Port Logistics Function Evaluation Model Based on Entropy Weight TOPSIS Method

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Port logistics has developed rapidly, but due to late start, poor foundation, and other reasons, there are still some deficiencies in the development process; for example, some port logistics capacity is weak, and low efficiency has hindered the development of ports. Therefore, this paper puts forward the evaluation model of port logistics function based on entropy weight TOPSIS (Technique for Order of Preference by Similarity to an Ideal Solution) method. Analyze the factors that affect the operation effect of port logistics, extract four key indicators, and construct index evaluation factors. Entropy weight method and TOPSIS method are used to calculate the weight of each factor so as to quantify the indicators, thus determining the scoring standard of each indicator, obtaining the comprehensive scoring standard, and realizing the port logistics function evaluation. The experimental results show that to realize the effective use of port resources and the protection of the port environment, it not only needs to conduct port logistics function evaluation but also take into account the efficiency of port logistics. It is of great significance to study the capacity and efficiency of port logistics for improving the core competitiveness of port enterprises and driving the sustainable economic development of surrounding areas.

1. Introduction

Port logistics refers to the development of a comprehensive port service system with the characteristics of covering all links of the logistics industry chain by a central port city by making use of its own port advantages and relying on advanced software and hardware environment, strengthening its radiation capacity to logistics activities around the port, highlighting the expertise of the port in cargo collection, inventory, and distribution, taking the port-based industry as the basis, information technology as the support, and optimizing the integration of port resources as the goal [1, 2]. At present, more than two-thirds of the world’s foreign trade cargo are shipped by sea. In order to meet the increasing service demands of customers and keep a foothold in the increasingly competitive market, we must constantly broaden the functions of port logistics, improve service efficiency, and develop towards providing all-round value-added services. Nowadays, more and more ports are changing the traditional single function of cargo handling and transportation and gradually developing towards providing modern logistics services [3, 4]. Relying on the port, developing modern logistics has become an important strategic measure for the port to seek long-term development and enhance competitiveness. As the node of the global comprehensive transportation network, the port plays a more and more important role in the development of modern logistics. The port realizes the function of modern logistics center with compound advantage, the port multiple identities have strategic status in the international logistics, and the port provides value-added services through the logistics system.

Zhang and Chen [5] mainly present the logistics reasonable degree, the logistics efficiency and the service level, and the external environment three angles to construct the Tianjin area logistics development level index system and have carried out the appraisal analysis. Hyland et al. [6], through the evaluation and ranking of the logistics industry...
2. Entropy Weight TOPSIS Method for Port Logistics Function Evaluation Index Factors

2.1. Construction of Evaluation Index System. There are many complicated factors involved in the evaluation of port city logistics competitiveness. To reflect the status and characteristics of the comprehensive competitiveness system comprehensively and accurately, the evaluation index system should present a structural hierarchy. Hierarchical evaluation can not only get the overall evaluation results, but also understand the evaluation status of each level and reflect the whole picture of port city logistics competitiveness systematically [7–9]. In order to reflect the logistics competitiveness of port city, taking into consideration the availability of data, this paper constructs 4 first-class indexes, including port infrastructure, logistics industry scale, hinterland economic development, and informatization level.

2.1.1. The Level of Port Infrastructure. Port has been an important transportation infrastructure since ancient times, which is the window to realize economic and trade exchanges and cooperation and provides basic support for economic construction and foreign trade development [10–12]. For coastal port cities, port is the core and carrier of city logistics industry. Perfect infrastructure and superior conditions directly affect the operation capacity and efficiency of port and then affect the competitiveness of city logistics. This paper mainly chooses 5 secondary indexes, namely, dock length, berth number, 10000 berth number, port cargo throughput, and port container throughput.

2.1.2. Logistics Industry Scale. The scale of logistics industry and the competitiveness of logistics in port cities complement and influence each other to a large extent [13, 14]. The expansion of logistics industry in a city means that the city has a comparative advantage in logistics competitiveness, and the strong logistics competitiveness in turn accelerates the expansion of the city’s logistics industry. Road mileage, road cargo transport, waterway cargo transport, road cargo turnover, and waterway cargo turnover are mainly selected as 5 secondary indicators.

