

Research on the Relationship Between Suzhou Port Logistics Efficiency and Local Economic Development Based on the DEA Model

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Abstract: In order to further study the relationship between the logistics efficiency of Suzhou port and the local economy, this study chooses Suzhou Port as the main research object. This paper collates the relevant data from 2013 to 2022, determines the corresponding input and output performance indicators, and uses the data envelopment analysis (DEA) model to evaluate the logistics efficiency of Suzhou Port. For those data that did not meet the DEA validity criteria, we performed further optimization and performed projection analysis. The analysis shows that during 2013-2022, the comprehensive efficiency of port logistics in Suzhou Port is constantly improving, but the efficiency value also fluctuates. Part of the reason lies in the mismatch between economic input and output, and the extra economic burden caused by the setting of excessive berth number and berth length of the wharf makes the logistics efficiency low. Based on the above factors and the relationship between Suzhou port and regional economy, some suggestions are given to enhance the logistics efficiency of Suzhou port.

Keywords: DEA model, Port of Suzhou, Efficiency evaluation, Economic development.

1. Introduction

1.1. Research Background

In the context of global economic integration, ports play an increasingly crucial role in regional trade and occupy a core position in the modern logistics chain. Coastal ports in China benefit from favorable locations, attracting talent and integrating information technology, while also driving the development of neighboring industries. With support from the "Belt and Road" initiative, coastal regions have increased investment in port infrastructure. Ports are optimizing their functions, shifting from loading and unloading toward warehousing and distribution to meet changing market demands and enhance competitiveness [1].

The 12th Five-Year Plan set a clear direction for China's economic development, promoting the concept of "driving industrialization through informatization and promoting urban and market development through ports." In 2020, despite COVID-19, Suzhou's overall value exceeded one trillion yuan, ranking sixth nationally. Jiangsu's economy has maintained double-digit growth for six consecutive years, with total foreign trade reaching US\$322.35 billion.

Suzhou Port was established in 2002 on the Yangtze River, playing a key role in the Yangtze River Delta port cluster. Its location near the estuary and Shanghai Port gives it excellent geographical advantages and ample capital reserves. The container port serves as a vital hub for integrated river-sea transport, driving growth in logistics, finance, and insurance in surrounding cities. However, its public terminal functions are inferior to non-public terminals and certain deep-water shoreline assets, and energy, land, and shoreline depletion remain significant issues. This study analyzes the relationship between Suzhou Port's logistics indicators and its regional economy, their coordinated development, and proposes suggestions for mutual development of the local economy and logistics.

1.2. Literature Review

This paper compiles relevant data from 2013 to 2022 and uses a Data Envelopment Analysis (DEA) model to assess the logistics efficiency of Suzhou Port. Through in-depth analysis of existing problems and shortcomings, the core factors affecting logistics efficiency are identified. Furthermore, based on the research results, specific policy recommendations and suggestions are proposed to improve the logistics efficiency of Suzhou Port and promote economic development. These may involve specific measures in areas such as port management improvement, transportation network optimization, and government support policies, to specifically promote a positive interaction between logistics and the economy.

1.3. Research Significance

(1) Research can help to fully understand the current status and potential problems of logistics efficiency in Suzhou Port, and provide objective assessment and guidance for improving logistics efficiency. By identifying bottlenecks and problems, improvement plans can be proposed, which will help improve the logistics efficiency of Suzhou Port, optimize cargo flow, and reduce logistics costs.

(2) This study can provide an in-depth analysis of the relationship between the logistics efficiency of Suzhou Port and local economic development, and explore the intrinsic connection between logistics and the economy from both macro and micro perspectives. The results may provide theoretical reference and practical basis for exploring more effective economic growth paths.

(3) The research findings can provide important basis for Suzhou Port and the local government to formulate logistics development policies. Based on a deep understanding of the relationship between logistics efficiency and economic development, relevant policy recommendations can be put forward, which will help guide resource allocation and industrial restructuring, and promote economic development.

2. Literature Review

2.1. Current Status of Research on Port Efficiency

In the early 1980s, many scholars began to explore theories related to port efficiency. These research documents delved into the operational logic of ports from various perspectives to identify the factors affecting port operational efficiency and to provide strategies for improving it.

