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Article

New development strategy of international logistics supply chain: Case study of Ningbo City

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Abstract: International logistics supply chain is an important guarantee to support the country to build a new development pattern, this paper aims to propose a new strategy to promote the development of international logistics supply chain through the case study of Ningbo City. On the basis of supply chain theory and international logistics theory, this paper constructs SWOT model to study the case of Ningbo City, and draws the following conclusions: The international logistics supply chain of Ningbo city has the advantages of superior geographical location, perfect logistics infrastructure and strong port resources, and the disadvantages of low logistics informatization level and logistics management mode to be optimized. At the same time, it faces the opportunities of "One Belt and One Road" initiative and the competitive threat of other logistics centers. Adopting strategies such as policy support, strengthening logistics informatization construction and optimizing logistics management mode can ensure the stable development of foreign trade, which is conducive to accelerating the construction of a new development pattern and modern economic system in which domestic and foreign cycles promote each other.

Keywords: Ningbo City; international logistics; supply chain; SWOT model

1. Introduction

With the deepening of global economic integration and the rapid growth of international trade, the international logistics supply chain, as an important link connecting logistics and supply chain, has attracted more and more attention and played an increasingly important role in national and local economy. The report of the 20th National Congress of the Party proposed that "efforts should be made to improve the resilience and security level of the industrial chain and supply chain", and the international logistics supply chain is an important guarantee for improving the resilience and security level of the industrial chain and supply chain and supporting the construction of a new development pattern. In recent years, China's foreign trade shipping, international aviation, China-Europe freight trains, and new land-sea routes are running smoothly, and international logistics continues to improve. 2023 marks the 10th anniversary of the Belt and Road Initiative. In the first three quarters of this year, the ratio of China's total social logistics expenses to GDP was 14.3%, which dropped to a low level in recent years.

China supports the eight actions of high-quality joint construction of the "Belt and Road", the first is to build the "Belt and Road" three-dimensional connectivity network, which indicates the direction and requirements for the high-quality development of international logistics and supply chain in the next stage, but also brings unprecedented opportunities and challenges. In the context of globalization, the

development of international logistics supply chain has become the key for countries to enhance economic competitiveness and achieve sustainable development, but the competition of international industrial chain supply chain is becoming increasingly fierce, and the risk of "chain break" has increased. First of all, the rapid development of export-oriented economy represented by China's manufacturing industry makes the efficiency and competitiveness of logistics supply chain become the focus of attention. At the same time, since the smooth connection and efficient operation of all aspects of logistics are crucial to achieve fast, safe and on-time delivery of goods, globalization and the diversification of market demand also put higher requirements on the logistics supply chain. Therefore, although the development of the international logistics supply chain continues to improve, there are also certain challenges. It is necessary to make use of the opportunities of the "Belt and Road" to continuously optimize and innovate in all aspects, improve competitiveness and efficiency, and thus promote the sustainable development of the international logistics supply chain as a whole.

Ningbo is an important economic center and foreign trade port city in the southeast coastal area of China, so it is of great strategic significance to study the current situation of its international logistics supply chain for the development of China's overall international logistics supply chain. First of all, Ningbo's international logistics supply chain has a good foundation for development. Ningbo Port is the second largest port in China, located in the East China Sea coast, is one of the important import and export ports in China, with strong port operation capacity and large-scale shipping network. At the same time, Ningbo has also made breakthroughs in the construction of logistics facilities, and the links of warehousing, transportation and distribution have been effectively integrated and optimized, which has laid a solid foundation for the development of Ningbo's international logistics supply chain. Secondly, the development of Ningbo's international logistics supply chain benefits from the active support of government policies. The Ningbo Municipal government has been committed to providing a good investment environment and service guarantee, and has provided rich policy support and preferential policies for international logistics supply chain enterprises. Then, Ningbo actively promoted economic transformation and upgrading, and increased its support for the industrial economy and service industry, thus further promoting the development of the international logistics supply chain. In addition, the development of Ningbo's international logistics supply chain also benefits from the rapid development of information technology. With the in-depth application of information technology, the international logistics supply chain of Ningbo City can realize the fine management of order management, inventory management, transportation tracking and other aspects, and improve the logistics efficiency and service level. At the same time, information technology also provides strong support for the collaborative management and information sharing of the international logistics supply chain, and further promotes the optimization and upgrading of the supply chain. In short, the development of international logistics supply chain in Ningbo City is in a stage of rapid development, with great potential and advantages. Taking Ningbo City as an example to conduct a case study is of great practical and strategic significance to put forward a new strategy for the development of China's international logistics supply chain.

