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Research Article

Hainan Port Logistics Supply Chain and Its Flexible Operation Mechanism considering Digital Visual Remote Control

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Data visualization is in a process of constant change, the edge is constantly expanding, and information can be conveyed with the help of graphic technology. This article aims to study the Hainan port logistics supply chain and its flexible operation mechanism of digital visualization remote control and hopes that through the blessing of remote control technology, the port's ability to deal with the external environment will be improved. Based on the theory of logistics service availability of supply line flexibility, this paper constructs the evaluation of Hainan port logistics service supply chain flexibility; logistics flexibility refers to the ability of an enterprise to respond quickly and effectively to changes in customer demand for transportation, delivery, and services. Logistics flexibility includes four important elements: logistics supply flexibility, procurement flexibility, distribution flexibility, and demand management flexibility. Using the concept of two-level planning to build a port collection and distribution network optimization model in the supply chain environment and analyze related examples to find the best route for port transportation, the attributes related to port flexibility are selected from the perspectives of strategic flexibility, system flexibility, service provider flexibility, and organizational flexibility. The test outcomes of this document show the radiation capacity of Haikou port is relatively strong, the proportion of people who think it is excellent is 60%, and the proportion of people who think that the radiation ability of Haikou Port is good is 20%. Haikou Port has a good resource utilization capacity; 70% think its resource utilization rate is good, and 20% think its resource utilization is very good. Haikou Port's response capability is relatively average compared to Kia's capability, and even 10% of people think that Haikou Port's response capability is very average, so Haikou Port needs to strengthen training for port response capabilities. According to the operating flexibility data, the informatization development of Haikou Port is showing a good level.

1. Introduction

With the continuous development of Internet technology, the country has launched the "Internet +" strategy, which combines various fields of social production with the Internet to promote production development. This strategy has further promoted the development of the global economy, and with the rapid development of global trade, Port trade has also entered the era of worldwide trade cycle planning. Ports are the nodes of land and water transportation and the concentrated points of trade exchanges all over the world. The port is a gathering point and hub for land and water transportation, a distribution center for industrial and agricultural products, and foreign trade import and export materials, as well as a place for ships to berth, load, and unload cargo, get on and off passengers, and supplement supplies. With the continuous development of Chinese economy and trade, competition in port trade has intensified. Therefore, improving the management capacity of the port will help improve the harbour's ability to compete and promote healthy economic progress. In several decades, the logistics of inland and overseas with ports as the center have become increasingly large-scale and systematized. With the continuous transformation of port functions, logistics and transportation services also need to change. Ports need to have corresponding changes in logistics capabilities and management concepts. The port includes logistics service functions, providing comprehensive logistics services for ships and automobiles; modern ports not only provide consulting services, but also provide customers with logistics services such as order management and supply chain control; the existence of ports not only is a prerequisite for commodity exchange and domestic and foreign trade, but also promotes their development. The sudden emergence of computer technology has provided technical support for the popularization of social informatization, and enterprise informatization management has also become an important indicator to measure the level of enterprise management. In order to further promote the development of port transportation, we combine port transportation with visual remote control, hoping to provide new ideas for current port management through computer technology.

Flexibility is related to the service level of the port and is closely related to the consumer experience of consumers. Through the flexible evaluation of the port, it can find out the flexible short board of the port, carry out targeted improvement, and provide a direction for the flexible evolution of the harbour. The analysis of harbour logistics services can contribute to the maximum utilization of port resources and the sustainable growth of the port industry. At the meantime, it can provide targeted input into port logistics data.

As a distribution center for global trade, ports have an important impact on economic globalization. How to improve the level of port management with the help of Internet technology has become a hot topic at the moment. DG implements a configuration of clear-field dynamic digital holomicroscopy without phase contrast noise for the 3D in vitro cardiac ganglion sample visualization. It is impossible to visualize such sandwich samples by traditional atomic force microscopy (AFM), and it is challenging to visualize using DHM with a long coherence length. His proposed configuration consists of an extremely short pour current beam signal source. Cyclically polarised Li-Niobate crystals were used to translate the underlying spectrum into a beam suitable for use with CCD cameras via second harmonic generation (SHG). The experimental results show that, compared with the results based on He-Ne laser, the improved contrast of the rebuilt coherent image has been achieved to a greater extent. The authors attribute this increase to two factors: the properties of pulsed femtoseconds optics, which can act as a chopper to suppress coherent noise, and the fact that the difference in coherence patterns can be reduced by a factor of nine due to the low loss through the non-linear medium [1]. Xu et al. propose new methods to identify switch sets in current electricity power supply systems that need to be scaled up to achieve the greatest resilience by upgrading physical controls to remotely controlled switches. The remote switch arrangement issue is represented to be a weighted collective coverage problem, and a greedy method with politically time-efficient computation aims to produce a close optimal solution to the WSC problem [2]. Lee et al. have proposed a generic remote control system for smart home devices called Point-n-Press. It addresses the feature of directionality and allows for simple and visual control by pointing to the intended device to display the interface for target control on the remote control screen. The demonstration of the viability of the proposed scheme was achieved by utilising the state dependency of home device/appliance operation to implement two real prototypes [3]. Le et al. aimed to validate five factors that are determinants of quality of care. Firstly the review of literature related to service quality and client fulfilment is presented. Secondly, the relevant methods are used to conduct an experimental investigation, and the results show that the quality of port liaison services is affected by five factors: relevance, assurance, reputation, accessibility, and authorization [4]. Maldonado et al. present a strategy to develop a decision system to improve cargo handling operations. Analytical techniques are first used to predict the dwell time of each container. The results confirm the advantages of the proposed DSS, which can effectively support planning decisions for container yards [5]. Raimbault analyses the situation of the Paris cosmopolitan transport policy. The results show that spaces and structures of interior courts are involved in each of the policies for urban mobility. They are among the scarce instruments of policy used to implement territorial programmes and develop the city's material flow sites. In the meantime, the infrastructure of interior harbours has been established as a functional strategic asset of the megacity's economic competitiveness axis, with the aim of improving harbour territorialisation. From this perspective, the inland port institutions contribute to metropolitan governance in terms of logistics issues [6]. Prajogo proposes a supply distribution integration and a value chain process linking a company's competitive operational performance. To achieve it, the authors have developed a study tool. The model includes a range of linkages from integration of provisioning flows to the results of operating. The findings revealed that there was no clear positive link with respect to direct relation on supply flow alignment and critical operational results; instead, the link was fully moderated by incoming stock supply results and in-house processes of lean manufacturing. Furthermore, the lean manufacturing process had a unique positive impact on warehouse supply behaviour [7]. Batarfi proposes a new system for the provision of information on supply chains and also considers restocking of goods policy whereby customers can return their purchases for a refund. The authors discuss two sales tactics, from which a mathematical model is developed. The main objective is to investigate the impact of various refund strategies on the conduct of the SC system leading up to and following the adoption of double access channels [8]. Although these theories have explored port logistics and remote control to a certain extent, the combination between the two is not close enough and is not practical in actual operation.