In the early stages of research, due to the lack of depth in the investigations, most studies relied on a single evaluation criterion to assess port productivity. For example, Bendall and Stent selected only the efficiency of cargo handling as the criterion for evaluating port efficiency, further using it to measure port productivity and operational effectiveness [1].

As theories have developed, researchers worldwide have conducted more in-depth studies on port operational efficiency. A growing number of scholars understand that ports are inherently highly complex systems, and a single evaluation standard is insufficient to accurately measure this complexity. Therefore, many researchers have begun exploring multi-input and multi-output measurement methods to assess port operational efficiency. Among the various evaluation indicators for port operational efficiency, the number of berths and storage area are widely accepted by experts, while port throughput capacity and profitability have also become key parameters for measuring port effectiveness. For example, when Tonzon evaluated the operational efficiency of container ports, he first categorized port performance standards in detail, ultimately selecting the number of berths and straddle carriers as its primary evaluation indicators [2]. Kuang Haibo, in evaluating the operational performance of port enterprises, selected indicators for assessing input and output from three dimensions: human resources, financial resources, and materials [3], and conducted in-depth evaluations and discussions. Han Bing and his team selected 12 port companies in China as their main research subjects. They chose basic facilities such as the number of port employees and berths as indicators for evaluating port inputs, and incorporated the port's main business revenue and net profit as evaluation indicators in their output analysis [4]. In this paper, the team conceived an innovative theoretical framework for evaluating port operational performance. Their research focuses on how to enhance port companies' effectiveness in increasing their value growth in a highly competitive environment.

2.2. Research on DEA Models

In 1978, Charnes and his team first launched research on the DEA model [5]. This model is mainly aimed at "inefficient" decision-making units. It evaluates the relative utility between inputs and outputs by using some degree of correlation between them, thereby assessing the operational efficiency and effectiveness of the entire system.

(1) Dynamic DEA model

The models fall into two main types: the DEA-Malmquist index model and the DEA window model. Since each has advantages and disadvantages, the most suitable method should be chosen based on the research object. Many scholars currently combine DEA with the Malmquist index to measure ports' dynamic operational capacity, yielding rich results. Indicator selection varies by port region, leading to differing assessment outcomes.

Li Lanbing's team divided 16 Chinese coastal ports into 6 port cluster regions and used the DEA-Malmquist model to assess static and dynamic benefits [6]. Zhang Tao's team used panel DEA to analyze regional port investment and output [7]. Barros studied African port productivity changes from 2004 to 2010 [8]. Liu Tao's team assessed dynamic efficiency of major Bohai Rim ports [9]. Schøyen and Odeck analyzed six Norwegian and 14 Northern European ports from 2009 to 2014, finding Norwegian ports significantly more efficient [10]. Zhang Mingmin and Wang Huiling built input-output evaluation systems [11]. Wanke's team used fuzzy GMSS and DEA-Malmquist to evaluate 17 major Chinese ports from 2006 to 2015, observing increasing returns to scale [12]. Sui Xiaoyan's team evaluated 37 Chinese ports and used clustering to explore efficiency differences and influencing factors [13]. Xiao Xianghong and Song Bingliang assessed eight Chinese coastal ports from 2009 to 2018 and introduced a "Comprehensive Port Development Level" standard [14].

A small group of scholars use the DEA window model instead. Gamassa and Yan compared two non-major east and west ports using container throughput, port size, and efficiency [15]. Fan Yuejiao and Wang Jinyan used the DEA window model to study maritime logistics efficiency along five major routes of the 21st Century Maritime Silk Road [16].

(2) Three-stage DEA model

Currently, the application of this model has yielded significant research progress both domestically and internationally. For example, Liu selected ten ports in the Pacific Ocean as his research sample and compared the operational efficiency of each port in different modeling approaches [17]. He firmly believes that the three-stage DEA model presents a more scientific and objective approach to measuring port efficiency compared to the traditional DEA model. Domestically, scholars have also conducted empirical research and analysis on this model for Chinese ports. Du Linan and Zhang Jianbao selected 20 container ports along the main Yangtze River as their main research subjects and adopted the three-stage DEA model to measure their operational efficiency [18]. After comparing and analyzing three different stage models, the researchers found that this three-stage model is more suitable for evaluating port operational performance. Based on the three-stage DEA model, Wang Xuanshuang and his team selected several inland container ports in China as their evaluation benchmark. They chose three major cities—Waigaoqiao Port in Shanghai, Dalian Port, and Zhoushan Port in Ningbo—as the subjects of their comparative study [19]. After a detailed exploration of external environmental factors, the team used a three-stage DEA model to evaluate the effectiveness of container port operations.

