World Scientific Research Journal Volume 6 Issue 12, 2020
ISSN: 2472-3703 DOI: 10.6911/WSRJ.202012_6(12).0013

Comprehensive Evaluation of Service Industry in Eastern China based on High Tech Factor Analysis

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Abstract

As the extension of high-tech manufacturing industry and the high-end link of modern service industry, high-tech service industry is of great significance to expand domestic demand and promote industrial transformation and upgrading. In this paper, through the construction of high-tech service industry development evaluation system, the development level of high-tech service industry of 12 provinces and cities in eastern China is evaluated. Firstly, the development level of high-tech service industry is analyzed based on factor analysis method, and then 12 provinces and cities are ranked by comprehensive evaluation. Finally, according to the above analysis results, the improvement of high-tech service industry in eastern China is proposed Suggestions on the development level of surgical service industry.

Keywords

High tech service industry; factor analysis; comprehensive evaluation.

1. INTRODUCTION

Since the 20th century, the rapid development of knowledge economy, a large number of high technology industry, effectively promoted the service process of high technology, a large number of supported by high and new technology of high value-added, high technology content of emerging service industry, service industry began to shift from mainly focuses on labor to mainly provide the knowledge service. The characteristics of high value-added, high radiation and strong agglomeration, as well as the multiplier effect far higher than that of traditional industries, make the high-tech service industry have a strong driving effect, which can promote and drive the development of social economy. The high-tech service sector has become an important driving force for industrial development and upgrading in developed countries and a new engine of economic growth. In addition, high-tech services have been integrated into all aspects of traditional industries. For example, the integration of information and manufacturing technology continuously promotes the intellectualization, flexibility and servitization of manufacturing industry. Research and development design services for traditional industries to provide product image, structural engineering, functional experience, intelligent connectivity, information interaction and other integrated services, in the building of independent brand, improve overall efficiency and international competitiveness of the contribution is increasingly obvious.

On the whole, various provinces and cities have a large scale of high-tech service industry, but the service capacity needs to be improved. Compared with developed countries or regions, the high-tech service industry is mostly dominated by large enterprises that are not big or strong enough, and small enterprises that are not professional or sophisticated enough. As a new industry and new form of business, high-tech service industry has a weak ability to cope with market risks. The high-tech service industry is mainly composed of brainwork, and its assets are mostly intangible assets, so it faces the difficulty of market financing.

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202012_6(12).0013

Wang Yangdong et al. [1] constructed a complete set of evaluation index system of high-tech service industry from the perspectives of products, market benefits, innovation and product services. Sanni [2] from the level of development, basic conditions, industrial structure, etc, to reflect the condition of high technology service industry competitiveness index set, and the factor analysis and cluster analysis method, to our country of 17 regional high-tech services to evaluate comprehensive development level, the scale that high technology service industry development in our country exists in the structure is not reasonable and serious imbalance of regional development; Du Yongfei [3] for the first time, combining the factor analysis method and the grey correlation model, the development high technology service industry area in our country and its correlation with technological innovation, the results show that the regional development of our country advantages and disadvantages of different high technology services, comprehensive development level differences, and high technology has a significant correlation between service industry and science and technology innovation; Mr Wang [4] from the basic conditions, such as industrial structure, innovation input and output of four dimensions, build contains 4 first-level indicators, 18 second index of evaluation index system, using factor analysis method to extract high technology service industry development level of main factors, and use the clustering analysis method based on weighted markov distance improvement of various provinces, municipalities and autonomous regions in China is used to evaluate high technology service industry development level.

In this paper, through building the appraisal system of high technology service industry development, to the twelve provinces and cities in east China's high technology service industry development level to evaluate, first of all, based on factor analysis method to analyze the development level of high technology service industry, then using comprehensive evaluation to a ranking of 12 provinces and cities, according to the above analysis result, proposed to improve the level of high technology service industry development in east China.

2. AN OVERVIEW OF THE EVALUATION OF HIGH TECH SERVICE INDUSTRY

2.1. Concept of High Tech Service Industry

Generally speaking, knowledge intensive service industry refers to the commercial companies or organizations with high knowledge intensity, relying on emerging technologies and professional knowledge, with obvious customer interaction characteristics. It mainly includes the financial industry (banking, securities, insurance, other financial activities), information and communication service industry (Telecommunications and other information transmission services, computer services, software industry), science and technology Technical service industry (Research and experimental development, professional technical service industry, engineering technology and planning management, science and technology exchange and promotion service industry), business service industry (legal service, consulting investigation, other business services).