This article combines the port with the economic hinterland and takes the entire port logistics system as the research object. Through research and classification, it has created a flexible evaluation index system for port logistics systems; it analyzes port business processes from a total supply sector point of view and supply line control allows for more transparent sharing of port information, more complete logistics systems, and more reasonable resource allocation.

2. Materials and Methods

2.1. Overview of Port Logistics Supply Chain. With the development of economic globalization, the competition among enterprises has become increasingly fierce, and the supply chain has become a symbol of mutual cooperation between enterprises [9]. Supply chain refers to the network chain structure formed by all upstream and downstream enterprises participating in the activity in the process of commodity production, circulation, and provision of products or services to end users. The emergence of the supply chain model has also enabled enterprises to develop rapidly. Since the emergence of the supply chain model, the concept of service has been included, but in the previous supply chain field, more attention was paid to the manufacturing field. The exploration of service supply chain is still in the initial stage, service supply chain involves many fields, and there is still no universally accepted definition of service supply chain [10, 11]. The service supply chain at this stage is very different from the beginning of the supply chain. The initial supply chain is mainly to manufacture products, while the service supply chain participates in the service process of products, and the production and consumption of services occur at the same time [12]. The service supply chain has the following characteristics: customer participation in the service process and the ability of service production and consumption to occur at the same time, disappearing over time. The choice of location depends on the customer, labor intensity, intangibility, and difficulty in measuring output. Supply chain is a link in the transportation of products, and the concept of logistics supply chain emerges when products are transported to all parts of the world. There is no doubt that the essence of the logistics supply chain is to provide transportation services. The logistics supply chain takes the customer's logistics needs as the starting point and manages relevant information. It forms a network model between the initial supplier of the product and the demand from the final customer, which reduces service costs and improves service efficiency [13, 14]. From the common point of product supply chain, service supply chain, and logistics chain, both product supply chain and service supply chain can be regarded as the category of supply chain. The activities involved in product supply chain, service supply chain, and logistics chain all have value transmission and value-added, so they all belong to the category of value chain. Figure 1 shows the basic structure of the logistics supply chain.

The functional service providers involved in the figure refer to providers with a relatively single type of service, while logistics integrators involve a wide range of businesses, usually have a strong logistics network, and can provide customers with a full set of services. Functional logistics is a kind of logistics service; it is a relatively simple logistics service. Companies that provide this service only undertake and complete one or several logistics functions, such as undertaking transportation, warehousing or processing a certain business, a single cargo loan, or ship loan business [15]. In fact, the logistics service supply chain is a multilevel service, as shown in Figure 2.

The logistics service supply chain is a multilevel service and exists at all levels of logistics service providers. It can achieve the purpose of providing high-quality logistics services to end customers while obtaining its own profits through cooperation and integration.

A port is a place for product handling and storage, and the logistics that appears in this port is called port logistics. As a global material node, ports have an important international status. With the rise of port economy, the importance of port logistics has also begun to appear. Port logistics is a special product, which mainly includes formal products, extended products, and core products [16, 17]. Its core product is the loading and unloading of goods; formal products are the use of different loading and unloading machinery and equipment and safety guarantee systems to complete the loading and unloading, transportation, and storage of goods; the extended product is to provide high-quality and convenient shipping and delivery procedures to shippers, and it is a complete service network. Due to the importance of port logistics to the entire port, the design of the port logistics service supply chain also affects the entire product supply chain [18]. The port logistics service supply chain refers to the functional network chain structure formed by the effective integration of various logistics service providers, port enterprises, transportation companies, and cargo owners relying on ports.

The chain structure is suitable for enterprises with a small business volume, whose model can be used in the initial stage of port construction, and the supply chain can be basically formed by selecting logistics suppliers in important locations [19]. The details are shown in Figure 3.

The network structure is developed on the basis of the chain structure, which is suitable for formulas with more business volume, and realizes the development of the entire supply chain through division of labor and cooperation. The details are shown in Figure 4.

The port logistics supply chain is the core of the entire supply chain, and the port has a unique advantage due to its unique geographical location. The supply chain formed with the port as the center has good transportation capacity and can greatly improve its competitiveness [20, 21]. The port supply chain structure is composed of port service providers, ports, and customers. The port supply chain structure is based on the establishment of long-term and stable strategic partnerships between ports, port service providers, and customers, relying on information technology to form multiple supply chain structures with logistics service providers, ports, and customers as nodes. The details are shown in Figure 5.