(3) Other DEA model types

In addition to the models mentioned earlier, the port research field also frequently uses various models, including network DEA models, nonlinear DEA models, environmental DEA models, super-efficiency models, and DEA cross models.

3. Research Design

3.1. Research Methodology

Based on the Data Envelopment Analysis (DEA) model, this study incorporates the DEA-CCR model and its derived DEA-BCC model. In terms of computational results, compared with the latter, the former can more accurately calculate pure technical efficiency and scale efficiency. This

study intends to analyze the logistics performance of Suzhou Port from multiple indicator dimensions. Considering that the results generated by the former mainly reflect technical efficiency and are relatively easy to interpret and analyze, the DEA-CCR model is adopted for further investigation.

The CCR model was proposed by Charnes, Cooper, and Rhodes in the late 1970s. It is designed to measure resource allocation efficiency under the assumption of constant returns to scale. In the derivation of this model, the efficiency index of the j_0 -th Decision-Making Unit (DMU) is taken as the objective function, while constraints are imposed on the overall efficiency of the decision-making units. The model can therefore be expressed as follows:

$$\max h_{j_0} = \frac{\sum_{r=1}^s u_r y_{rj_0}}{\sum_{i=1}^m v_i x_{ij_0}} \quad (1)$$

$$\text{s.t. } \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} \leq 1, j = 1, 2, \dots, n, u \geq 0, v \geq 0$$

$$w = \frac{1}{v^T x_0}, \mu = \frac{1}{v^T x_0} u \quad (2)$$

$$\begin{aligned} \max h_{j_0} &= \mu^T y_0 \\ \text{s.t. } w^T x_j - \mu^T y_j &\geq 0, j = 1, 2, \dots, n \\ w^T x_0 &= 1 \\ w &\geq 0, \mu \geq 0 \end{aligned} \quad (3)$$

$$\begin{aligned} \min \theta \\ \text{s.t. } \sum_{j=1}^n \lambda_j y_j + s^+ &= \theta x_0 \\ \sum_{j=1}^n \lambda_j y_j - s^- &= \theta y_0 \\ \lambda_j &\geq 0, j = 1, 2, \dots, n \\ s^+ &\geq 0, s^- \leq 0 \end{aligned} \quad (4)$$

3.2. Research Content

To investigate the interaction between port logistics development and regional economic growth in Suzhou, this study constructs a DEA-based evaluation system using indicators related to port infrastructure, port operational performance, and local economic development.

Considering the characteristics of port logistics activities and data availability, indicators are selected from both input and output dimensions. The evaluation index system is presented in Table 1.

Table 1. Evaluation Index System

Indicator Type	Category	Indicator	Unit	Code
Input	Port Infrastructure	Number of Berths	Unit	x1
Input	Port Infrastructure	Total Berth Length	Meter	x2
Output	Port Operational Performance	Foreign Trade Throughput	10,000 Tons	y1
Output	Port Operational Performance	Cargo Throughput	10,000 Tons	y2
Output	Port Operational Performance	Container Throughput	10,000 TEUs	y3
Output	Port Operational Performance	Inland Port Cargo Throughput	10,000 Tons	y4
Output	Economic Development	Total Import and Export Value	RMB 100 Million	y5
Output	Economic Development	Gross Domestic Product (GDP)	RMB Trillion	y6

The input indicators reflect the government's financial support for port infrastructure construction. Choosing the operational efficiency and economic indicators of Suzhou Port as benchmarks for comparing the economic and logistics growth rates of Suzhou Port can intuitively demonstrate the strength of its port transportation capacity.

3.3. Research Framework

Figure 1 illustrates the technical framework of this study, which follows a sequential top-down research design: it

begins with the research background and significance alongside a literature review, then applies the DEA method to evaluate port efficiency by establishing the DEA-CCR model and determining input-output metrics (berth number and length as inputs; throughput, container volume, import-export value, and GDP as outputs), proceeds to a one-stage DEA efficiency analysis of Suzhou Port from 2013 to 2022, and finally conducts projection result analysis with policy suggestions, concluding with a summary and outlook.

