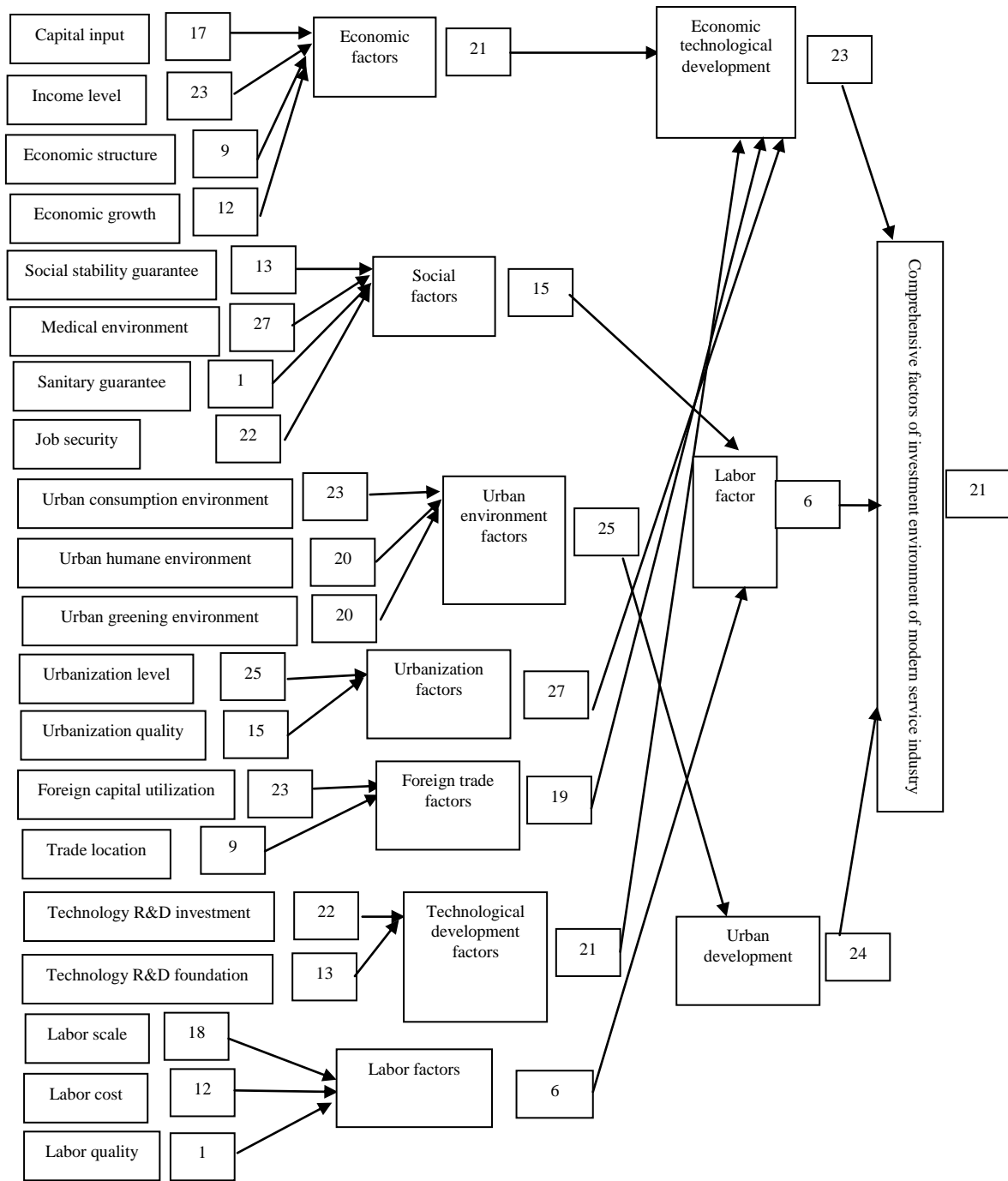


Fig. 1. The generation process of synthesis score of investment environment evaluation in modern service industry and factor analysis on the ranking of Guangxi province in each stage.