2.2. Selection of Evaluation Index for High Tech Service Industry

Following the principles of system optimization, feasibility and essentiality, this paper establishes three first-class indicators, which are development scale, basic conditions and public environment. After determining the first level title, some secondary indicators are selected as the evaluation index system. There are 13 secondary indicators and all of them are quantitative indicators.

1) Development scale

The basic indicators of development scale include the added value of high-tech service industry, the number of employees in high-tech service industry, the proportion of added value

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202012_6(12).0013

of high-tech service industry in GDP, the proportion of added value of high-tech service industry in the tertiary industry, and the added value of high-tech service industry per capita.

2) Basic conditions

The basic indicators of basic conditions include per capita GDP, the number of public transport vehicles per 10000 people, per capita consumption expenditure of residents, per capita urban road area and telephone penetration rate.

3)Public environment

The basic indicators of public environment include the average number of college students per 100000 people, the per capita turnover of technology market, and the investment of government public service industry.

In view of the comprehensiveness and comprehensiveness of the index selection of high-tech service industry, this paper selects 13 basic indicators for the evaluation of high-tech service industry from three aspects, namely, the added value of high-tech service industry, the number of employees in the high-tech service industry, and the proportion of the added value of high-tech service industry in GDP from the development scale, basic conditions and public environment The proportion of the added value of high-tech service industry in the tertiary industry, the per capita added value of high-tech service industry, per capita GDP, the number of public transport vehicles per 10000 people, the per capita consumption expenditure of residents, the per capita urban road area, the telephone penetration rate, the average number of College students per 100000 population, the per capita technology market turnover, and government investment in public services. The information reflected by these performance indicators covers all aspects of high-tech service industry, which can better reflect the development level of high-tech service industry.

3. THEORETICAL BASIS

At present, with the continuous development and improvement of statistical analysis methods, the use of statistical analysis methods to analyze economic problems, business management and so on has been paid attention to, has practical significance. In this paper, through factor analysis, the evaluation index of high-tech service industry is simplified into several main influencing factors, and then the comprehensive evaluation is used to rank 12 provinces and cities, so as to evaluate and analyze the development level.

3.1. Theoretical Basis of Factor Analysis

1)The concept and significance of factor analysis are as follows

Factor analysis is an important analysis method in multivariate statistical analysis. Its basic purpose is to use a few factors to describe the relationship between multiple indicators or factors. In this way, we can reflect most of the information of the original observation data through a few less factors, that is to say, the closer several variables are grouped into the same category and each type of variable is classified into a factor.

2)The essence of factor analysis is as follows

The purpose of this paper is to describe the covariance relationship among multiple variables with several potential but not directly observed and inquired random variables. We can use factor analysis to divide them into several factors according to the correlation between the indicators of the development level of high-tech service industry in 12 provinces and cities in this paper, and directly use factors to evaluate the development level of high-tech service industry in 12 provinces and cities, Measure, measure. The application of factor analysis ensures that most of the indicators of the development level of high-tech service industry in 12 provinces and cities can be used reasonably without wasting them. Moreover, the number of

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202012_6(12).0013

measurement standards is greatly reduced, which reduces the difficulty of analysis, and the factor interpretation is more innovative and clear, which is conducive to our analysis and interpretation model.

3.2. Theoretical Steps of Establishing Model of Factor Analysis

1) Data processing

Firstly, suppose there are m provinces and cities, and each province has n index variables. Based on the difference of data units in this paper, in order to avoid the adverse consequences caused by the difference of observation dimension and its order of magnitude, it is necessary to standardize the sample observation data. The standardized sample data matrix is as follows:

$$X=\begin{bmatrix} X_{11} & X_{12} & \cdots & X_{1n} \\ X_{21} & X_{22} & \cdots & X_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ X_{m1} & X_{m2} & \cdots & X_{mn} \end{bmatrix} \quad (1)$$

The vector coefficient of X is an observable random variable, and its mean value is E (X)=0 and covariance matrix COV(X)=1

2) KMO and Bartlett sphericity test to determine the feasibility of factor analysis

KMO statistics: it is to judge the correlation between variables by comparing the simple correlation coefficient and partial correlation coefficient. When the correlation is strong, the number of partial correlation is far less than the simple correlation coefficient, and the KMO value is close to 1. In general, KMO > 0.9 is very suitable for factor analysis; 0.8 < KMO< 0.9 is suitable; above 0.7 is acceptable, 0.6 is poor, and below 0.5 is not suitable for factor analysis.