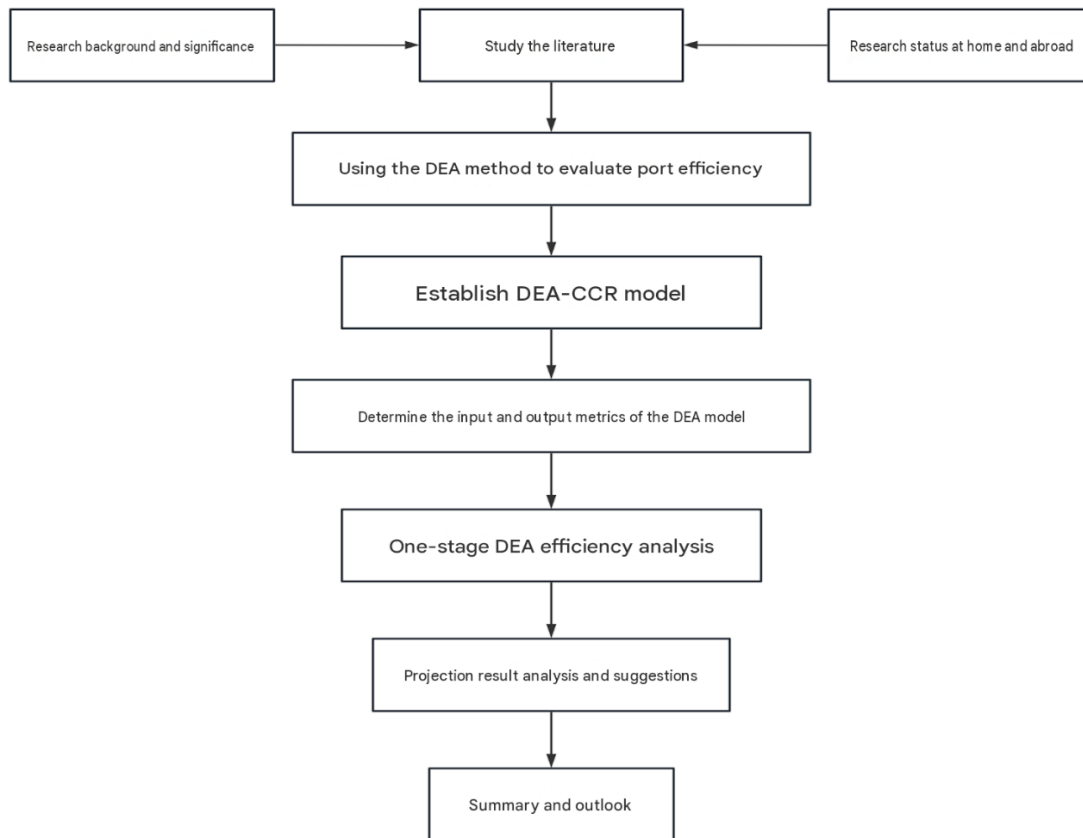


Figure 1. Technical Framework

4. Port logistics and economic efficiency calculation and projection analysis

consulting the official website of Suzhou Municipal People's Government and the annual yearbooks of Suzhou Port, are shown in Table 2 below.

4.1. Logistics Efficiency Calculation

The input-output indicators of Suzhou Port, obtained by

Table 2. Key Input-Output Indicators of Suzhou Port City

	Output metrics			
years	cargo throughput	Container throughput	Foreign trade throughput	Inland port cargo throughput
2013	45435	530.52	1.09	5503.80
2014	47792	444.99	1.23	5841.24
2015	53989	520.19	1.41	7102.00
2016	57936	547.92	1.51	7095.55
2017	60455	587.50	1.54	7600.00
2018	53226	635.50	1.39	8266.00
2019	52274	626.70	1.47	8700.00
2020	55408	628.90	1.60	11000.00
2021	56590	811.49	1.71	17700.00
2022	57300	907.99	1.73	15500.00
	Output metrics		Input metrics	
years	City's total import and export volume	City GDP	berth length	Number of berths
2013	19196.64	12929.78	45728	276
2014	19124.80	13716.95	45064	284
2015	18957.12	14468.68	45064	291
2016	18061.51	15445.26	45030	290
2017	21394.89	16997.47	45031	292
2018	23375.60	18263.48	45597	298
2019	21987.43	19264.80	45543	298
2020	22321.43	20180.45	45543	298
2021	25332.00	23168.21	45543	298
2022	25721.11	23958.34	45547	301

After calculation using the software deap2.1, the annual logistics efficiency of Suzhou Port was obtained, as shown in Table 3 below.