2.1.3. Hinterland Economic Development Level. Hinterland economy plays a vital role in any industry, and the development of port city logistics industry cannot do without the support of hinterland economy. Hinterland economy provides support and guarantee for the development of logistics industry. The larger the hinterland economy scale is, the more developed the logistics industry in port cities is [15, 16]. This paper selects 5 secondary indexes: GDP, total import and export, secondary industry added value, tertiary industry added value, and total fixed asset investment.

2.1.4. Information Level. Logistics informatization is a series of processing activities, such as collection, classification, transmission, summary, identification, tracking, and inquiry of the information generated in the process of urban logistics. The informatization level of port cities reflects the efficiency level of the urban logistics industry and mainly selects four secondary indicators, namely, the total amount of postal and telecommunications services, the number of mobile phone users, the number of fixed-line telephone users at the end of the year, and the number of the Internet broadband users [17].

2.2. Entropy Weight-TOPSIS Model

2.2.1. Entropy Weight Method. Entropy weight method is an objective valuation method, which measures the effective information and index weight contained in known data by calculating the information entropy of indexes [18]. The calculation formula is

\[ C_i = L_i + G_i + F_i + \lambda. \] (1)

In the formula, \( i \) represents the total investment cost of the port logistics enterprise in the development stage; \( L_i, G_i, \) and \( F_i \), respectively, represent the circulation cost, management cost, and service cost of the enterprise in the development stage; and \( \lambda \) represents the other costs required by the enterprise’s production and operation. The smaller the information entropy of an index, the greater the variation degree of the index, the greater the amount of information provided, and the greater the role of the index in the comprehensive evaluation, the higher its weight. Conversely, the greater the information entropy of the index, the lower its weight.

2.2.2. TOPSIS Method. TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution), also known as approximate ideal solution ordering, is a multiobjective decision-making method [19]. The basic principle is that the ideal solution and the negative ideal solution of the decision problem are defined, and then the feasible solutions are compared with the ideal solution and the negative ideal solution. If one of the feasible solutions is the closest to the
ideal solution and is far away from the negative ideal solution, the solution is the satisfactory solution of the feasible solution set.

**Basic Steps.** Assuming that there are \( m \) coastal port cities and \( n \) cities’ logistics competitiveness evaluation indexes, the corresponding original data matrix of each port city and logistics industry competitiveness evaluation index is as follows:

\[
R = (r_{ij})_{mn} = \begin{bmatrix} r_{11} & \cdots & r_{1n} \\ \vdots & \ddots & \vdots \\ r_{m1} & \cdots & r_{mn} \end{bmatrix}.
\]  

(2)

Calculate the proportion of PIPIJ for each indicator for each port city:

\[
y_{ij} = \frac{r_{ij} - \min (r_{ij})}{\max (r_{ij}) - \min (r_{ij})} \quad (3)
\]

Calculate the proportion of the \( j \) index of the \( i \) port city \( p_{ij} \):

\[ p_{ij} = \frac{y_{ij}}{\sum_{j=1}^{n} y_{ij}}, \quad (j = 1, 2, \ldots, n). \]  

(4)

According to the relative proximity degree, the evaluation objects are sorted. The larger \( p_{ij} \), the closer to the ideal solution; conversely, the smaller \( p_{ij} \), the closer to the negative ideal solution.

### 3. Construction of Port Logistics Function Evaluation Model

The construction of port logistics function evaluation model mainly includes the construction of port logistics function evaluation index system, the measurement and weight of evaluation index, and the final evaluation standard.

**3.1. Construction of Comprehensive Evaluation Model for Port Logistics Function.** Only by establishing a reasonable evaluation model can the function of port logistics be evaluated effectively. Combining with the theoretical knowledge of port logistics function, the comprehensive evaluation model of port logistics function is constructed, as shown in Figure 1.

According to the comprehensive evaluation model of port logistics function, the evaluation index system of port logistics function is shown in Figure 2.