Therefore, this paper aims to find the current strengths, weaknesses, opportunities

and challenges of the international logistics supply chain through a case study of Ningbo City, and propose a new development strategy to optimize the international logistics supply chain based on these findings. The overall structure is as follows: firstly, the theory of logistics supply chain and the literature on the development and optimization of international logistics supply chain are sorted out, and then the SWOT model is constructed to analyze the case of Ningbo City. Finally, according to the conclusion of SWOT analysis, this paper puts forward new strategic suggestions for the future development of international logistics supply chain, so as to promote the sustainable development of Ningbo city and China's international logistics supply chain.

2. Review of literature

2.1. Supply chain theory

Supply chain refers to the network chain structure formed by upstream and downstream enterprises that provide products or services to end users in the process of production and circulation, that is, the whole chain of products from merchants to consumers (Snyder and Shen, 2019). Supply chain covers the flow of material flow, information flow and capital flow in an enterprise. The complete supply chain structure model is shown in **Figure 1**.

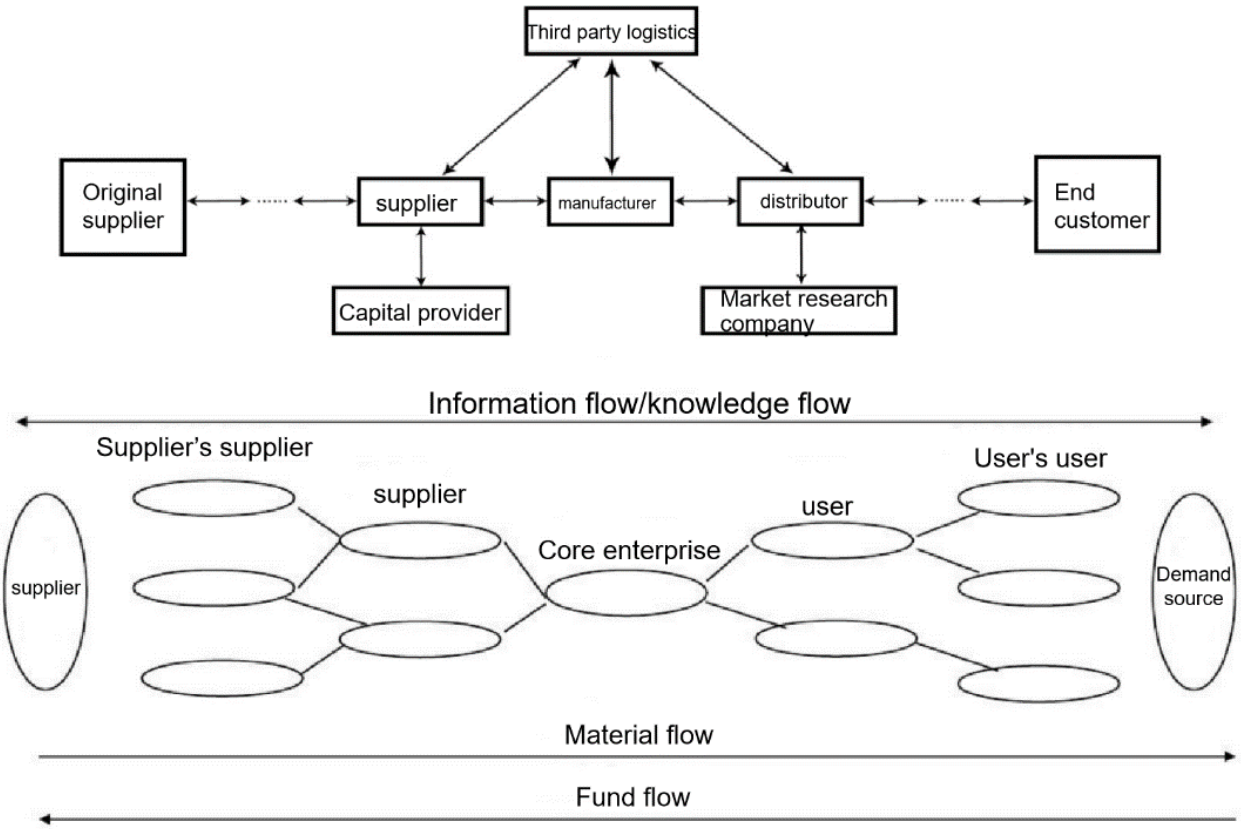

Figure 1. Complete supply chain structure model diagram.
Source: Li and Fung Research Center (2003).

In order to study the development status of the international logistics supply chain and put forward new development strategies, this paper combs the elaboration of the

supply chain theory in the existing literature, and provides theoretical support for the research perspective of this paper and the proposal of new strategies. First of all, the core view of supply chain theory is to emphasize the importance of collaboration and coordination among all links in the whole logistics process (Wieland, 2021). First of all, resource sharing in the supply chain is very important, and different organizations can maximize the utilization and optimal allocation of resources by sharing resources (Goudarzi et al., 2021). Secondly, information flow in the supply chain is also crucial. In a complex supply chain network, information about orders, inventory, delivery time and other information needs to be shared among various organizations in real time, so as to better coordinate production and logistics activities. In addition, various organizations in the supply chain are faced with various risks, such as supply chain disruption, logistics delay, market fluctuations and