

Study on regional competitiveness differentiation of Shandong Peninsula Urban Agglomeration

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Abstract: In this paper since 2011, the State Council has formally incorporated the Blue Economic Zone of Shandong Peninsula into the 12th Five-Year Plan, which has become an important part of the national strategy. To maximize the comprehensive competitiveness of Shandong Peninsula is an urgent problem to be solved. By sorting out the statistical indicators of urban development from 2010 to 2018, this paper selects 16 indicators, such as urban GDP, per capita green space area, as indicators to measure urban competitiveness, and uses principal component analysis to get the ranking of urban competitiveness in recent years. Among them, Qingdao and Jinan are the two centers of Shandong Peninsula region, their competitiveness is always in the first two places, Yantai as the regional sub-center, always in the third place, the comprehensive evaluation of Dongying and Weifang has an upward trend, Zibo and Rizhao has a downward trend. Combine the ranking of cities in recent years with government policies, and forecast the development trend of cities. That is to say, the ranking of Zibo will rise steadily and Dongying city will fall accordingly. In addition, through the analytic hierarchy process, it is concluded that the main factors affecting urban competitiveness are scale competitive and environmental competitiveness. Combining with the development situation of each city, this paper puts forward the development countermeasures of Shandong Peninsula Blue Economic Zone. For example, Dongying has shortcomings in functional competitiveness, and should actively develop new green industries. Rizhao has shortcomings in environmental competitiveness, and should actively expand trade imports and exports by taking advantage of its own advantages.

1. Introduction

Economists assert that the basic unit of international economic competition in the 21st century is not enterprises, nor countries, but urban agglomerations. With the development of economic globalization, the competition among urban agglomerations has replaced the competition among cities and become the main form of market competition. It is not only one of the important means for developed countries and developing countries to enhance the comprehensive competitiveness of urban agglomerations and promote the development of cities and related cities by analyzing the development status of cities in urban agglomerations. Therefore, the development of urban agglomerations is an inevitable choice for China's modernization and an important means to cope with the world economic integration [1] [2].

In recent years, the research on the competitiveness of urban agglomerations has gradually deepened in China. The research shows that the development of urban agglomerations determines the competitiveness of a country or a region, and also determines the 11th Five Year Plan of a region. It is pointed out that urban agglomeration should be regarded as the main form of urbanization. The understanding of urban competitiveness is of great significance to the development of each city and even the whole blue economic zone of Shandong Peninsula. The study of urban competitiveness can strengthen the role of the government and clarify the direction of the government's [3]; so that the government can understand the real situation of each city and formulate relevant strategies more appropriately at present, the development strategies of different cities are different. Some cities pay

attention to economic development, while some cities pay attention to eco-tourism. How to find a suitable direction for their own development is also an important research topic the results of the analysis of urban competitiveness are the basis for major enterprises and multinational corporations to make investment choices.

At present, more than 40 cities in China have been positioned as international metropolises. However, the specific positioning of cities is chaotic, and the lack of mutual assistance and cooperation between cities makes it difficult to form regional complementary advantages, and repeated aimless construction will also cause waste of resources. All these are not conducive to the improvement of urban competitiveness. Correctly understand the advantages and disadvantages of each city, put forward corresponding development policies combined with the development trend of the city, establish its own development trend, actively carry out regional cooperation, and realize cooperative development among cities. This makes the research and analysis of the competitiveness of each city go beyond pure theoretical research. Shandong Peninsula Economic Zone is an economically developed area, but the development of each city is not balanced. By analyzing the competitiveness of each city, we can objectively realize the advantages and disadvantages of each city, which is of great significance for the government to formulate development strategy.

At present, the city governments are actively uniting with the surrounding cities to create comprehensive and complementary urban agglomerations and improve the quality of development. At present, the urban agglomerations that have been built well include Yangtze River Delta urban agglomeration, Pearl River Delta urban agglomeration, Wuhan urban agglomeration, Shandong Peninsula urban agglomeration, etc., but the current scholars mainly focus on the Yangtze River Delta Urban Agglomeration and the Beijing Tianjin Hebei Urban Agglomeration, and have less research on the Central Plains urban agglomeration. Therefore, this paper studies the development of Shandong Peninsula and provides reference for the study of other Central Plains urban agglomerations.

2. Analysis on the main influencing factors of urban competitiveness in Shandong Peninsula

2.1 Selecting a Template

First, Using analytic hierarchy process to calculate the main factors affecting the development of the city X_{10} , first establish the judgment matrix A.

Table 1. Judgment matrix A.