2.2. Evaluation Model of Logistics Suppliers. When the entire supply chain of the port is established, the logistics suppliers should be tendered based on the supply chain indicators, and the method of selecting suppliers is mainly quantitative and qualitative [22]. Quantitative analysis mainly examines the weight problem in the index system, and then comprehensively evaluates suppliers and selects the most suitable supplier [23]. Quantitative analysis methods include fuzzy comprehensive evaluation method, factor molecular method, and neural network algorithm. This paper takes neural network algorithm as an example to discuss [24].

Artificial neural network is an information processing system that imitates a biological system. Through the learning of sample patterns, knowledge can be obtained, qualitative and quantitative analysis of multitarget objects can be carried out, and it is very similar to human thinking [25]. The neural network is composed of many nodes, and according to the

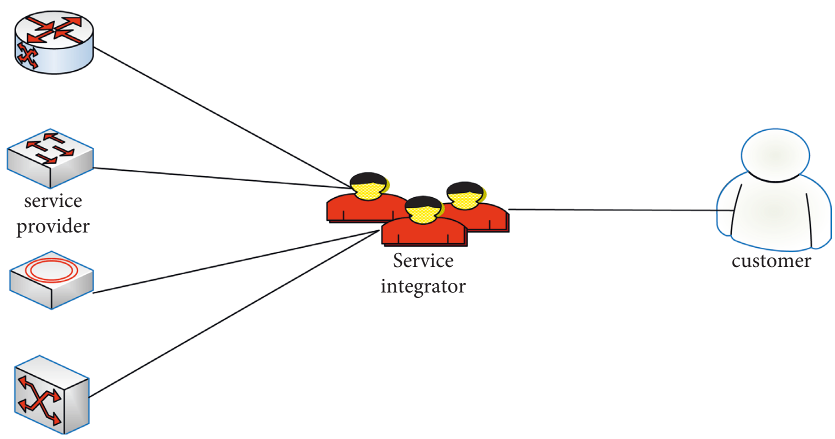


FIGURE 1: Basic structure of logistics supply chain.

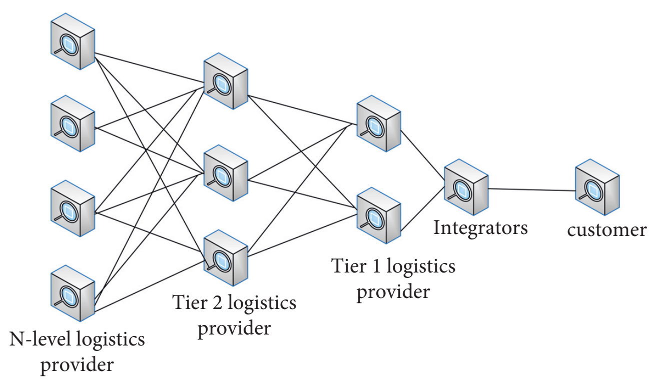


FIGURE 2: Multilevel logistics service supply chain.

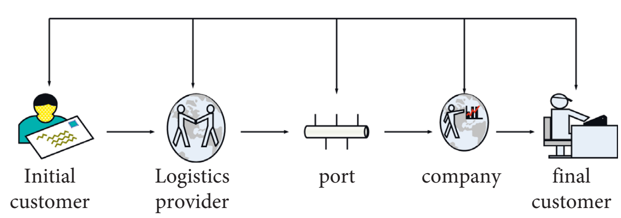


FIGURE 3: Chain structure.

connection mode of the nodes, the neural network can be divided into a hierarchical structure and an interconnected structure. The hierarchical structure can include the input layer, output layer, and intermediate layer, and any node of the interconnected structure can be connected with the same function [26]. Figure 6 shows the hierarchical neural network structure.

Supposing we set the input layer to a, the hidden layer to b, and the output layer to c, then we can get the hidden layer:

$$b_i = g(\text{net}_i) + (b_1, b_2, \ldots, b_d)^{Q}, \tag{1}$$

and

$$\text{net}_i = \sum_{i \longrightarrow 0}^{d} t_{xy} y_x + \delta_i, i = 1, 2, \ldots, d. \tag{2}$$

For the output layer,

$$c_l = g(\text{net}_l), \quad l = 1, 2, \ldots, h, \tag{3}$$

and

$$\text{net}_l = \sum_{l \longrightarrow 0}^{d} r_{xy} b_x + \delta_d, \quad l = 1, 2, \ldots, d. \tag{4}$$

The transfer function can use the sigmoid function:

$$g(a) = \frac{1}{1 + e^{-a}}. \tag{5}$$

The node output error at this time can be expressed as

$$Y = 0.5 \sum_{D=1}^{X} (j_l - b_l)^{4/3}. \tag{6}$$

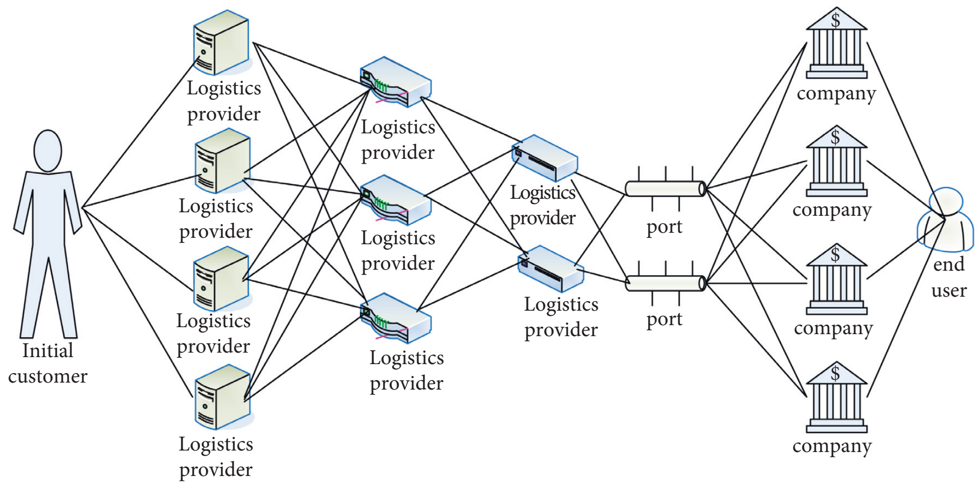


Figure 4: Basic network structure.

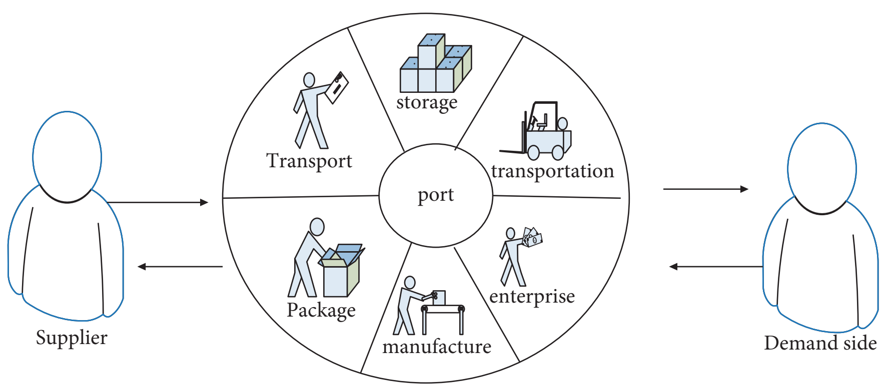


Figure 5: Port supply chain model.

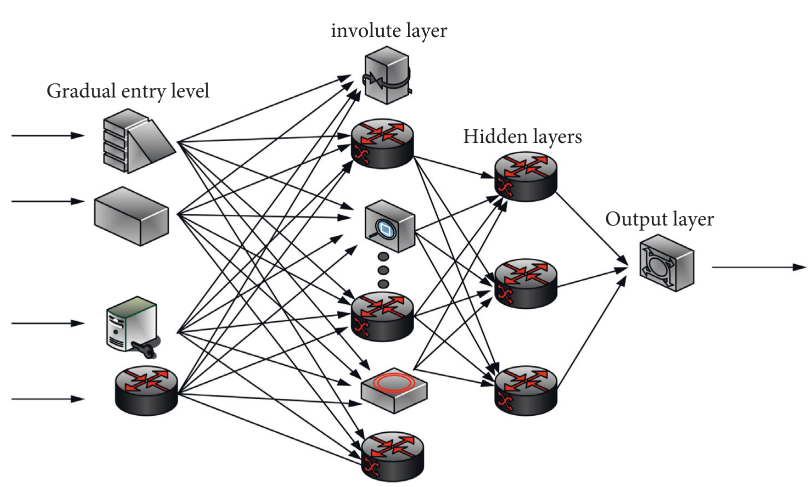


Figure 6: Hierarchical neural network structure.

Due to the weight correction function, the error of the function will show a downward trend, as shown in the following function:

$$\begin{aligned}
\Delta d_{xy} &= -\mathfrak{I}\frac{\alpha Q}{\alpha d_{xy}} = \mathfrak{I}\left(\sum_{D=1}^{k}\left(\left(j_l - b_l\right)b_l\left(1-b_l\right)\right)d_{xy}\right),\\
\Delta t_{xy} &= -\mathfrak{I}\frac{\alpha Q}{\alpha t_{xy}} = \mathfrak{I}\left(j_L - b_l\right)b_l\left(1-b_l\right),\\
\Delta\varphi_d &= \mathfrak{I}\left(j_l - b_l\right)b_l\left(1-b_l\right),\\
\Delta\varphi_h &= \mathfrak{I}\left(\sum_{d=1}^{j}\left(\left(j_l - b_l\right)b_l\left(1-b_l\right)\right)t_{xy}\right).
\end{aligned} \tag{7}$$

Among them d_{xy}, t_{xy} represent the network weight, φ_d, φ_h represent the threshold, and Q represents the error.

For each flexibility index, we can classify it as high, high, normal, low, etc., and deal with it accordingly. The details are as follows:

$$a_{hi} = \frac{f_{hi}}{f}. \tag{8}$$

Among them, a_{hi} represents the grade probability, f_{hi} represents the i-th comment number of the h-th evaluation index, and f represents the total number of participants.

$$Q_K = \begin{pmatrix} q_{11} & q_{12} & \cdots & q_{16} \\ q_{21} & q_{22} & \cdots & q_{26} \\ \vdots & \vdots & \vdots & \vdots \\ q_{l1} & q_{l2} & \cdots & q_{l6} \end{pmatrix}. \tag{9}$$

Among them, Q represents the membership matrix, and element q_{ly} represents the degree of membership of the h-th evaluation index to the y evaluation levels.

$$W_J = E_J * K_J = \left(w_{j1}, w_{j2}, w_{j3}, w_{j4}, w_{j5}, w_{j6}\right). \tag{10}$$

Among them, W represents the single comprehensive value of the port flexibility index system.

$$W = E * K = \left(w_j, w_2, w_3, w_4, w_5, w_6\right). \tag{11}$$

W stands for fuzzy hierarchical evaluation, K stands for evaluation matrix, and E stands for weight coefficient.

$$Q = R * H^S. \tag{12}$$

Among them, Q represents the index of port logistics system flexibility, R represents the final evaluation vector, H represents the evaluation grade branch vector, and S represents the matrix.