Bartlett's ball test (Bartlett's test): used to test whether the correlation matrix is a unit matrix, that is, whether the variables are independent. It takes the correlation coefficient matrix of variables as the starting point, zero hypothesis: the correlation coefficient matrix is a unit matrix. If the statistical measurement value of Bartley's spherical test is large, and the corresponding associated probability value is less than the significance level given by the user, the null hypothesis should be rejected; otherwise, the null hypothesis cannot be rejected, and the correlation coefficient matrix may be a unit matrix, which is not suitable for factor analysis. If the hypothesis can not be denied, it means that these variables may provide some information independently and lack common factors.

3) Calculate the correlation coefficient matrix R

$$R=\begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{1n} \\ \cdots & \cdots & \cdots & \cdots \\ r_{m1} & r_{11} & \cdots & r_{mn} \end{bmatrix} \quad (2)$$

(4) Factor analysis was carried out and the eigenvalues and eigenvectors of the observed data were calculated

The simple steps are as follows: let $|R-\lambda I|=0$, get the eigenvalue, eigenvalue vector.

(5) Calculate factor load matrix

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202012_6(12).0013

$$A\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{1n} \\ \cdots & \cdots & \cdots & \cdots \\ a_{m1} & a_{11} & \cdots & a_{mn} \end{bmatrix} \tag{3}$$

(6) Factors for extracting principal components

Selecting p(p<n) main factors (marked with F) so that the sum of variance contribution rate of these p main factors accounts for more than 80% of the total variance contribution rate, or the corresponding eigenvalue of the main factors is greater than 1, which means that these main factors basically retain the information of the original analysis indicators, and reduce the original n analysis indexes to p factors, thus achieving the simplified analysis index optimization model The purpose of the model.

(7) A factor model was established:

$$\begin{cases} x_1 = a_{11}F_1 + a_{12}F_2 + \cdots + a_{1p}F_p + \varepsilon_1 \\ x_2 = a_{21}F_1 + a_{22}F_2 + \cdots + a_{2p}F_p + \varepsilon_2 \\ \cdots\cdots\cdots\cdots\cdots \\ x_n = a_{n1}F_1 + a_{n2}F_2 + \cdots + a_{np}F_p + \varepsilon_n \end{cases} \tag{4}$$

The matrix form of the factor model is: x = AF + ε. Among them is the common factor (also known as the main factor), they are the factors that appear in the expression of each original observation variable, making them independent and unobservable theoretical variables. Among them It is called special factor, which means that the index vector can not be explained by common factor, and its mean value E (ε) = 0. At the same time, the special factors and all common factors are independent.

(8) Maximum variance orthogonal rotation

After the first factor analysis, it is necessary to find out whether each main factor is related to the relevant information of the original observation data from the factor load table, and to sum up the information contained in it to find new ideas, so that the factors in the new sense can explain the samples. If the factor load table shows that the factor has little correlation with the original index, that is, the factor load does not meet the “simple structure criterion”, and the typical representative variables of each factor are not prominent, which will make it impossible for us to explain the meaning of the factors. Therefore, it is necessary to rotate the factor load so that the square of factor load can be transformed from 0 and 1 in order to simplify the structure and clarify the meaning of factor interpretation. There are many ways to rotate a factor. Here I use the maximum variance orthogonal rotation, which is an orthogonal rotation of the factor load matrix. It can make the rotated factor load matrix keep the columns orthogonal to each other, and at the same time make the variance of the data squared as large as possible.

3.3. Theoretical Basis of Comprehensive Evaluation

Comprehensive evaluation, also known as comprehensive evaluation method or multi index comprehensive evaluation method, refers to the method of using more systematic and standardized methods to evaluate multiple indicators and units at the same time. It is also called comprehensive evaluation method, which is widely used in reality. Comprehensive evaluation is to establish an evaluation index system for the research object, and use certain methods or

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202012_6(12).0013

models to analyze the collected data and make a quantitative overall judgment on the evaluated things.

3.4. Steps of Comprehensive Evaluation

1) Establish judgment matrix.

2) The weight of each index was calculated.

The geometric mean value of all elements in each row of judgment matrix is calculated, and then the importance weight of each evaluation index is calculated.