Table 3. Evaluation Results of Suzhou Port's Logistics and Economic Efficiency

years	crste	vrste	scale	Return to scale
2013	0.845	1.000	0.845	irs
2014	0.847	1.000	0.847	irs
2015	0.907	0.999	0.907	irs
2016	0.976	1.000	0.976	irs
2017	1.000	1.000	1.000	-
2018	0.931	0.993	0.937	irs
2019	0.899	0.992	0.906	irs
2020	0.955	0.994	0.961	irs
2021	1.000	1.000	1.000	-
2022	1.000	1.000	1.000	-
mean	0.936	0.998	0.938	

Note: CRSTE: Overall efficiency; VRSTE: Technical efficiency; SCALE: Scale efficiency;

drs: Decreasing returns to scale; -: Constant returns to scale; irs: Increasing returns to scale

4.2. Analysis of Evaluation Results

data from CRSTE, Suzhou Port's port logistics efficiency has been continuously improving from 2013 to 2022, which is closely related to overall societal progress. Although Suzhou Port's overall efficiency has shown an upward trend over the past decade, there were five years where efficiency did not reach its average level, revealing certain shortcomings in Suzhou Port's development. Through in-depth analysis, combining calculated data and actual conditions, we found that in the years when CRSTE did not reach DEA (Dead-End Effectiveness), Suzhou Port's port construction faced the

problem of excessive resource input and insufficient output. This study uses relevant data from 2015 as the research object, as shown in Figure 7 (the reasons for other years are consistent and will not be elaborated here).

Results for firm: 3					
Technical efficiency = 0.999					
Scale efficiency = 0.907 (irs)					
PROJECTION SUMMARY:					
variable		original value	radial movement	slack movement	projected value
output 1	53989.000	0.000	4623.803	58612.803	
output 2	520.190	0.000	38.364	558.554	
output 3	1.410	0.000	0.108	1.518	
output 4	7102.000	0.000	129.085	7231.085	
output 5	18957.120	0.000	0.000	18957.120	
output 6	14468.680	0.000	1393.627	15862.307	
input 1	45064.000	-33.731	0.000	45030.269	
input 2	291.000	-0.218	-0.245	290.537	
LISTING OF PEERS:					
peer	lambda	weight			
5	0.269				
4	0.731				

Figure 2. Analysis of Suzhou Port's Logistics Efficiency in 2015

The number and length of berths at Suzhou Port have steadily increased, but its overall logistics efficiency, while improving between 2013 and 2017, has fluctuated since then. This suggests a direct correlation between the overall logistics efficiency of Suzhou Port and the input indicators chosen in this paper (such as the number and length of berths). Despite the continuous growth in the number and length of berths, the analysis in Figure 7 shows that Suzhou Port's investment remains redundant; the economic benefits of newly added facilities do not fully cover the costs, indicating a mismatch between output and input. However, considering SCALE, the annual returns to scale are increasing, suggesting that while Suzhou 's overall economic development is on an upward trend, the invested resources are being fully utilized, and its port resource conversion capabilities are relatively mature.

Table 4. Optimization Results of Input Indicators

years	Output metrics			
	cargo throughput	Container throughput	Foreign trade throughput	Inland port cargo throughput
2013	45435	530.52	1.09	5503.80
2014	47792	444.99	1.23	5841.24
2015	58613	558.54	1.52	7231.09
2016	57936	547.92	1.51	7095.55
2017	60455	587.50	1.54	7600.00
2018	58900	726.67	1.63	11542.06
2019	59427	691.89	1.60	10173.23
2020	59012	734.05	1.63	11212.41
2021	56590	811.49	1.71	17700.00
2022	57300	907.99	1.73	15500.00
years	Output metrics		Input metrics	
	City's total import and export volume	City GDP	berth length	Number of berths
2013	19196.64	12929.78	45728	276
2014	19124.80	13716.95	45064	284
2015	18957.12	15862.31	45030	291
2016	18061.51	15445.26	45030	290
2017	21394.89	16997.47	45031	292
2018	23375.60	2016.10	45272	296
2019	22804.05	19264.80	45199	295
2020	23373.13	20180.45	45267	296
2021	25332.00	23168.21	45543	298
2022	25721.11	23958.34	45547	301

4.3. Projection Analysis

According to the projection analysis results, the overall operational efficiency of Suzhou Port did not fully reach the DEA efficiency benchmark in several years. The primary reason is the unreasonable allocation and excessive expansion of berth resources. Based on the preceding analysis, together with the calculated results and the actual development conditions of Suzhou Port, several conclusions can be drawn regarding the relationship between port logistics efficiency and regional economic development.