In the actual operation process, we use the data matrix as the basis, the feature vector of the logistics system of the technical port, and then normalize it to meet the following requirements:

$$\sum_{k=1}^{d} w_k + a\left(b_1 + b_2 + \cdots + b_6\right), \tag{13}$$

where w represents the feature vector.

$$G_j = \prod_{k=1}^{d} a_{xy}\,(j = 1, 2, \cdots, d), \tag{14}$$

where G represents the product of matrix elements.

$$\overline{R}_J = \sqrt[d]{G_j}. \tag{15}$$

R represents the d-th root of formula.

$$R_J = \frac{\overline{R}}{\sum_{k=1}^{d}\overline{R}_j}, \tag{16}$$

where R represents the normalization of $\overline{R}$.

$$\alpha_{\max} = \sum_{k=1}^{d}\frac{(AB)_j}{de_j}, \tag{17}$$

where α represents the maximum eigenvalue.

2.3. Digital Visualization Remote Control. The advent of computers promoted technological innovation, and visualization technology began to appear after the advent of the first digital computer [27]. It uses visualization technology for computer calculations, which can make the calculation results more intuitive and simple [28]. With the development of technology, the existing visualization technology is widely used in the field of network information [29]. Data visualization is more efficient in communication. It uses big data visualization tools to report, and some short graphics can reflect this complex information; data visualization can improve the efficiency of data analysis; data visualization can better trace the cause from the results and help operational decision-making. The main purpose of visualization is to realize resource sharing, to be able to remotely operate the server through a remote network, which requires remote control technology. The control and operation of cloud servers are an important means to improve system security. With the increasing scale of enterprises, the difficulty of control is also escalating, and remote control has become the best choice now. The control system is closely related to communication technology [30, 31]. The control system that first appeared was a stand-alone control, which could only realize one-to-one monitoring function, could not carry out data transmission, had a small scope of application, and was more difficult to use [32]. The second stage is centralized control. In this stage, multiple computer devices can be controlled, information can be transmitted, and input information can be simply analyzed. However, the amount of analysis at this time is very limited and the analysis results are not accurate enough. The third stage is distributed control, the market demand is becoming more and more complicated, and the dominant position of centralized control gradually gives way to market demand dominance. The distributed control system combines the advantages of

Table 1: Export cargo throughput.

Year	Cargo throughput (100 million tons)		Foreign trade cargo throughput (100 million tons)		Container cargo throughput (100 million tons)	
	National	Coastal	National	Coastal	National	Coastal
2016	132	80	38.5	23	22000	20000
2017	140	83	41	23.5	23800	20186
2018	143	92	42	23.8	25100	20200
2019	139	91.7	43	24	26100	20289
2020	145	94	44	24.7	26500	20369

single-machine control and centralized control, borrows Internet technology, expands the control range, and achieves remote control.

Moreover, the amount of calculation is very large, and the accuracy of the analysis results has also been qualitatively improved. The design of the remote control system is based on the software and hardware construction of the cloud branch server, and the response and feedback of the control command is the realization result. The purpose is to build a multilayer distributed architecture including user terminals based on the Internet to realize remote control and management of branch servers. With the continuous deepening of the "Internet +" strategy, remote control has been widely used due to its advantages of efficient management and fast response [33].

3. Experimental Analysis and Results

From the perspective of cargo layout, China has established four major cargo centres. In view of the scheme, China will shape five port clusters, including the region around the Bohai Sea, the delta region of the Yangtze River, the southeast delta region, the delta region of the Pearl River, and the southwest coastal region [34]. Table 1 shows the port cargo throughput situation.

According to geographical analysis, the biggest competitor of Hainan Port is Zhanjiang Port. The location of Zhanjiang Port is very advantageous, which also makes it very competitive. Table 2 shows the throughput of Zhanjiang Port.

According to the data in Table 3, the tide type and average tide level of Hainan Port can be known. In fact, the characteristics of tides can be reasonably used for port transportation activities, such as entering the port when the tide is high and leaving the port when the sea is about to fall. The height of the harbour pier is closely related to the tide, and the height of each harbour pier needs to be combined with the height of the tide so that the pier will not be submerged or stranded.

According to the data in Table 4, the length of Haikou Port is the longest and the number of berths in the port is the largest. Haikou Port includes four major port areas: Xingang Port Area is mainly responsible for bulk cargo; Macun Port Area is mainly responsible for bulk cargo; Xiuying Port Area is mainly responsible for packing work; Xinhai Port Area is responsible for fuel work. There are 7 berths in Sanya Port Area, which can berth 2 large ships.

According to the port logistics service supply chain model, we conducted a flexible analysis of the major ports in Hainan. The specific data are as follows.

We scored the level of each port and divided the port level into four levels: excellent, good, medium, and general, and there were 10 experts participating in the evaluation. From the data in Figure 7(a), it can be seen that the radiation capacity of Haikou Port is still relatively strong, 60% of which are considered to be excellent, and 20% think that the radiation ability of Haikou Port is good. Haikou Port has a good resource utilization capacity, 70% think its resource utilization rate is good, and 20% think its resource utilization is very good. Haikou Port's response capability is relatively average compared to Kia's capability, and even 10% of the people think that Haikou Port's response capability is very average; therefore Haikou Port needs to strengthen training for port response capabilities. According to the flexible structure data of Haikou Port in Figure 7(b), the development of value-added services in Haikou Port is still good, and 80% of them believe that their level is good and excellent. The network scale and the overall level of node services of Haikou Port are in good condition. Therefore, from the perspective of structural flexibility, the overall level of Haikou Port is very good.