so on (Scheibe and Blackhurst, 2018). These risks need to be addressed jointly through cooperation and coordination among organizations. Secondly, the supply chain theory emphasizes the application of information technology in the logistics process (Srinivasan and Swink, 2018). With the rapid development of information technology, enterprises can timely obtain market demand information, coordinate suppliers, optimize inventory management, etc., through information systems, so as to improve the flexibility and efficiency of logistics operation, reduce costs, and improve customer satisfaction. In addition, the supply chain theory not only focuses on the efficiency and benefits of the supply chain, but also emphasizes the importance of risk management (Bokrantz and Dul, 2023). In the international logistics supply chain, various risks often bring challenges to the operation of the supply chain, and these risks include but are not limited to changes in market demand, interruption of raw material supply and transportation delay.

To sum up, supply chain theory is the theoretical basis for the development of international logistics supply chain, which emphasizes the importance of collaboration and coordination, information technology application and risk management. For the detailed views of existing scholars, please refer to relevant literature in **Table 1** for further understanding. In the subsequent research, based on the above theory, we deeply discuss the problems existing in the development of international logistics supply chain, and put forward the corresponding strategic countermeasures.

Table 1. Literature related to supply chain theory.

Theories	Authors
Basic definition of supply chain	Snyder and Shen, 2019
The flow of information and capital flows	Fan and Stevenson, 2018
Detailed explanation of supply chain structure model	Li Fung Research Center, 2003
The importance of collaboration and coordination	Wieland, 2021
The significance of resource sharing	Goudarzi et al., 2021
Risk sharing in the supply chain	Scheibe and Blackhurst, 2018; Macdonald et al., 2018
The importance of risk management	Bokrantz and Dul, 2023; Craighead et al., 2020

2.2. International logistics theory

International logistics refers to cross-border logistics activities, involving international trade, international transportation, international storage, international

packaging and other links (Meersman and Voorde, 2017). This section will review the development, characteristics and business processes of international logistics theory. To provide a method and theoretical basis for the case study of Ningbo international logistics supply chain.