"Fig. 1" shows the generation process of the comprehensive evaluation score from the second-level indicator factor to the investment environment of modern service industry. The number behind each factor is the factor score ranking of Guangxi province. The common factors and scores in the sixth column of "Table II" were obtained by the factor analysis on grouping second-level indicators in the second column of "Table I". According to the grouping situation of the first-level indicators, the scores of each common factor are weighted and summarized into seven

first-level scores. Through further factor analysis, the author finally obtains a comprehensive evaluation of the investment environment. As can be seen from the figure, the comprehensive score of the investment environment of modern service industry in Guangxi province is ranked as 21. According to the retrospective score generation process, we can find that the rankings of economic and technological development and urban development of Guangxi province are relatively backward. Urbanization factors, foreign trade factors, and technological development factors, which have

strong correlations with economic and technological development scores, are ranked lower, especially the urban environment and urbanization factors are ranked 25th. The results show that urban development in Guangxi province is weak. Compared with other provinces, the urban environment is poor, and the level of urbanization is low.

According to further analysis, we can find that among the second-level indicator factors, there is a big gap between Guangxi province and other provinces in terms of medical environment, income level, urban consumption environment, urbanization level, and foreign capital utilization.

TABLE IV. SECOND-LEVEL INDICATOR FACTOR OF INVESTMENT ENVIRONMENT OF MODERN SERVICE INDUSTRY IN GUANGXI PROVINCE AND SECOND-LEVEL INDICATOR COMPREHENSIVE FACTOR SCORE RANKING

Score Ranking	Nanning	Liuzhou	Guilin	Wuzhou	Beihai	Port of Fangcheng	Qinzhou	Guigang	Yulin	Bai'se	Hezhou	Hechi	Laibin	Chongzuo	
<i>Second-level indicator factor score ranking</i>	Economic scale	1	2	3	5	8	12	7	9	4	10	14	6	11	13
	Labor efficiency	8	3	6	5	2	1	9	13	10	4	12	14	11	7
	Material capital efficiency	8	10	4	1	3	12	9	7	6	11	5	13	14	2
	Public service	11	5	7	6	1	12	4	9	2	13	10	8	3	14
	Medical security	2	1	3	6	8	13	10	14	7	4	12	5	9	11
	Urban consumption environment	1	13	2	10	7	3	8	12	4	11	9	6	5	14
	Urban living environment	2	1	6	8	10	14	3	5	11	7	13	12	9	4
	Urban transportation environment	8	9	3	4	11	13	14	10	5	7	6	1	12	2
	Urbanization quality	1	11	3	6	5	2	10	8	9	12	13	7	4	14
	Urbanization level	5	1	8	4	2	6	10	7	3	13	9	14	11	12
	Scale of foreign capital utilization	1	6	2	11	3	5	4	9	12	14	13	8	7	10
	Scale of foreign trade	3	6	11	9	5	2	4	14	8	7	12	10	13	1
	Location conditions of foreign trade	6	9	8	4	5	1	2	3	11	13	12	10	7	14
	Science and technology input	3	1	2	7	13	12	4	10	6	5	11	9	14	8
	Labor quality	6	4	3	8	1	12	13	14	9	2	5	11	10	7
	Labor cost	1	3	6	12	9	4	13	8	14	11	5	7	2	10
	Labor scale	2	9	3	7	11	14	5	4	1	6	12	8	13	10
	Economic factor synthesis score	1	2	4	6	3	5	10	11	7	8	12	14	13	9
	Social factor synthesis score	7	2	4	5	1	13	10	14	3	9	11	8	6	12
	Urban environment factor synthesis score	1	3	2	8	11	14	12	10	5	9	13	4	7	6
Urbanization factor synthesis score	1	2	5	6	4	3	12	8	7	13	11	10	9	14	
Foreign trade factor synthesis score	3	1	2	7	13	12	4	10	6	5	11	9	14	8	
Science and technology development factor synthesis score	4	1	2	10	14	12	3	6	5	7	11	9	13	8	
Labor factor synthesis score	1	4	2	10	5	13	12	14	6	3	7	8	9	11	

IV. INVESTMENT ENVIRONMENT EVALUATION OF MODERN SERVICE INDUSTRY IN THE CITIES OF GUANGXI PROVINCE

For the investment environment of modern service industry in the cities of Guangxi province, it has set a total of 36 second-level indicators. After the second-level indicators are grouped according to the first-level indicators, 17 common factors are extracted by factor analysis. The weighted scores of each group of common factors are

summed up to obtain the comprehensive indicator scores of the group and the factor comprehensive scores of 7 second-level indicators are obtained. According to further factor analysis of the comprehensive scores of the seven factors, we can extract three new first-level indicator common factors. The calculation process is the same as the process of China's provincial investment environment evaluation. Therefore, it will not be repeated here. Specific common factors and score rankings are shown in "Table V" and "Table VI".