According to Figure 8(a), the operational flexibility data shows that the informatization development of Haikou Port is showing a good level. 60% believe that its degree of informatization is good, and the lean degree of Haikou Port is similar to the level of informatization development, and there is still room for improvement. From the perspective of Haikou Port's business culture and quality, 80% of them believe that its level is good or above. It can be seen from these data that service level plays an important role in flexible operation. From the perspective of development flexibility in Figure 8(b), the economic benefits of Haikou Port are relatively average, but there are also outstanding projects. From the perspective of port service costs, 80% of people think that the cost is relatively good, so the overall cost control of Haikou Port is still relatively good. From the perspective of customer satisfaction, the overall level is good, but customer satisfaction has an important impact on subsequent cooperation, so customer satisfaction should be paid special attention.

According to the strategic flexibility data shown in Figure 9(a), the overall radiation capacity of Sanya Port is relatively general, which may be related to its geographic location, and only 50% of its radiation levels are considered to be good. If the overall level of Sanya Port is to be

Table 2: Port throughput of Zhanjiang Port.

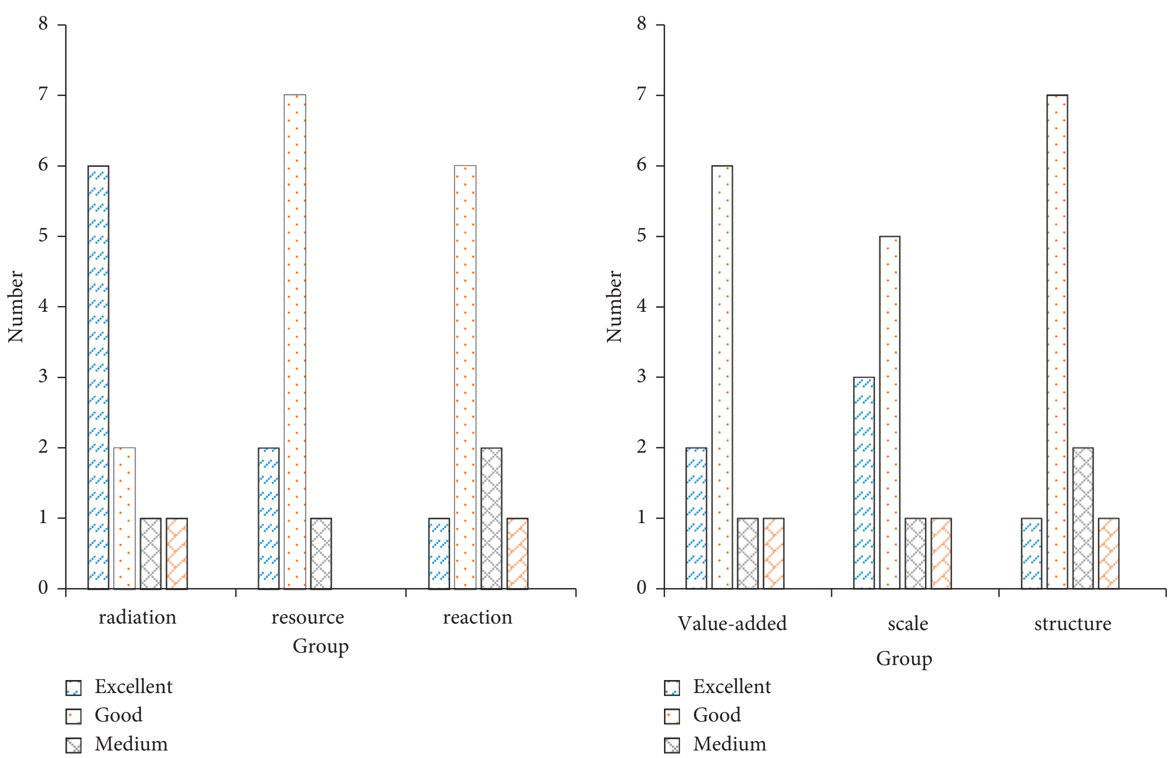
Group	2017	2018	2019	2020
Cargo throughput (10,000 tons)	9895	10000	10091	11000
Container throughput (TEU)	110	115	118	122
Passenger throughput (1000 people)	28567	30185	33698	39657

Table 3: Port tide table.

Port	Type	Average high tide (m)	Average low tide (m)	Average tide level (m)
Haikou Port	Half-day tide	2.5	0.5	2
Hachisho Port	Day tide	2.8	1.3	1.9
Sanya Port	Day tide	2.3	0.7	1.1
Yangpu Port	Full day tide	4	1.3	1.95

Table 4: Port berth situation.