3) The consistency test of judgment matrix.

a. Calculating the maximum eigenvalue of judgment matrix:

$$\lambda_{\max} = \frac{1}{m}\sum_{i=1}^{m}\frac{(Aw_i)}{w_i} \tag{5}$$

Where AW is the product of judgment matrix A and eigenvector W, namely:

$$AW = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1m} \\ a_{21} & a_{22} & \cdots & a_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ a_{m1} & a_{m2} & \cdots & a_{mm} \end{bmatrix}\begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_m \end{bmatrix} \tag{6}$$

b. Calculating the consistency index of judgment matrix

$$CI = \frac{\lambda_{\max} - m}{m-1} \tag{7}$$

c. The random consistency ratio of judgment matrix is calculated. According to the consistency index CI, the random consistency ratio CR for the test can be calculated:

$$CR = \frac{CI}{RI} \le 0.10 \tag{8}$$

In the above formula, RI is called the average random consistency index of the judgment matrix, and its value depends on the number of evaluation indexes in the judgment matrix.

4. COMPREHENSIVE EVALUATION OF HIGH TECH SERVICE INDUSTRY IN EASTERN CHINA BASED ON FACTOR ANALYSIS

High tech service industry is a kind of high-end service industry supported by network technology, information communication technology and other high-tech technologies, mainly providing technology (knowledge) intensive products and services with high-tech content and high added value, and taking into account the advantages of high-tech industry and knowledge-based service industry. It is a kind of high-end service industry that modern service industry and high-tech industry infiltrate and integrate with each other in economic development The development of emerging industries. Therefore, this paper collects the development of high-tech service industry in 12 provinces and cities in eastern China, namely Beijing, Tianjin, Hebei,

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202012_6(12).0013

Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Guangxi and Hainan, and makes a comprehensive evaluation based on factor analysis.

4.1. Data Source and Processing

1) Data selection

On the basis of reading the classification of national economic sectors, this paper holds that high-tech service industry mainly includes three categories: I (information transmission, computer service and software industry), M (scientific research and technical service industry) and N (water conservancy, environment and public facilities management industry). Because the data of environmental treatment industry in n category is difficult to obtain, this paper summarizes the data of information transmission, computer service and software industry and scientific research and technical service industry to obtain the data of high-tech service industry. The data are mainly from the 2017 China Statistical Yearbook, the 2017 statistical yearbook of all provinces, autonomous regions and municipalities directly under the central government, the 2017 statistical yearbook of China's tertiary industry, and the 2017 China Statistical Yearbook of science and technology. From three aspects of development scale, basic conditions and public environment, this paper selects 13 basic indicators for evaluation of high-tech service industry, which are: added value of high-tech service industry, number of employees in high-tech service industry, proportion of added value of high-tech service industry in GDP, added value of high-tech service industry in tertiary industry, per capita added value of high-tech service industry, per capita GDP, per 10000 The number of public transport vehicles owned by people, per capita consumption expenditure of residents, per capita urban road area, telephone penetration rate, average number of college students per 100000 population, per capita technology market turnover, and government investment in public services. The information reflected by these performance indicators covers all aspects of high-tech service industry, which can better reflect the development level of high-tech service industry.

4.2. Comprehensive Evaluation Process based on Factor Analysis

Through the construction of high-tech service industry development evaluation system, this paper evaluates the development level of high-tech service industry of 12 provinces and cities in eastern China. Firstly, it analyzes the development level of high-tech service industry based on factor analysis method, and then uses comprehensive evaluation to rank 12 provinces and cities.

1) Evaluation on the development scale of high tech service industry

According to the principle of factor analysis method, the eigenvalue, contribution rate and cumulative contribution rate of common factor before and after rotation are calculated by using R, as shown in Table 1. It can be seen from table 1 that the cumulative contribution rate of the first two common factors has reached 83.26%, which can be used to evaluate the development level of high-tech service industry in various regions of China. The load matrix after rotation is shown in Table 2.

Table 1. Characteristic root and variance contribution of each factor after rotation

	Characteristic root	Variance contribution rate	Cumulative variance contribution rate
Factor1	2.530	50.60	50.60
Factor2	1.633	32.66	83.26

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202012_6(12).0013

Table 2. Load of factor after rotation

	Factor1	Factor2
x1	0.9242	-0.3604
x2	0.8332	-0.2334
x3	0.7125	0.5295
x4	0.6674	0.5951
x5	0.8734	-0.2826

It can be seen from table 2 that the public factor F1 has a large load on X1 (added value of high-tech service industry), X3 (added value of high-tech service industry in GDP), X2 (number of employees in high-tech service industry), X4 (proportion of added value of high-tech service industry in tertiary industry) and X5 (added value of high-tech service industry per capita).