First, excessive investment in berth infrastructure should be appropriately controlled. Taking the year 2020 as an example, the total berth length increased by 68 meters compared with the previous year. However, this increase failed to enable the port to achieve DEA efficiency. Similarly, after berth length adjustments were implemented in 2018, the overall efficiency performance in 2019 did not improve significantly. These findings indicate that continuous expansion of infrastructure investment does not necessarily lead to proportional growth in logistics output. In some cases, excessive investment may even generate additional operating costs and financial burdens, thereby reducing overall efficiency.

Furthermore, analysis of the projection results suggests that there is still a certain degree of redundancy in the input resources of Suzhou Port. The economic benefits generated by newly added infrastructure have not entirely compensated for the costs associated with their construction and maintenance. This phenomenon reflects an imbalance between input and output, indicating that the utilization efficiency of some infrastructure resources remains relatively low.

In addition, a review of local statistical yearbooks and the current operational status of Suzhou Port reveals that public terminals are generally less competitive than specialized or privately operated terminals. Part of the deep-water shoreline resources and land resources within the port area have not been fully utilized. Functional overlap among port shorelines and terminal facilities has also resulted in inefficient resource allocation and unnecessary resource consumption. Therefore, greater emphasis should be placed on optimizing resource allocation, improving the utilization rate of existing infrastructure, and enhancing the service capacity of supporting maritime facilities.

From a broader strategic perspective, Suzhou Port occupies an important position within the framework of the Belt and Road Initiative and the Yangtze River Economic Belt. Consequently, the port should fully leverage its geographical advantages and accelerate the transformation of its operational model. By promoting digitalization, intelligent port management, and information-based logistics systems, Suzhou Port can further improve its logistics efficiency and competitiveness. Such efforts will not only strengthen the port's operational performance but also contribute to the coordinated and sustainable development of both regional logistics and the local economy.

Overall, the projection analysis demonstrates that the major challenge facing Suzhou Port is not insufficient investment, but rather the need to improve the efficiency of resource utilization. Future development should therefore focus on optimizing the allocation of logistical resources, enhancing operational efficiency, and promoting the balanced growth of port logistics and regional economic development.

4.4. Analysis of Projection Results

Based on the projected data analysis, the overall efficiency of Suzhou Port failed to meet the effective standard of DEA, mainly due to the unreasonable setting of the number of berths at the terminals. Based on the foregoing analysis, and combined with the calculated data and actual conditions, we offer the following recommendations for the port and economic growth of Suzhou City.

The first step is to reduce the excessive length of berths. Using 2020 as a reference, berth length increased by 68 meters compared to the previous year, but this did not bring the overall efficiency to the DEA (Dead-End Performance Assessment) standard. After reducing berth length in 2018, overall efficiency was even worse in 2019. This indicates that excessive resource input does not fully translate into actual output, and port operating costs increase economic pressure. Furthermore, through studying the local yearbook and existing enterprise conditions of Suzhou Port, we found that the capacity of Suzhou Port's public terminals is not as good as that of non-public terminals, some deep-water shoreline and land resources in the port area are not being fully utilized, and there is overlap in the functions of the port shoreline, leading to significant resource waste. It should optimize resource allocation and further improve shipping service facilities. Finally, from a broader perspective, Suzhou Port is located at the core of the "Belt and Road" initiative and needs to leverage its unique geographical advantages to accelerate its internal development, enhance its information technology infrastructure and capabilities, thereby promoting sustainable economic and logistics development.