Name	Length (m)	Quantity (pieces)	Grade (10,000 tons)	Length of wharf (m)	Number (units)	Grade (10,000 tons)
Haikou Port	5200	60	5	5200	55	5
Hachisho Port	1700	10	5	1700	10	5
Sanya Port	2100	45	1	2100	44	1
Yangpu Port	3800	15	2	3800	15	2
Total	12800	130	13	12800	124	13



(a) (b)

Figure 7: Flexibility evaluation of Haikou Port. (a) Strategic flexibility. (b) Structural flexibility.

improved, the level of economic radiation must be improved. From the perspective of the utilization of port resources, the overall level of Sanya Port is relatively good, with 70% of the people believing that the utilization of resources is good or above. However, 10% of people still think that its resource utilization rate is relatively average, indicating that Sanya Port still has excessive waste of resources in some areas. From the perspective of the port's response capacity,

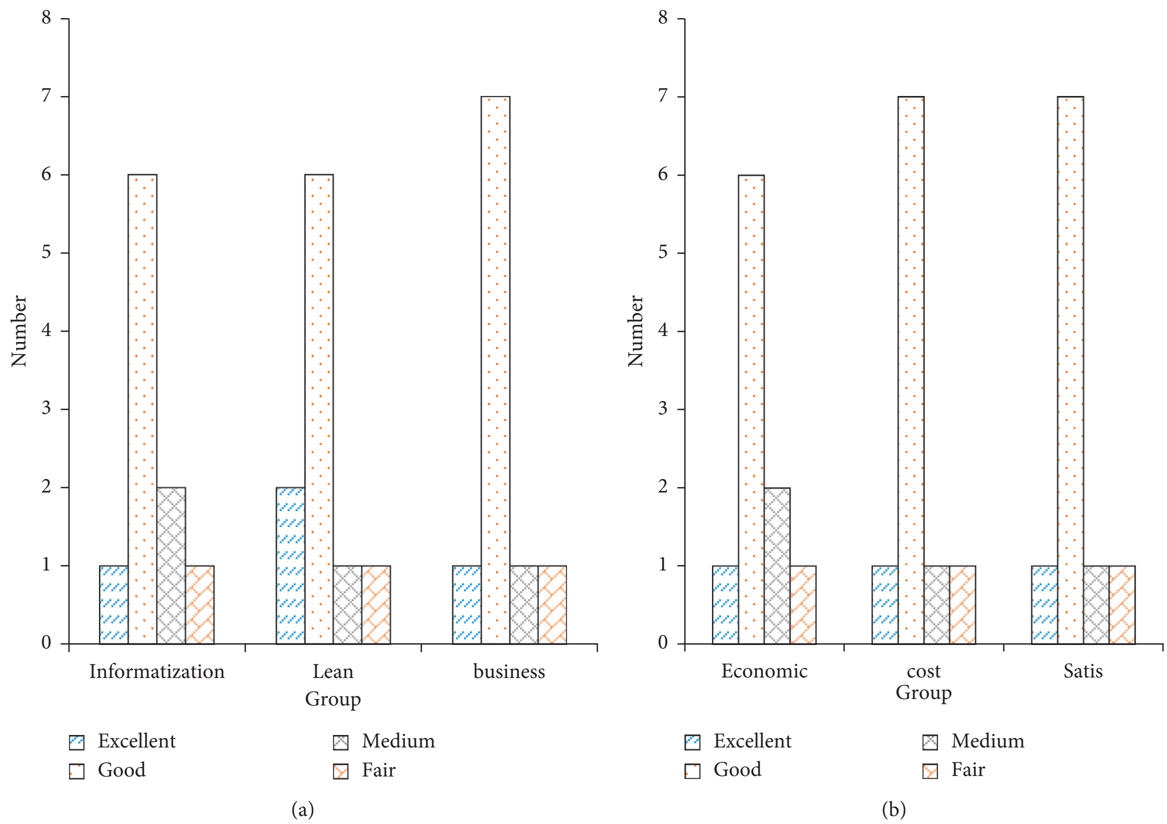


FIGURE 8: Haikou port development survey. (a) Operational flexibility. (b) Development flexibility.

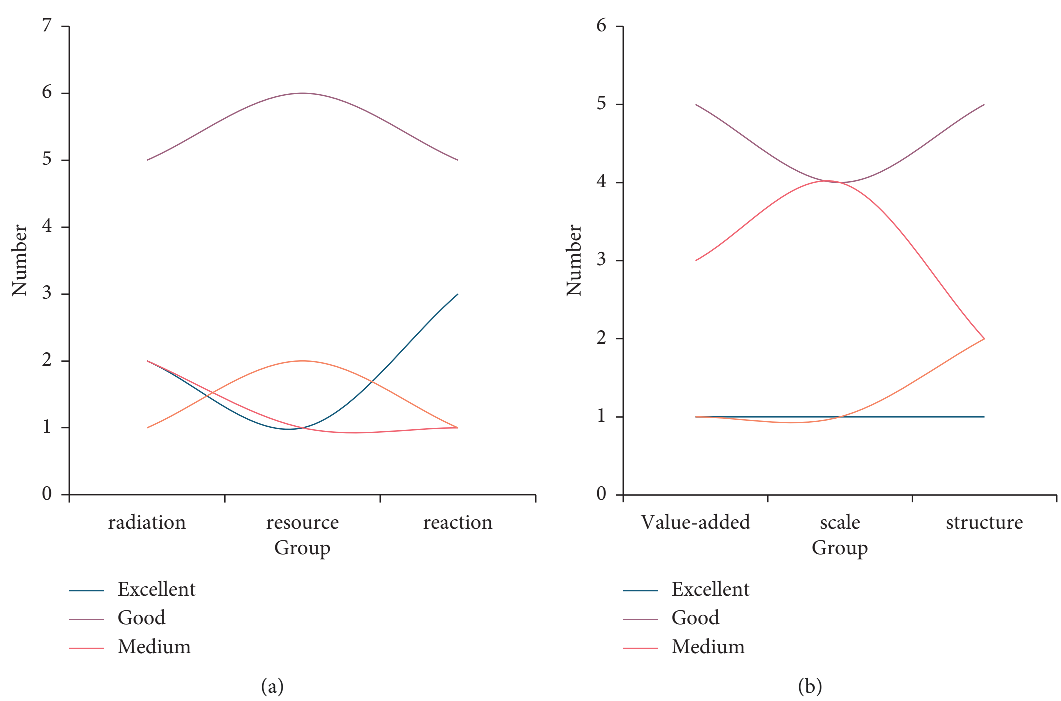


FIGURE 9: Sanya Port flexibility evaluation. (a) Strategic flexibility. (b) Structural flexibility.

