Study on the Development of anhydrous Port in Jinan City

Xiangru MENG¹* Jianmeng SUN ² Haining WANG ³

¹Shandong Jiaotong University, Jinan, Shandong Province, China
²Shandong Institute of Transportation Science, Jinan, Shandong Province, China
³Shandong Hi-speed Group Co., Ltd, Jinan, Shandong Province, China
*Mxr6465201@126.com

Abstract. The construction of anhydrous port in Jinan is very beneficial to its economic development. Anhydrous port is the product of high speed economic operation, and it is an important tool for the efficient development of economy. In order to develop rapidly, economy must be equipped with corresponding and efficient tools. Anhydrous port is like the Internet for economic development, can not lack. This paper expounds the important role of anhydrous port in promoting regional linkage opening; this paper analyzes the economic and geographical advantages of the development of Jinan anhydrous port. The evaluation method of AHP-Fuzzy combination is used to evaluate Jinan anhydrous port.

1. Introduction

Anhydrous port (known as "land port") can be interpreted as "port without water". The actual meaning of the logistics center is the logistics center of the inland area, and the logistics center has the service function of the transportation of goods. The water-free port is to set up customs, inspection and quarantine institutions and provide clearance services. At first, the "anhydrous port" was the transformation procedure from the hinterland container transit station to the inland multimodal transit station. With the continuous growth of the operating capacity and services of the anhydrous port, the sequence developed on the basis of the function of a single transit station. Finally, can have logistics, business, customs settlement as one of the full set of services.

The development of Jinan City drives the development of Shandong Province as a whole, and even drives the development of other provinces in China. Jiangsu Province and Hebei Province, which are adjacent to Shandong Province, are plain areas and have certain sea areas, so there must be some similarities in their development. Anhydrous port is a necessary tool to open up international trade, from the direction of reducing transportation costs and improving specialization to promote economic export-oriented development. The establishment of Jinan anhydrous port is necessary and has important economic significance. At present, the trend of economic development is the need to build anhydrous port, and at present, almost every province in China has a corresponding logistics transit center. Jinan should not lag behind other regions in order to develop its economy rapidly, and its infrastructure should be sound. The rapid economic development of Jinan needs such an effective tool to promote the economy. According to some data, the construction of Jinan anhydrous port still needs to be strengthened, which can not fully meet the needs of economic development.
2. The important role of anhydrous port in promoting regional linkage and opening up

2.1. Port promotes the development of export-oriented economy
When promoting economic development, anhydrous port can promote the development of open economy, that is, the development of export-oriented economy. Since China's reform and opening up, the gap between rich and poor has gradually increased, especially between coastal areas and inland areas. What is the path to the development of inland cities? In the process of exploring the development path of inland areas, the concept of anhydrous port is gradually improved, just as ships drive the development of coastal cities. Anhydrous port is an important way to promote the development of non-coastal cities. Anhydrous port breaks the traditional concept that transportation without wharf is limited, just as there is no condition to create conditions, no wharf, no port must create wharf, create port.

2.2. Anhydrous port promotes the development of marine industry
The development of marine industry is an important part of promoting national economic development. The sea area of our country is large, and the development of marine economy is an important way to promote the growth of GDP. Marine transportation has the characteristics of low transportation cost and high carrier capacity. We make more efforts to improve the time of marine transportation and form the development of shipping industry, which is beneficial to the development of the five major sea ports in China. For example, the development of ports in the Yangtze River Delta has formed a port group, which has a great impact on the development of the transport industry in Shanghai, Jiangsu and Zhejiang. Anhydrous ports can accelerate the development of logistics parks and diversify the supply of goods. It is an important tool to promote sustainable development.

2.3. Anhydrous port promotes the joint development of sea and land economy
China has issued an effective mechanism for linkage development, which makes linkage more efficient in all aspects, enriches the function of anhydrous port, improves the overall amount of information, and makes the overall operation more integrated. Considering each link of logistics transportation, the port customs declaration is simplified, the packing is integrated, the unpacking is specialized, the storage mode is more perfect, and the transit is more systematic. Distribute the trunk line and branch line, each logistics node seamlessly connects, causes the linkage development to be more dense. In the development of anhydrous port, we should combine the development of the network, consistent with the Internet, make full use of the network big data to make the overall operation level more high-tech. The way of digitization can save more manpower, but also can effectively reduce the cost, form a complete system of network data, and achieve the effect of information linkage development.