5. Conclusion

5.1. Recommendations

5.1.1. Achieve Optimal Resource Allocation and Formulate a Detailed Planning Framework for The Port

Suzhou Port is located at the Yangtze River estuary, with abundant shoreline resources and an advantageous location. It maintains close ties with Japan, South Korea, and South Asia, serving as a major river-sea intermodal hub. The Suzhou-Wuxi-Changzhou region has formed an economic structure centered on major Yangtze River Delta cities and is moving toward international metropolis status. Despite being on the outer edge of the Yangtze River, Suzhou Port remains a crucial transportation node, though it faces challenges: public terminals lack core functions of private terminals, deep-water shoreline and land reserves are insufficient, and resource utilization is inefficient with overlapping shoreline functions.

To achieve sustainable development, Suzhou Port needs strategic planning. The government should play a leading role in resource allocation, increase support for infrastructure and talent, and foster a favorable policy environment. Ports in Zhangjiagang, Taicang, and Changshu should define distinct responsibilities for differentiated yet coordinated development, and cross-sectoral cooperation with neighboring ports should be deepened.

Adjacent to Shanghai Port, Suzhou Port can leverage Shanghai's logistics and information technology resources to strengthen communication and information sharing. As the Yangtze River Delta is one of the largest international container logistics markets, Suzhou Port should use its advantages to promote regional container shipping, adopt

interconnected technologies, and implement resource-sharing strategies. This will reduce congestion-related inefficiency, optimize resource use, establish port clusters, accelerate resource integration, improve shipping infrastructure, and help build an international shipping distribution network center, contributing to the sustainable development of the shipping industry.

5.1.2. Promote a New Development Philosophy and Rapidly Advance the Construction of Green Ports

Efforts should focus on reducing environmental pollution from port operations while improving ecological quality. Ports contain various pollution sources, including ship emissions, residential waste, and industrial gases. China has invested more in port environmental protection, promoting energy conservation and emission reduction. Measures include building windbreak and dust suppression nets with monitoring devices, maintaining port channels and breakwaters, improving ship emission management, repairing horizontal transport equipment, phasing out heavily polluting equipment, and greening surrounding cities. Water pollution early warning and control should also be strengthened to enhance the port's capacity to absorb vessel pollutants. Accelerating green port construction is urgent to ensure industrial production and environmental protection coexist.

Maritime transport should also shift toward modern logistics. Although Suzhou Port ranks first among China's inland ports in container handling, it relies heavily on road transport, increasing costs, congestion, and pollution. Due to insufficient cutting-edge technology, it has not yet become a modern core hub port. To increase green transport utilization, intermodal modes such as waterborne transshipment and river-sea intermodal transport should be promoted, with green ports as main connection points. Collaboration among ports should be enhanced for resource sharing, and investment in port logistics—especially railway container terminals—should increase, along with building a systematic, shared multimodal transport information platform.

Finally, financial support measures for green ports should be improved. Green port construction faces high initial costs and low returns, so the government should provide tax incentives and financial assistance. Currently, most local funding focuses on shore-based power facilities, with few cities implementing green port subsidies, and China lacks a comprehensive green port assessment and evaluation mechanism. The state should guide provinces and cities to formulate supportive policies to reduce green port operating costs. Once the model reaches a certain scale and marketization, financial subsidies should support overall green port project construction.

5.2. Summary

This paper constructs a DEA model by selecting relevant indicators to calculate the port logistics efficiency of Suzhou Port. It also analyzes the areas for improvement in Suzhou Port by considering the relationship between Suzhou Port and the economy of Suzhou City, and proposes suggestions. However, areas for improvement in this paper include:

(1) Indicator selection: The range of output indicators selected in this paper is relatively wide, but the selection of input indicators is not particularly suitable for evaluating the logistics efficiency of Suzhou Port. After referring to other literature, further research can be conducted on indicators such as the number of berths of 10,000 tons or more, labor force size, total assets, and net fixed assets.

(2) Furthermore, the ten-year data for Suzhou Port was not compared with data from surrounding ports. Identify the similarities and differences before making recommendations.

(3) The relationship between Suzhou Port and the Suzhou region's economy can be explored more deeply, and we can further understand their relationship by examining their respective industrial structures and growth rates.

In the current new model of international division of labor, ports are not merely natural facilities, but also key nodes in the global allocation of resources. Therefore, promoting the comprehensive development of Suzhou Port and the ports of Jiangsu Province as a whole has become particularly crucial, using ports to drive urban economic growth and achieve common prosperity for both ports and cities.

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