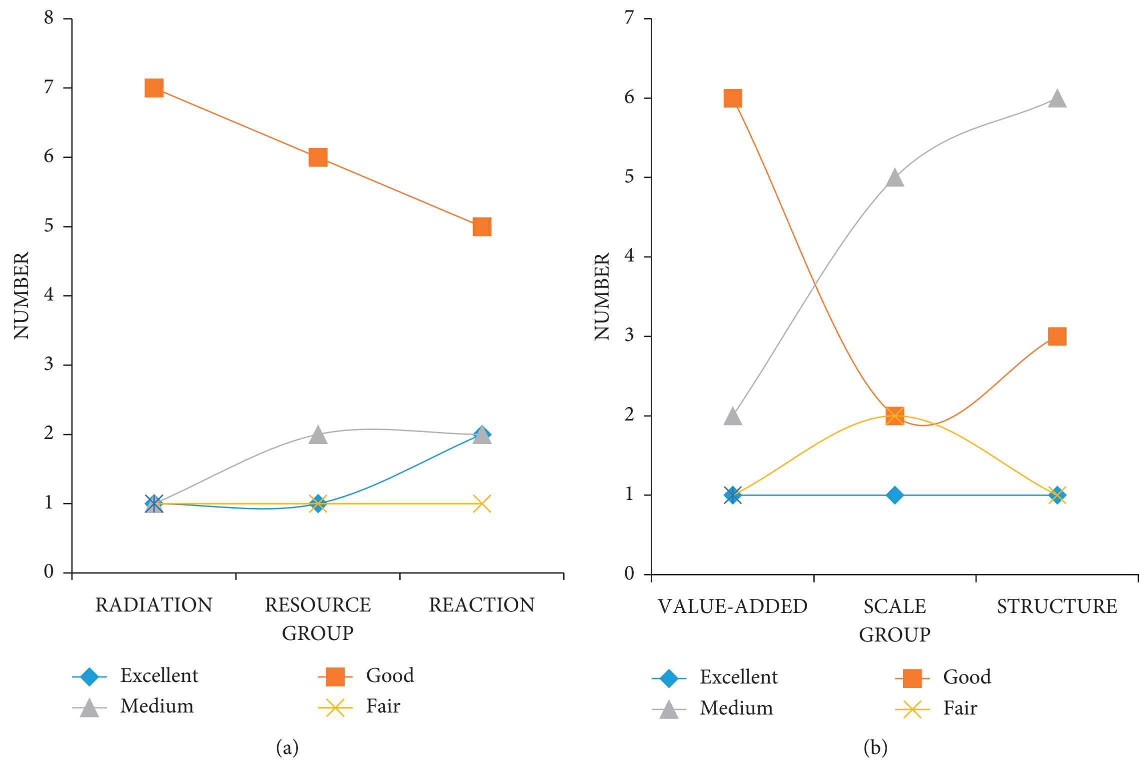


Figure 10: Flexibility evaluation of Yangpu Port. (a) Strategic flexibility. (b) Structural flexibility.

the overall response level of Sanya Port is very good, and 80% of the respondents believe that its response capacity is good or above. Judging from the structural flexibility data in Figure 9(b), the development of value-added services in Sanya Port is relatively general, neither particularly good nor bad. In order to improve the port's level of competition, it is necessary to find another way out. From the point of view of network scale and node service level, the whole is relatively general, and from the point of view of the flexible structure of the port, there is no particular highlight. From the overall data, the development of Sanya Port is relatively stable.

According to the strategic flexibility data shown in Figure 10(a), the radiation capacity of Yangpu Port is still very strong, and 80% of the people think its radiation capacity is good or above; therefore, Yangpu Port should make full use of the radiation capacity of curious regions. From the perspective of resource utilization, Yangpu Port has a better effect, but 10% still think it is general, indicating that resource utilization is still not done well in some areas. From the perspective of port responsiveness, the overall response level of Yangpu Port is average, but there are still some areas that have done very well. Judging from the structural flexibility data in Figure 10(b), the value-added service development of Yangpu Port is relatively general, neither particularly good nor bad. In order to improve competitiveness, areas with good value-added should be improved. From the point of view of network scale and node service level, Yangpu Port's level is relatively average, and 50% of people think that its node service is very general, and the flexible structure of the port also has a lot of room for improvement.

4. Conclusion

The in-depth development of economic globalization has made economic competition increasingly fierce. This requires countries to give full play to their own advantages, improve their competitiveness, and become beneficiaries in the process of economic globalization. In the process of economic globalization, international trade is indispensable. As a cargo distributing center for international trade, the port has an increasing business volume and has become a transportation hub for international trade. In a bid to make the port more productive and internationally competitive, we must use technology to optimize the port's transportation procedures. This article aims to explore the Hainan Port logistics supply chain and its flexible operation mechanism based on digital visualization and remote control. During the exploration process of this article, the following work has been mainly completed: (1) starting from the concept of port supply chain, referring to the current situation of port supply chain management and analysis of the construction of the supply cycle, and the business process operation process based on the supply chain environment is briefly described. (2) It understands the status quo of industry development, analyzes the advantages and disadvantages of major ports in Hainan, and evaluates the flexible procedures of the port logistics service supply chain. (3) The use of a remote control system can ensure data security, reduce production costs, and provide convenient and efficient back-end services.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

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