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
X_1	1	2	1/5	1/5	1/8	1/7	1/5	1/5	1/5	1/2
X_2	1/2	1	2	3	1/3	1	3	5	4	3
X_3	5	1/2	1	1	1/5	1/3	2	1/3	2	2
X_4	5	1/3	1	1	1/3	1/2	3	2	1/3	5
X_5	8	1/3	5	3	1	2	3	5	5	6
X_6	7	1	3	2	1/2	1	2	3	5	5
X_7	5	1/3	1/2	1/3	1/3	1/2	1	1	2	5
X_8	5	1/5	3	1/2	1/5	1/3	1	1	1/3	1
X_9	5	1/4	1/2	3	1/5	1/5	1/2	3	1	3
X_{10}	2	1/3	1/2	1/5	1/6	1/5	1/5	1	1/3	1

The judgment matrix is normalized, and then the weight vector is obtained.

$$W = (0.037, 0.126, 0.08, 0.11, 0.18, 0.129, \dots, 0.0576)^T \quad (1)$$

So we can be used as the weight vector.

2.2 Influencing factors of urban competitiveness

In the weight indexes determined in table 1, the comprehensive weight of the four indicators, namely, urban GDP, urban employment / urban agglomeration employees, urban domestic waste

treatment rate, and the total import and export volume / GDP of the whole city, are of great importance. Therefore, we can use these six indicators to replace their respective criteria and analyze their correlation with urban competitiveness one by one.

(1) The selected index data are dimensionless. Since the value of the standardization method used above is small, the efficacy coefficient method is used to dimensionless the data.

(2) In the calculation of competitiveness index, we use the weight of scale competitiveness and structure competitiveness to form the function of urban competitiveness evaluation.

Table 2. Competitiveness of cities.

	X ₀	X ₁	X ₂	X ₃	X ₄
Jinan	80.351	84.87	85	91.1	60.5
Qingdao	99.526	100	100	97.29	100
Yantai	90.704	88.73	87.5	100	89.4
Weihai	75.572	67.93	87.5	99.66	65.7
Rizhao	66.26	60	65	85.05	65.2
Zibo	69.13	75.87	72.5	60.87	60
Dongying	65.53	71.50	60	60	60.9
Weifang	75.47	77.80	97.5	67.73	64.0

Through the above analysis, it can be found that scale competitiveness and environmental competitiveness are closely related to the competitiveness of cities in Shandong Peninsula, which is more consistent with the actual level of the development of manufacturing industry and import and export trade in Shandong Peninsula [4]. Therefore, scale competitiveness and environmental competitiveness are the leading factors affecting the development of Shandong Peninsula.

Compared with this, the correlation between structural competitiveness and functional competitiveness is small, which indicates that these factors play a small role in promoting urban competitiveness. It also shows that the rapid development of Shandong Peninsula in recent years, the quality of urbanization has been improved slowly. Although these factors have little impact on urban competitiveness, they cannot be ignored only comprehensive development, can make each city development more long-term.

3. Countermeasures and suggestions on improving the competitiveness of cities in Shandong Peninsula

Through table 1, it can be found that there are short boards in the development process of each city. Next, combined with the actual situation of each city's development, targeted suggestions are put forward.

3.1 Grasp the advantages of regionalization4.1 grasp the advantages of regionalization

Shandong Peninsula, facing South Korea and Japan across the sea, should give full play to its geographical advantages, actively respond to the policy of "bringing in" and "going out" to promote its urban development. However, the percentage of total import and export / GDP of each city from 2010 to 2014 did not increase significantly, and some years even showed a downward trend. Therefore, priority should be given to the development of foreign trade with Japan and South Korea.

The establishment of China Japan South Korea free trade zone can further reduce tariff barriers and promote trade economy Shandong Peninsula region, especially the Bohai Rim region, has broad prospects in new energy utilization, science and technology research and development cooperation with Japan and South Korea. All cities should seize the opportunity, respond to the call of national policies, participate in the regional cooperation between China, Japan and South Korea, and realize complementary advantages. By learning from other countries' advanced technology and management experience, they can enhance their position in the global value chain and achieve higher level of development.

3.2 Break through their own limitations and develop comprehensively

Each city should make full use of its own resource advantages to carry out innovative transformation.

For Jinan, as one of the two regional centers of Shandong Peninsula, the output value of Jinan's manufacturing industry cluster is lower than that of Qingdao. Jinan city should actively develop innovative manufacturing industry with great competitive potential. First of all, Jinan should steadily develop traditional advantageous industries such as steel manufacturing and paper industry at the same time, we should actively rectify the industrial wastewater treatment problems and expand the green space in the city. The per capita green area of Jinan is lower than that of Qingdao and Weihai. Secondly, Jinan should give full play to its advantages in land transportation and support the development of heavy truck. Finally, Jinan should make use of scientific and technological resources to actively develop new technologies.