The comprehensive evaluation model of port logistics function includes quantitative index and qualitative index, and the meanings and functions of each index are different. In order to achieve better evaluation results, different evaluation criteria should be given to each index. This paper adopts fuzzy evaluation criteria set method, divides each index into five grades, puts forward the score corresponding to each grade, establishes fuzzy evaluation criteria set, realizes index quantification, and facilitates the implementation of comprehensive evaluation of port logistics function. [20, 21]. This set of fuzzy evaluation criteria is a kind of reference data. When adopting different comprehensive evaluation methods, we can use different quantitative methods and criteria according to specific conditions and needs. In order to embody the function, status, and importance of each index in the system, it is necessary to assign different weights to each index after the index system is determined [22, 23]. The judgment matrix is constructed by using AHP and the scale from 1 to 9 to determine the weights of each index. The calculation is carried out with the help of MATLAB mathematical software; the pseudocode of the process is as follows.

\[
U = \begin{bmatrix} 1 & 3 & 5 & 4 & 7 \\ 1/3 & 1 & 3 & 2 & 5 \\ 1/5 & 1/3 & 1 & 1/2 & 2 \\ 1/4 & 1/2 & 2 & 1 & 3 \\ 1/7 & 1/5 & 1/2 & 1/3 & 1 \end{bmatrix}.
\]  

(5)

The criteria for evaluating specific secondary indicators in the model are as follows:

- **U11** port cargo throughput: Quantitative indicators, usually expressed as "10000 tons."
- **U12** port container throughput: Quantitative indicators, usually expressed as "Ten Thousand Bidding Containers (ten thousand TEU)."
- **U13** port foreign trade throughput: Quantitative indicators, usually expressed as "10000 tons."
- **U14** port routes: quantitative indicators, usually expressed in terms of "items."

The evaluation criteria are shown in Table 1 below. To determine the weight of each indicator, the formula is as follows:

\[
U_t = \begin{bmatrix} 1 & 1 & 3 & 3 \\ 1 & 1 & 3 & 3 \\ 1/3 & 1/3 & 1 & 1 \\ 1/3 & 1/3 & 1 & 1 \end{bmatrix}.
\]  

(6)
U21 channel water depth: quantitative indicators, usually expressed as “meters.”

U22 number of berths: quantitative indicators.

U23 port and wharf length: quantitative indicators, usually expressed as “meters.”

U24 storage area of goods: quantitative index, usually expressed as “ten thousand square meters.”

The evaluation criteria are shown in Table 2 below. To determine the weight of each indicator, the formula is as follows:

\[
\text{Algorithm 1}
\]

Figure 2: Port logistics function evaluation index system.
Table 1: Scoring standard 1.

<table>
<thead>
<tr>
<th>Index</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>U11</td>
<td>U11 ≥ 30000</td>
<td>20000 ≤ U11 &lt; 30000</td>
<td>U11 &lt; 20000</td>
<td>U11 &lt; 10000</td>
<td>U11 &lt; 5000</td>
</tr>
<tr>
<td>U12</td>
<td>U12 ≥ 900</td>
<td>800 ≤ U12 &lt; 900</td>
<td>U12 &lt; 800</td>
<td>U12 &lt; 700</td>
<td>U12 &lt; 200</td>
</tr>
<tr>
<td>U13</td>
<td>U13 ≥ 18000</td>
<td>17000 ≤ U13 &lt; 18000</td>
<td>13000 ≤ U13 &lt; 17000</td>
<td>8000 ≤ U13 &lt; 17000</td>
<td>U13 &lt; 8000</td>
</tr>
<tr>
<td>U14</td>
<td>U14 ≥ 140</td>
<td>120 ≤ U14 &lt; 140</td>
<td>100 ≤ U14 &lt; 120</td>
<td>80 ≤ U14 &lt; 100</td>
<td>U14 &lt; 80</td>
</tr>
</tbody>
</table>

To determine the weight of each indicator, the formula is as follows:

\[
U_2 = \begin{bmatrix}
1 & 1 & 3 & 3 \\
1 & 1 & 3 & 3 \\
1/3 & 1/3 & 1 & 1 \\
1/3 & 1/3 & 1 & 1
\end{bmatrix}
\] (7)

U31 inland water transportation: qualitative indicators.
U32 seaborne and railway combined transport: qualitative indicators.
U33 railway: qualitative indicators.
U34 maritime feeder line transportation: qualitative indicators.