TABLE V. THE SCORE AND RANKING OF FIRST-LEVEL INDICATOR FACTORS OF INVESTMENT ENVIRONMENT OF MODERN SERVICE INDUSTRY IN GUANGXI PROVINCE

Region	Economic urban development factor		Trade science and technology development factor		Social development factor		Synthesis Score	
	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking
Nanning	2.90	1	-0.05	7	-0.75	10	1.36	1
Liuzhou	0.58	2	1.79	2	1.02	3	0.8	2
Guilin	0.57	3	1.80	1	0.26	6	0.79	3
Wuzhou	-0.10	6	-0.42	11	0.49	4	-0.09	6
Beihai	0.55	4	-1.81	14	1.70	1	0.25	4
Port of Fangcheng	0.33	5	-1.04	13	-1.24	13	-0.2	7
Qinzhou	-1.22	14	1.10	3	0.14	8	-0.23	8
Guigang	-0.54	10	0.03	4	-1.65	14	-0.59	14
Yulin	-0.26	7	-0.19	9	1.24	2	-0.01	5
Bai'se	-0.48	9	-0.03	6	0.22	7	-0.27	9
Hezhou	-0.58	12	-0.25	10	-0.89	11	-0.58	13
Hechi	-0.74	13	-0.09	8	0.13	9	-0.42	11
Laibin	-0.58	11	-0.85	12	0.47	5	-0.43	12
Chongzuo	-0.44	8	0.02	5	-1.14	12	-0.38	10

From "Table V" and "Table VI", it can be found that the scores of various factors in the cities of Guangxi province have the following characteristics. 1. Different from the national situation, the coastal cities in Guangxi province have not shown obvious advantages. Beihai has lower scores in trade science and technology development. The port of Fangchenggang is ranked 13th in terms of trade science and technology development factor and social development factor. The economic urban development factor of Qinzhou is ranked last. This indicates that the trade location advantages of coastal cities in Guangxi province have not been fully utilized. Compared with other coastal provinces in China, the leading role of the coastal cities are obviously weak. 2. From the point of view of the second-level indicator factor scores, the cities in Guangxi province have scattered advantages, and do not have obvious resource agglomeration. The author uses the second-level indicator factor score ranking in "Table V" to calculate the coefficient of variation in each city. The coefficient of variation obtained is generally large, with the maximum value of 79.11% in Nanning city and the minimum value of 30.73% in Hezhou city. 3. The synthesis scores of investment environment of modern service industry in Nanning, Liuzhou, and Guilin have great advantages. Guilin obtained the lowest score among the three cities. The score was 0.79, with 1.16 times higher than that of Beihai. And Beihai ranked the fourth, with the score of 0.25. The fifth-ranked Yulin city scored -0.01. The mean value of each subject factor score of the

factor analysis is zero, indicating that when a factor score of a certain subject is greater than zero, the score is higher than the mean value, and vice versa. From the perspective of synthesis scores, the four cities of Nanning, Liuzhou, Guilin and Beihai have reached the average level of investment environment of modern service industry in Guangxi province, while other cities are below this level. 4. From the perspective of spatial structure, the modern service industry with the central axis consisting of Guilin, Liuzhou, Nanning and Beihai has the best investment environment, and the synthesis scores of investment environment of the urban cities such as Hechi, Bai'se and Chongzuo in the west of the central axis are generally low. The spatial distribution of the investment environment of modern service industry in Guangxi province is generally the highest in the central axis, and higher in the east than that in the west. 5. From the perspective of regional economic development, the investment environment of the Beibu Gulf Economic Zone (6 cities) has the highest mean score. The region has advantages in urban economic development and social development. The mean value of the synthesis scores of the Guixiyuan enrichment region is the lowest. Its scores of economic urban development and social development are lower than those of the other two regional economic entities.