2) Evaluation on basic conditions of high tech service industry

According to the principle of factor analysis method and R, the eigenvalue, contribution rate and cumulative contribution rate of public factors after rotation are calculated, as shown in Table 3. It can be seen from table 3 that the cumulative contribution rate of the first two common factors has reached 91.62%, which can be used to evaluate the basic conditions for the development of high-tech service industry in various regions of China. The load matrix after rotation is shown in Table 4.

Table 3. Characteristic root and variance contribution of each factor after rotation

	Characteristic root	Variance contribution rate	Cumulative variance contribution rate
Factor1	3.447	68.94	68.94
Factor2	1.134	22.68	91.62

Table 4. Load of factors after rotation

	Factor1	Factor2
x6	0.9328	0.07431
x7	0.9581	0.04212
x8	0.9778	-0.12016
x9	-0.0301	0.98558
x10	0.8379	-0.37524

It can be seen from the table that the first main factor has relatively high load on the four indicators of per capita GDP, the number of public transport vehicles per 10000 people, the per capita consumption expenditure of residents, and the telephone penetration rate, indicating that economic level is an important basic condition for the development of high-tech service industry. The load of the second main factor is mainly concentrated in the per capita urban road area.

3) Public environment evaluation of high tech service industry

According to the principle of factor analysis method and R, the eigenvalues, contribution rate and cumulative contribution rate of public factors before and after rotation are calculated, as shown in Table 5. From the table, the cumulative contribution rate of the first two common

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factors has exceeded 88.94%, which can be used to evaluate the public environment of high-tech service industry development in various regions of China. The load matrix after rotation is shown in Table 6.

Table 5. Characteristic root and variance contribution of each factor after rotation

	Characteristic root	Variance contribution rate	Cumulative variance contribution rate
Factor1	1.883	62.78	62.78
Factor2	1.010	33.66	96.44

Table 6. Load of factors after rotation

	Factor1	Factor2
x11	0.96694	0.106692
x12	0.97335	-0.002159
x13	0.03074	0.999209

It can be seen from the table that the first major factor has a large load on the two indexes of the average number of students in institutions of higher learning and the per capita turnover of technology market per 100,000 population, indicating that the investment in science and technology is very important for the development of high-tech service industry. From the perspective of the characteristics of the first principal component, the first principal component can be investment in science and technology factor, the second principal factor mainly concentrated in the per capita government public service sector investment, government investment and policy support is very important to the development of high technology service industry, from the perspective of the characteristics of the second principal component, can put the second main factor become the government investment.

The first three sections evaluate the development level, basic conditions and public environment of the high-tech service industry. On this basis, this section will evaluate the comprehensive strength of the high-tech service industry in various regions.

The following is to calculate the weights of the first and second level indexes of the established high-tech service industry index system.

1) Overall evaluation of the development level of high-tech service industry

(1) Establish a judgment matrix

A	Development scaleA1	Basic conditionsA2	Public environmentA3
Development scaleA1	1	3	3
Basic conditionsA2	1/3	1	1
Public environmentA3	1/3	1	1

(2) Determine the weight

Development scale weight	Weight of basic conditions	Public environment weight	CI	CR	λ max
0.6	0.2	0.2	0	0	3

Because the judgment matrix CI=0, CR=0, λmax=3, the consistency test is passed.

2) Evaluation on the development scale of high tech service industry

(1) Establish judgment matrix

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x	Added value of high tech service industry x1	Number of employees in high tech service industry x2	The proportion of added value of high tech service industry in GDP x3	Proportion of added value of high tech service industry in tertiary industry x4	Per capita added value of high tech service industry x5
Added value of high tech service industryx1	1	1	1/3	1/3	1
Number of employees in high tech service industry x2	1	1	1/3	1/3	1
The proportion of added value of high tech service industry in GDP x3	3	3	1	1	3
Proportion of added value of high tech service industry in tertiary industry x4	3	3	1	1	3
Per capita added value of high tech service industry x5	1	1	1/3	1/3	1

(2)Determine the weight

Weight of added value of high tech service industry	Weight of added value of high tech service industry	Weight of added value of high tech service industry in GDP	Weight of added value of high tech service industry in tertiary industry	Weight of per capita added value of high tech service industry
0.1111	0.1111	0.3333	0.3333	0.1111
CI	CR	λmax		
0	0	5		

Because the judgment matrix CI=0, CR=0, λmax=5, the consistency test is passed.