The evaluation criteria are as follows: excellent, 5 points; good, 4 points; average, 3 points; fair, 2 points; and poor, 1 point.

To determine the weight of each indicator, the formula is as follows:

\[
U_3 = \begin{bmatrix}
1 & 5 & 1/3 & 1/3 \\
5 & 1 & 3 & 3 \\
3 & 1/3 & 1 & 1 \\
3 & 1/3 & 1 & 1
\end{bmatrix}
\] (8)

U41 EDI electronic data interchange technology application: qualitative indicators.
U42 GPS global positioning system technology application: qualitative indicators.
U43 GIS technology application: qualitative indicators.
U44 RFID application of radio frequency technology: qualitative indicators.

The evaluation criteria are as follows: excellent, 5 points; good, 4 points; average, 3 points; fair, 2 points; and poor, 1 point.

To determine the weight of each indicator, the formula is as follows:

\[
U_4 = \begin{bmatrix}
1 & 1 & 3 & 3 \\
1/2 & 1 & 1 & 2 \\
1/2 & 1 & 1 & 2 \\
1/2 & 1/2 & 1/2 & 1
\end{bmatrix}
\] (9)

U51 customs clearance environment: qualitative indicators.
U52 production scheduling system capacity: qualitative indicators.
U53 loading and unloading efficiency: qualitative index.

To determine the weight of each indicator, the formula is as follows:

\[
U_2 = \begin{bmatrix}
1 & 1 & 2 \\
1 & 1 & 2 \\
1/2 & 1/2 & 1
\end{bmatrix}
\] (10)

3.2. Determination of Criteria for Comprehensive Evaluation Results. The final evaluation result shall be set as “good, better, general, poor, and poor.” The above secondary indicators are sorted according to the score. When the number of indicators with a score of 5 points is the largest, the final evaluation result is 5 points. The final evaluation result is 4 points when the secondary index scores 4 points at most. The final evaluation result is 3 points when the secondary index scores 3 points at most. The final evaluation result is 2 points when the secondary index scores 2 points at most. When the number of secondary indicators with a score of 1 is the largest, the final evaluation result is 1. Thus, the standard set of final comprehensive evaluation results can be determined, as shown in Table 3.

4. Experimental Analysis

4.1. Selection of Sample Data. Port is located in the sea, rivers, lakes, and reservoirs along the water and land transport hub. It is the center for distribution of industrial and agricultural products, foreign trade import and export, vessel berthing, loading and unloading of goods, boarding and alighting passengers, and supplementary supplies. According to the overall competitiveness index of ports in the world, logistics efficiency, and the actual situation of major ports, this paper selects the top nine ports in the world in terms of throughput, namely, Zhoushan Port in Ningbo, Shanghai Port, Singapore Port, Tianjin Port, Kwai Chung Container Terminal, Busan Port in Korea, Guangzhou Port, Suzhou Port, and Qingdao Port, and then selects Dubai Port as the sample port for port logistics efficiency evaluation [24].

These nine ports are located in the regions with fast development of port logistics and developed port economy. In a year, the cargo throughput of these nine port cities is as high as the container throughput of the whole country [25]. Therefore, this paper will use these nine ports as experimental cases, which are representative to some extent, and can roughly represent the port development. The relevant data of the port comes from official website, a port operation company. Set the experimental environment as MATLAB 2.0 simulation platform, with 100 iterations, 20 allowable failures, and 2 clustering centers.
4.2. Experimental Results. According to the index system, the paper analyzes the data according to the above steps and evaluates the competitiveness of logistics function of 9 port cities, as shown in Table 4.

Table 4 mainly analyzes the subindex of port city logistics competitiveness and analyzes the port infrastructure index. From Table 4, we can see that Guangzhou port has the highest degree of similarity U, and all of the four indexes rank first, which shows that Guangzhou port has great advantages over other port cities in port infrastructure construction and equipment supply. Kwai Chung container terminal, Korea Busan Port, and Singapore boatport ranked second, third, and fourth, respectively, in terms of infrastructure indicators [26–28]. Guangzhou port and Kwai Chung container terminal rank high in terms of wharf length, port cargo throughput, and container throughput. Both ports rely on good port infrastructure environment and have relatively strong competitiveness in logistics function. The payback period for port investment shall generally be five years and shall be combined with the actual conditions. Port planning shall be carried out once every five years. Data five years apart make sense if you want to measure how much dynamic efficiency has improved [25, 29, 30]. Calculate the description of the minimum, maximum, median, average, and standard deviation of the input and output indicator variables for 2018 and 2019 according to formula (1). The details are shown in Table 5.