TABLE VI. MEAN VALUE OF INVESTMENT ENVIRONMENT ASSESSMENT OF MODERN SERVICE INDUSTRY IN MAJOR REGIONAL ECONOMIES IN GUANGXI PROVINCE

First-level indicator factor	Beibu Gulf Economic Zone		Guixiyuan enrichment region		The Pearl River — Xijiang economic belt	
	Mean score	Ranking	Mean score	Ranking	Mean score	Ranking
<i>Economic urban development factor</i>	0.31	1	-0.55	3	0.19	2
<i>Trade science and technology development factor</i>	-0.33	3	-0.03	2	0.07	1
<i>Social development factor</i>	-0.01	1	-0.26	3	-0.19	2
<i>Synthesis Score</i>	0.13	1	-0.36	3	0.06	2

^a. Note: Beibu Gulf Economic Zone (6 cities) includes Nanning, Beihai, Fangchenggang, Qinzhou, Yulin, Chongzuo; Guixiyuan enrichment region refers to Baise, Hechi, Chongzuo; Pearl River-Xijiang Economic Belt refers to Nanning, Liuzhou, Wuzhou, Guigang, Baise, Laibin, Chongzuo.

From the above analysis process and results, we can find that compared with other provinces in China, the comprehensive investment environment of modern service industry in Guangxi province is not optimistic. Especially in terms of urban construction, the competitiveness is low. Judging from the situation in Guangxi province, Nanning is the capital of Guangxi province and the investment environment of modern service industry is the most superior. The investment environment of the sub-central cities such as Liuzhou and Guilin is also superior. From the perspective of regional economy, the investment environment of modern service industry in the Beibu Gulf Economic Zone is superior to that of the other two regional economies. Guixiyuan enrichment region is relatively backward due to the economic development and urban construction of the cities involved. Therefore, the synthesis score of comprehensive investment environment is the lowest.

V. CONCLUSION

On July 4, 2015, Guangxi Zhuang Autonomous Region promulgated the "Development Plan of Modern Service Industry Cluster in Guangxi Province (2015-2020)" (hereinafter referred to as "Planning"). The planning pointed out that Guangxi modern service industry should form a distribution system of "one circle, two belts and seven axes". Based on the previous research results, in order to achieve this goal, this paper believes that the following issues should be noted in improving the investment environment and promoting the development of modern service industry in Guangxi province.

A. Strengthening the Urban Construction of Key Cities, and Enhancing the Industrial Agglomeration of Modern Service Industries in Central Cities

The investment environment in Nanning, Liuzhou and Guilin is better. Compared with the cities outside the region, the urban environment and urbanization process in Guangxi province are relatively backward. From the calculation results of location entropy, it can be seen that apart from Nanning, the advantages of the location entropy of modern service industry in Liuzhou and Guilin are not obvious, and it is difficult to play the role of the service industry growth pole that secondary central cities should play.

B. Accelerating the Urbanization Process, and Strengthening the Links Among Cities in Regional Economies

Compared with other provinces, the level and quality of urbanization in the cities of Guangxi province are relatively backward. The development of modern service industry needs the support of the comprehensive functions of modern urban agglomerations. A city group with high connection and high-level urbanization is a necessary condition to promote the supply and demand of service industry. Beibu Gulf Economic Zone has excellent seaport resources and superior border location conditions, but lacks the strong urban agglomeration hinterland as support, and the development scale of the coastal industry is small. It is impossible to form a strong service industry gathering belt with the coastal industry as the core.

C. Strengthening the Construction of Nanning City, and Enhancing the Role of the Central City

Among the "one circle, two belts and seven axes", in addition to the gathering belt of northern Guangxi province, the development axis of eastern Guangxi province, and the development axis along the border, other gathering belts take Nanning city as the central city. The development of Nanning city is crucial to the development of modern service industry in Guangxi province. Compared with other cities in Guangxi province, Nanning city has no obvious advantages in terms of labor efficiency, material capital efficiency, public services, urban transportation environment and labor quality. For Nanning city, it should increase the investment in public services, urban transportation, public education infrastructure and basic environment construction. The urban production and living environment of Nanning city should be optimized, and the industrial agglomeration of modern service industry in Nanning city should be promoted. Then, the driving force of Nanning city as the central city could be promoted.

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