3. Analysis of the development of anhydrous port in Jinain

3.1. An Analysis of the Economic advantages of the Development of Jinan anhydrous Port
Jinan is a relatively stable city with stable economic development, mainly an export-oriented trade strategy. Shandong Province belongs to the Bohai Rim region, with an important port, the sea and land transportation industry is developed, and the convenient transportation of waterway drives the strategy of "going out". As the largest developing country, China is in the forefront of the world in terms of population and land area. We must give full play to our strategic advantages and strive to help other friendly countries develop in the process of maintaining their rapid development. This requires economic exchanges between China and other overseas countries. According to the statistics of the General Administration of Customs from 2015 to 2018, the proportion of total import and export trade between countries and regions in the total import and export volume of our country has increased obviously, as shown in Table 1.
Table 1 Total imports and exports of customs goods from China and some countries, 2015-2018

| Country      | 2015     | 2016     | 2017     | 2018     |
|--------------|----------|----------|----------|----------|
| North Korea  | 33695    | 245636   | 353240   | 250376   |
| Japan        | 15003369 | 1736596  | 15162183 | 17783385 |
| Mongolia     | 2536978  | 386252   | 2665350  | 394770   |
| Korea        | 7358845  | 15352530 | 8767768  | 16873762 |

China pursues a multilateral friendly economy in its development and needs to maintain long-term cooperation with other countries in the world. Mutual benefit, interconnection, strive to develop export-oriented economy, expand the scale of trade. The oil used by China is basically imported from five countries in central Asia, including natural gas and some mineral resources. In order to meet the needs of continuous economic development, we must constantly strengthen ties with other countries in the world. Gradually formed China and other countries "raw material import-finished product export" stable trade model.

3.2. Analysis on the Geo-advantage of Jinan anhydrous Port Development
Jinan is the capital city of Shandong Province. Shandong Peninsula has 3024.4 km coastline, and the mainland coastline accounts for 1/6 of the national coastline, second only to Guangdong. Qingdao Port has a long history and is the nearest port from Shandong to Japan and South Korea, about 160 km to 430 km. The depth of water in Qingdao Port is just right, the berth is also suitable for shipping, and Qingdao has a long coastline, has a lot of docks, and the flow rate is very large, which is the basic condition for Qingdao Port to lay its position. Rizhao City, located in the south of Shandong Province, is an important channel for Shandong to link to Huang Hai, and it is also an important area for Shandong's economic development. The development of Rizhao Port has directly led to the development of the five provinces of Shandong, Henan, Shanxi, Hebei and Shaanxi. And Rizhao's rail transport is also very developed, inland goods can reach Rizhao by rail, and then by sea to their destination. Yantai City is not only adjacent to Bohai Sea, but also connected with Huang Hai. Yantai is also the nearest seaport city between Shandong and Liaoning Province, and the shipping from Yantai City to Dalian City in Liaoning Province is very developed. To a certain extent, it promotes the material circulation and economic communication between North China Plain and Northeast Plain.

4. Evaluation of Jinan anhydrous port based on AHP-Fuzzy combination
Anhydrous port has developed to the present degree, its development direction and development rules are relatively perfect, at the same time, its influencing factors are more and more, mainly due to the social, economic, political and other mechanisms are related to the anhydrous port. AHP-Fuzzy combination evaluation method is used to sort out these influencing factors, quantitatively use specific numbers to explain the problem, qualitatively use relevant theories to prove the point of view, and fully determine the representativeness and scientific nature of the whole evaluation index. The specific steps are as follows:

1) the correlation between the factors is analyzed and the systematic evaluation is carried out, and the index hierarchy is established according to the top layer, the middle layer and the lowest layer.

2) For the application of Delphi method, the factors between different levels are compared in pairs, and the judgment matrix is obtained.

\[
A = \begin{pmatrix}
    a_{11} & \cdots & a_{1n} \\
    \vdots & \ddots & \vdots \\
    a_{n1} & \cdots & a_{nn}
\end{pmatrix}, \quad a_{ij} = 1, 2, \ldots, n
\]

Among them, the elements \(a_{ij}\) Given by Sadie's 1-9 scale method, see Table 2.
Table 2 Sadie 1-9 scale method

| Scale | Meaning |
|-------|---------|
| 1     | Represents a comparison of two factors, of equal importance |
| 3     | Represents a comparison of two factors, one of which is slightly more important than the other |
| 5     | Represents a comparison of two factors, one of which is significantly more important than the other |
| 7     | Means to compare two factors, one factor is more important than the other. |
| 9     | Means to compare two factors, one of which is more important than the other. |
| 2, 4, 6, 8 | The intermediate number of the above two adjacent judgments |

Count backwards Factor i and j are compared to judge by \( a_{ij} \), Factor j and i are compared to judge by \( a_{ij} = \frac{1}{a_{ij}} \)

(3) The root method is used to calculate the geometric average of each column of elements in the matrix, to obtain the final weight of each factor compared with other factors, and to test the results to test whether they pass the consistency.