According to the data in Table 1 and based on the extended model of DEAP software, the port logistics efficiency in 2018 and 2019 can be calculated, and various efficiency values and scale rewards in the two years can be taken as "reference index" and "current index," respectively, as shown in Tables 6 and 7.

As can be seen from Tables 6 and 7, the input-output efficiency column vertical comparison in the table, ranging from 0.3 to 0.9, shows a significant gap in the input-output efficiency of each port. While for the horizontal comparison of input-output efficiency of each port in 2018 and 2019, except for some ports that have developed rapidly in recent years, the values of most ports are closer. Data distribution trends are as shown in Figure 3.

The following is evident from Figure 3:
Among all the nine ports, Zhoushan port of Ningbo ranks first. Based on the analysis of the reasons, we can see that since the merge of the two pillar ports of Zhejiang province, Ningbo and Zhoushan in 2018, the cargo transport volume has also greatly increased, which has made the scale and potential of the port of Zhoushan port of Ningbo rapidly improved. Due to the location in the Yangtze River Delta economic zone and the rapid economic development of Zhejiang province, the port has been able to further increase the pace of opening up to the outside world, and the influx of more advanced management skills, experience and corresponding talents with high skills, which has greatly improved the logistics efficiency of the port [14]. Therefore, Ningbo Zhoushan port is not only a simple merger of the two ports, but also a forward-looking strategic merger, which leads to more economic derivatives of the port and makes the port economic zone more prosperous.

Busan port of Korea is the only port where the “current index” is lower than the “reference index,” which is due to the fact that the limited hinterland railway mileage is a restrictive factor, which makes the intermodal transport of Hong Kong and rail of Busan port of Korea stand still in the process of port development and there is no significant improvement. Only a small number of railways still maintain South Korea’s Pusan port’s intermodal rail transport, despite being highly efficient, it cannot solve the capacity, capacity constraints.

The fastest rising port among the nine ports is Suzhou port, with the index rising from 0.385 to 0.756. This is due to the fact that, before 2019, Suzhou port is an unplanned port. And the first phase of the 10000-ton channel of Suzhou port starts to be put into use in 2018, which indicates that Suzhou port is one step closer to the international hub port, which essentially improves the function of the port, establishes its status as a major hub port, and provides favorable conditions for the large-scale heavy chemical industry to carry out in Suzhou port. At the same time, the port allows the future development of Suzhou port to open up a new situation [31].

In order to verify the effectiveness and feasibility of the evaluation model of port logistics function based on entropy weight TOPSIS method, Dubai port is selected as a sample port to investigate the port logistics profit in the recent 6 years. In the port logistics function evaluation model, the data of Dubai port logistics management are shown in Table 8.

According to the two management data tables, the application of the port logistics function evaluation model can stimulate the volume of logistics and transportation and increase the revenue. Table 9 shows the business indicators obtained from the survey.

According to the above investigation results, the economic benefit of the enterprise is improved. Therefore, three economic benefit evaluation models are used to evaluate the economic benefit of the enterprise. The effective use of port resources and the protection of the natural environment to evaluate the port logistics not only aim at the profit, but also consider the efficiency of port logistics so that the port to find constraints logistics capacity and efficiency of the constraints is conducive to the optimization of port resource allocation, increasing port competitiveness. It is of great significance to

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Table 6: Input-output efficiency levels of nine ports in 2018.