3) Evaluation on basic conditions of high tech service industry

(1) Establish a judgment matrix

	Per capita GDP	Number of public transport vehicles per 10000 people	Per capita consumption expenditure of residents	Urban Road area per capita	Telephone penetration rate
Per capita GDP	1	3	1/3	3	1
Number of public transport vehicles per 10000 people	1/3	1	1	3	1
Per capita consumption expenditure of residents	1/3	3	3	1	3
Urban Road area per capita	3	1/3	1	1/3	1
Telephone penetration rate	1/3	1	1/3	3	1

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(2) Determining weights

Per capita GDP weight	Weight of public transport vehicles per 10000 people	Weight of per capita consumption expenditure of residents	Weight of Urban Road area per capita	Weight of telephone penetration rate
0.2099	0.0872	0.4058	0.0872	0.2099
CI	CR	λmax		
0.0489	0.0437	5.196		

Because the judgment matrix CI=0.0489, CR=0.0437, λmax=5.196, the consistency test is passed.

4)Public environment evaluation of high tech service industry

(1) Establish judgment matrix

x	Average number of students in Colleges and universities per 100000 population x11	Per capita technology market turnover x12	Government investment in public services x13
Average number of students in Colleges and universities per 100000 population x11	1	1	1/3
Per capita technology market turnover x12	1	1	1/3
Government investment in public services x13	3	3	1

(2) Determining weights

Proportion of average number of students in Colleges and universities per 100000 population	Proportion of per capita technology market turnover	Proportion of government public service investment	CI	CR	λmax
0.2	0.2	0.6	0	0	3

Table 7. score and ranking of development level of high tech service industry in eastern China

region	Development scale		Basic conditions		Public environment		Comprehensive results	
	score	ranking	score	ranking	score	ranking	score	ranking
Beijing	81.25	4	92.28	2	82.97	1	83.80	1
Tianjin	82.19	3	72.73	3	75.85	3	79.03	4
Hebei	75.25	8	48.64	11	66.13	5	68.10	8
Liaoning	42.44	12	54.39	9	47.60	11	45.86	12
Shanghai	86.71	2	93.70	1	64.92	6	83.75	2
Jiangsu	89.56	1	69.80	5	79.47	2	83.59	3
Zhejiang	61.30	10	71.25	4	74.90	4	66.01	9
Shandong	77.42	6	57.08	8	62.98	7	70.47	6
Fujian	77.24	7	60.51	7	57.26	9	69.90	7
Guangdong	80.74	5	68.89	6	61.93	8	74.61	5
Guangxi	59.18	11	43.32	12	50.33	10	54.24	11
Hainan	62.19	9	49.07	10	49.28	12	55.18	10

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202012_6(12).0013

Because the judgment matrix CI=0, CR=0, λmax=3, the consistency test is passed.

With a complete index system, and given a certain weight to all levels of indicators, the following can be a comprehensive analysis of patent data. The score and ranking of the development level of high-tech service industry in eastern China are shown in Table 8.

5. CONCLUSION

1) In terms of scale and level of development, As one of the cities in the Yangtze River Delta, Jiangsu enjoys a high level of economic development. Shanghai, as one of the cities with the highest level of economic development in China, takes the lead in the rapid development of high-tech service industry, which is also inevitable. In economically developed regions, the tertiary industry will naturally develop rapidly, and correspondingly, the scale of high-tech service industry will also develop. Therefore, Jiangsu, Shanghai and other places are prominent in the development scale of high-tech service industry.

2) In terms of basic conditions, it can be seen from the ranking that Shanghai ranks first, Beijing ranks second, and Tianjin ranks third. Shanghai scores 93.70, ranking first in China, which indicates that Shanghai has good basic conditions. To be specific, it is mainly reflected in Shanghai's high per capita GDP, high per capita annual consumption expenditure and high degree of openness, which are the economic conditions for the development of high-tech service industry in Shanghai.

3) In terms of public environment, it can be seen from the ranking that Beijing ranks first, Jiangsu ranks second, and Tianjin ranks third. As the capital, Beijing attaches great importance to higher education and investment in public service industry, which further promotes the development of high-tech service industry.

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