(4) The weight of each level relative to the target layer is obtained, and the weight of each index is defined.

Index set \( U = \{ u_{1}, u_{2}, \ldots, u_{6} \} \) can be established, Each represents six of the first-level indicators, then \( U_{1} = \{ u_{11}, u_{12} \} \), \( U_{2} = \{ u_{21} \} \), \( U_{3} = \{ u_{31} \} \), \( U_{4} = \{ u_{41}, u_{42}, u_{43} \} \), \( U_{5} = \{ u_{51}, u_{52} \} \), \( U_{6} = \{ u_{61} \} \) indicators is represented separately. By using the Delphi method, the pairwise comparison of the first index is carried out, the judgment matrix is constructed, and the weight of the first index is calculated, that is,

\[
R = (r_{ij})_{6x6} = \begin{bmatrix}
1 & 1/3 & 1/2 & 1 & 1 & 1/5 \\
3 & 1 & 2 & 3 & 3 & 1/4 \\
2 & 1/2 & 1 & 2 & 2 & 1/4 \\
1 & 1/3 & 1/2 & 1 & 1 & 1/5 \\
1 & 1/3 & 1/2 & 1 & 1 & 1/5 \\
5 & 4 & 4 & 5 & 5 & 1
\end{bmatrix}
\]

(2)

By using the square root method, the geometric average value of each row of elements is obtained, that is, \( \sigma = (1.76\cdot0.65\cdot1.76\cdot1.76\cdot0.28)^{T} \), the normalization treatment is carried out to obtain the obtained product, \( \sigma = (0.24\cdot0.09\cdot0.14\cdot0.24\cdot0.24\cdot0.05)^{T} \)

Through the consistency test, then we can determine that the ranking results maintain satisfactory consistency, and the distribution of weights is suitable for this goal, so I can make clear the weight of the indicators of anhydrous port, that is; \( A = \{ 0.24, 0.09, 0.14, 0.24, 0.24, 0.05 \} \).

By the same token, we can take a similar method to calculate the judgment matrix of the second-order index, and according to the above method, we can obtain the comprehensive weight of the whole index system, as shown in Table 3.

Table 3 The index system of comprehensive weight

| Primary indicator | Secondary index | weight factor | weight factor |
|-------------------|-----------------|---------------|---------------|
| Construction level of anhydrous port | Storage capacity | 0.24 | 0.5 |
|                      | Equipment condition |     | 0.5 |
| Management level of | Talent education level | 0.09 | 1 |
The purpose of constructing anhydrous port in Jinan is to realize economic development and logistics development. So that in the transportation of goods to save costs and improve the competitiveness of the economy. Committed to the import and export of goods, want to achieve considerable development with the Korean peninsula, Europe, Central Asia and Western Asia, the circulation of goods, to achieve economic coordination and stability. The development of economy requires the cooperation of all parties. As early as 2007, Rizhao reached a cooperation agreement with Jinan. Jinan City is rich in natural resources, human resources, Rizhao City has convenient shipping and other transportation advantages, the two cooperate together, give full play to their respective advantages, and promote the integration of coastal and non-coastal cities. Can form the joint development of the region. Jinan is not far from Tianjin. Jinan's freight transportation can also cooperate with Tianjin Port. The two ports serve Jinan together. For example, the export of Jinan cars can build port cooperative relations.

5. Conclusion
Through the results of the above analytic hierarchy process, we can fully understand the weight of each index of Jinan anhydrous port, find out the focus of its development, or it can be said to find the advantages and disadvantages of the development situation of Jinan. We can understand that among these indicators, the geographical location of Jinan is the main driving force for its development, and the level of education in Jinan, that is, talents, has a great impact on the development of anhydrous port. It also includes the current foreign trade situation of Jinan, which also affects the construction of anhydrous port, and the natural resources of a region is also an important aspect of its economic development.

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