<table>
<thead>
<tr>
<th>Port</th>
<th>Benefit value in 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input output rate (crate)</td>
</tr>
<tr>
<td>Ningbo Zhoushan port</td>
<td>0.756</td>
</tr>
<tr>
<td>Shanghai port</td>
<td>0.596</td>
</tr>
<tr>
<td>Singapore port</td>
<td>0.342</td>
</tr>
<tr>
<td>Tianjin port</td>
<td>0.414</td>
</tr>
<tr>
<td>Kwai Chung container terminal</td>
<td>0.336</td>
</tr>
<tr>
<td>Kwai Chung container terminal</td>
<td>0.851</td>
</tr>
<tr>
<td>Guangzhou port</td>
<td>0.409</td>
</tr>
<tr>
<td>Suzhou port</td>
<td>0.384</td>
</tr>
<tr>
<td>Qingdao port</td>
<td>1.000</td>
</tr>
</tbody>
</table>

---

Figure 3: Distribution chart of “Reference Index” and “Current Index” of nine major ports.
study the capacity and efficiency of port logistics for improving the core competitiveness of port enterprises and driving the sustainable economic development of surrounding areas.

5. Discussion

In recent years, with the prosperity and development of economy, modern logistics industry has gradually developed from the start to prosperity. Port logistics, as an indispensable part of modern logistics, has gradually developed into a new supporting role of industrial departments and national economy. In addition, the evaluation index system of port logistics capacity and port logistics efficiency is established to evaluate the port logistics capacity in order to verify its scientificity and effectiveness. It is feasible to explore the influence of port logistics capacity and efficiency on port competitiveness, which is beneficial to the development of port itself and provides theoretical basis for port management. It is hoped that this paper can provide some suggestions for the future construction of the port so as to improve the logistics capacity and efficiency.

From the aspect of port logistics capability, we can strengthen port logistics competitiveness from the following four aspects: enlarge the scale of port logistics, standardize port logistics equipment and facilities, improve port logistics operation capability, and speed up the development of port economic hinterland.

In terms of port logistics efficiency, we can strengthen the competitiveness of port logistics from the following four aspects: increasing investment in port logistics infrastructure, strengthening the connection between port and its hinterland economy, innovating the port management system, and starting to specialize in compound talents in logistics. We should give full play to the advantages of urban logistics, constantly enhance their own strength, give play to the proliferation effect, drive the development of logistics in surrounding areas, and improve the regional logistics capacity and level. Medium-level cities shall rely on the advantages of port facilities, focus on strengthening the connection between ports and hinterland economy, actively expand hinterland economy, improve the total economic output of hinterland, and provide a solid economic foundation for the logistics industry. At the same time, we should develop the information construction, including the basic environment construction and the information platform construction, enhance the logistics efficiency, and enhance the logistics competition strength. Cities with relatively weak logistics competitiveness shall accelerate the construction of port infrastructure, increase the investment in port projects, improve the port operation capacity, and enhance the

---

### Table 7: Input-Output efficiency levels of nine ports in 2019.

<table>
<thead>
<tr>
<th>Port</th>
<th>Benefit value in 2018</th>
<th>Input output rate (crate)</th>
<th>Pure technical efficiency (vrste)</th>
<th>Economies of scale (scale)</th>
<th>Returns to scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ningbo Zhoushan port</td>
<td></td>
<td>0.857</td>
<td>0.857</td>
<td>1.000</td>
<td>unchanged</td>
</tr>
<tr>
<td>Shanghai port</td>
<td></td>
<td>0.603</td>
<td>0.603</td>
<td>1.000</td>
<td>unchanged</td>
</tr>
<tr>
<td>Singapore port</td>
<td></td>
<td>0.487</td>
<td>0.732</td>
<td>0.665</td>
<td>incremental</td>
</tr>
<tr>
<td>Tianjin port</td>
<td></td>
<td>0.605</td>
<td>0.758</td>
<td>0.798</td>
<td>incremental</td>
</tr>
<tr>
<td>Kwai Chung container terminal</td>
<td></td>
<td>0.366</td>
<td>0.581</td>
<td>0.631</td>
<td>incremental</td>
</tr>
<tr>
<td>Kwai Chung container terminal</td>
<td></td>
<td>0.731</td>
<td>1.000</td>
<td>0.731</td>
<td>incremental</td>
</tr>
<tr>
<td>Guangzhou port</td>
<td></td>
<td>0.626</td>
<td>0.843</td>
<td>0.743</td>
<td>incremental</td>
</tr>
<tr>
<td>Suzhou port</td>
<td></td>
<td>0.756</td>
<td>0.821</td>
<td>0.689</td>
<td>unchanged</td>
</tr>
<tr>
<td>Qingdao port</td>
<td></td>
<td>0.847</td>
<td>1.000</td>
<td>0.847</td>
<td>incremental</td>
</tr>
</tbody>
</table>