As the intersection of Shandong Jiaoji axis and coastal axis, Qingdao should also actively seek innovation and development in the manufacturing industry, and strengthen the cooperation between import and export with Japan, South Korea and other places [5]. First of all, Qingdao should actively develop the electronic industry and electronic machinery industry with advantages. Secondly, we should make full use of the rich marine resources and ship resources, develop marine transportation, rely on international large ports to vigorously develop oil refining, oil and other heavy industrial clusters. We should also actively develop the service industry to form a situation of giving consideration to both the East and the West with Jinan.

Zibo City is an industrial manufacturing city dominated by petrochemical, pharmaceutical and new materials. Firstly, Zibo City should actively carry out environmental governance, expand urban green space area, and ensure that the per capita green space area shows an increasing trend. Secondly, Zibo and Jinan should form a situation of division of labor in the transportation equipment industry cluster and electronic information industry cluster, and actively seek for new manufacturing growth points.

As a key city of oil exploitation, Dongying City should actively extend the industrial chain to the upstream and downstream of crude oil exploitation and develop diversified petroleum undertakings. It is not advisable to rely solely on resource exploitation to develop economy. In terms of industrial development, Dongying City should actively strengthen cooperation with Jinan and Zibo. The implementation of the Yellow River Delta strategy is another opportunity for the development of Dongying [6].

Yantai city is a regional center city dominated by modern manufacturing industry, and it is also a hub of land and sea transportation. First of all, Yantai should continue to develop food, nonferrous metal smelting and other industries which have advantages in traditional manufacturing industry. Secondly, Yantai's coastal environment and transportation industry should be protected and developed. As the regional sub center of Shandong Peninsula, Yantai's comprehensive service industry is lower than that of Yantai and Jinan. However, with the development of ferry and coastal high-speed, Yantai's advantage in guarding Bohai Sea will be more prominent. Therefore, Yantai should focus on the development of transportation industry and corresponding logistics industry in the next stage.

Weifang City is a transportation hub connecting Shandong peninsula with central Shandong and Western Shandong. As the central city of Shandong Peninsula, it is necessary to actively develop transportation industry. Meanwhile, it should actively develop from traditional industry to advanced manufacturing industry by utilizing advanced agricultural resources and abundant marine resources.

The rubber, food and machinery manufacturing industries in Weihai are relatively developed. In terms of food manufacturing, we should make full use of the advantages of Haikou resources and marine resources, actively develop the processing of marine products and expand the import and export; in terms of rubber processing, we should use the existing rubber products industry base to maintain Weihai's advantages in tire manufacturing and garment processing; in addition, Weihai's advantages in tire manufacturing and garment processing should be maintained.

Although the function of the city mainly develops to the processing and manufacturing industry, its tourism industry has a higher reputation, and tourism should be the industrial pillar of Weihai City.

Rizhao City is characterized by industry and tourism. Rizhao's manufacturing industry is mainly labor-intensive, and its foundation is relatively weak. Therefore, it is necessary to develop the processing and manufacturing industry by utilizing rich Haikou and marine resources. Meanwhile, according to Qingdao's leading position, it should expand its trade import and export. In addition, Rizhao should also take advantage of the advantages of deep-water port to expand green space and develop tourism.

4. Conclusion

The evaluation of cities in Shandong Peninsula blue economic zone is based on the selected 16 indicators, and the comprehensive competitiveness evaluation system is constructed. Finally, the competitiveness ranking and dynamic development trend of each city in the blue economic zone from 2010 to 2014 are obtained. Qingdao and Jinan, as the leading cities in the Blue Economic Zone, always rank in the top two in terms of economic development level. Yantai, as a regional sub center, has always been in the third place. Although the economic development level of Dongying and Weifang lags behind that of Qingdao and Jinan, the overall comprehensive evaluation has an upward trend, while that of Zibo and Rizhao has a downward trend. Combined with the actual development situation of each city from 2015 to 2018, this paper makes a further forecast for the blue economic zone of Shandong Peninsula. Because the national development and Reform Commission has actively accelerated the construction of key demonstration area in Zibo, Shandong Province, and the economic pillar of Dongying is oilfield, the recent development is weak. It is predicted that after 2019, the comprehensive ranking of Dongying will gradually decline, and the comprehensive competitiveness of Zibo will gradually decline. In view of the four factors that affect the city's competitiveness, each city should actively combine its own development situation, cultivate the growth power of the city's competitiveness, and enhance the comprehensive competitiveness of the city.

When evaluating the comprehensive competitiveness of cities, some data such as per capita education expenditure and the number of college students per 10000 people in cities are difficult to investigate, so only 16 factors are selected as evaluation indexes. The urban evaluation system needs to be further improved.

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