### Table 8: Operational data of logistics enterprises at Dubai port.

<table>
<thead>
<tr>
<th>Business name</th>
<th>Index/ton</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branch transportation</td>
<td>Container capacity</td>
<td>852876</td>
<td>1068876</td>
<td>1202556</td>
<td>1315448</td>
<td>1554262</td>
<td>1682439</td>
</tr>
<tr>
<td>Bulk cargo volume</td>
<td>349965</td>
<td>315234</td>
<td>371485</td>
<td>400762</td>
<td>421503</td>
<td>43147</td>
<td></td>
</tr>
<tr>
<td>Land transportation</td>
<td>Container haulage</td>
<td>248857</td>
<td>232891</td>
<td>289704</td>
<td>323587</td>
<td>342875</td>
<td>35708</td>
</tr>
<tr>
<td>Container throughput</td>
<td>682452</td>
<td>1102729</td>
<td>1432956</td>
<td>1657844</td>
<td>1794325</td>
<td>190210</td>
<td></td>
</tr>
<tr>
<td>Bulk cargo throughput</td>
<td>1325507</td>
<td>1899964</td>
<td>1765143</td>
<td>1923640</td>
<td>2018769</td>
<td>2148612</td>
<td></td>
</tr>
</tbody>
</table>

### Table 9: Business indicators of logistics enterprises.

<table>
<thead>
<tr>
<th>Index/10000 yuan</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating income</td>
<td>107877.92</td>
<td>119170.12</td>
<td>121571.14</td>
<td>128635.22</td>
<td>135753.86</td>
<td>149608.05</td>
</tr>
<tr>
<td>Operating costs</td>
<td>87942.08</td>
<td>96420.54</td>
<td>96004.74</td>
<td>100302.15</td>
<td>103846.33</td>
<td>110695.81</td>
</tr>
<tr>
<td>Gross profit</td>
<td>19935.84</td>
<td>22749.58</td>
<td>25566.41</td>
<td>28035.69</td>
<td>29712.95</td>
<td>30754.37</td>
</tr>
<tr>
<td>Gross profit margin (%)</td>
<td>18.48</td>
<td>19.09</td>
<td>21.03</td>
<td>22.03</td>
<td>22.51</td>
<td>26.01</td>
</tr>
</tbody>
</table>
logistics strength; learn from the development and operation experience of domestic and foreign advanced logistics enterprises, create a good environment and conditions for the logistics industry, and constantly expand the scale of the logistics industry; develop hinterland economy and provide a material and economic basis for enhancing the competitiveness of urban logistics; and strengthen the construction of external environment and platform for logistics informatization, accelerate the development of modern logistics, and constantly enhance the logistics competitiveness.

In the next stage of development, port enterprises should start from the actual situation, seize the development opportunities of the fourth generation of port, integrate resources from service, function, and other aspects, optimize resource allocation, and improve port logistics capacity and efficiency so as to comprehensively enhance the core competitiveness of port logistics.

6. Conclusions

In this paper, the entropy weight method and TOPSIS method are used to evaluate the logistics performance of ports, and a data analysis model applicable to many ports is constructed. However, this paper still has the following deficiencies: First of all, data collection, some data is not comprehensive; individual data collected by different ways of the results of the differences between them have certain gaps. Secondly, the establishment of the model has some limitations, the application of the model is still not very mature because the port logistics is a comprehensive complex whole, and there are still many factors affecting the port logistics capacity and port logistics efficiency cannot be considered in specific parts, so the model is not comprehensive. It is hoped that with the development of science and technology and the improvement of data collection, the evaluation model of port logistics capability and efficiency will be improved [32].

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflicts of Interest

It is declared by the authors that this article is free of conflicts of interest.

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