Since the early 1990s, the concept and importance of international logistics have been widely accepted by governments and foreign trade departments of all countries. With the continuous expansion of global trade and the in-depth development of international cooperation, the rise of multinational enterprises and the increasingly close international demand exchanges and economic ties, international logistics has become an indispensable link (Akkaya and Kaya, 2019). First of all, international logistics is characterized by a large spatial span, that is, it involves supply chains and logistics networks in different countries. Secondly, the information flow of international logistics is fast, which is because of the development of modern science and technology and the application of information technology (Chang et al., 2021). However, there are also certain risks and challenges in international logistics. For example, legal, policy and cultural differences between different countries will bring some uncertainty to international logistics. At the same time, global emergencies and natural disasters may also affect logistics and transportation, resulting in cargo delay and loss. The development of international logistics involves a number of different links and business processes (Muravev et al., 2020), including: sending and receiving of goods, customs clearance, transportation mode selection, transportation arrangement and tracking, fee settlement and so on. The link of receiving and sending goods includes the link of loading, unloading and storage of goods; the link of customs clearance includes import declaration and export clearance; the choice of transportation mode includes the choice of sea transport, air transport, land transport and other modes of transportation; the arrangement and tracking of transportation includes the arrangement and tracking of goods collection, loading and unloading, transit, customs transfer and other links; the settlement of expenses includes the clearing and settlement of various expenses. Other business processes are shown in **Figure 2** below. These links are interrelated and affect each other, and any problem in one link may lead to the instability of the whole supply chain.

In short, international logistics is a complex of multiple links and business processes, and each link connects and influences each other. As a new form of business, international logistics service integrator has become the mainstream trend of international logistics development by providing one-stop process services, providing enterprises with more efficient, convenient and stable logistics solutions. This paper will use the characteristics of international logistics and existing solutions to study and explore the development status of Ningbo's international logistics supply chain, as a theoretical basis to formulate a more effective international logistics supply chain development strategy.

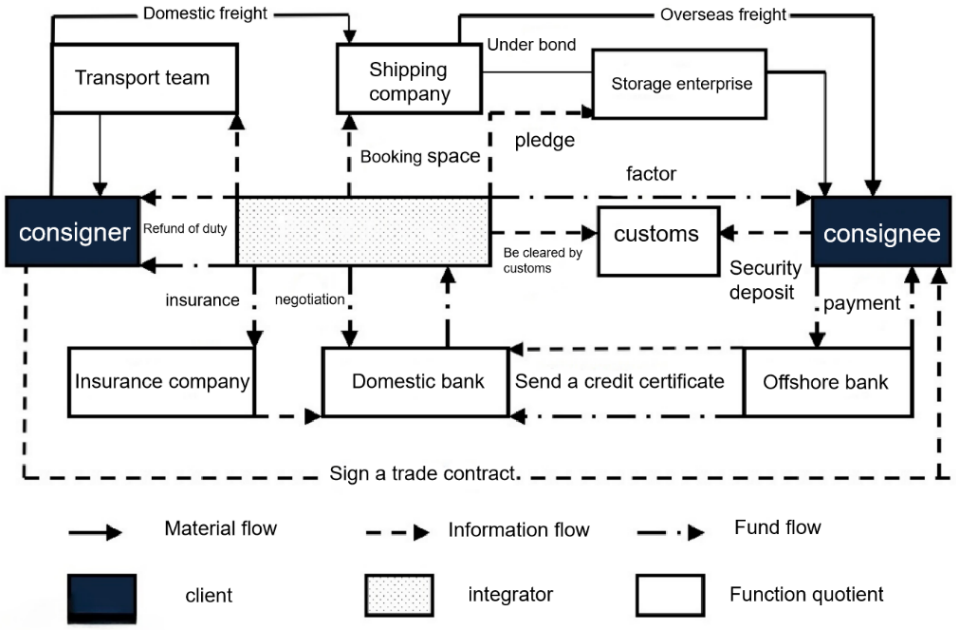

Figure 2. International logistics service supply chain business flow chart.
Source: International logistics service supply chain series teaching materials (Luo, 2015).

2.3. Development and optimization of international logistics supply chain

Domestic and foreign scholars have studied the development of international logistics supply chain from different perspectives. Some scholars have conducted in-depth research on the characteristics of international logistics supply chain, such as full traceability. Tien et al. (2019) believed that traceable information can help enterprises understand key information such as the origin, transportation path and storage environment of goods, so as to better manage supply chain risks and provide consumers with more accurate product information and higher satisfaction. In order to achieve this full traceability, scholars proposed that the use of bar code, RFID technology, blockchain and other information technology means can effectively record and track the flow direction and status of goods, so as to achieve the traceability of the supply chain. Green international logistics supply chain is a hot issue in the international logistics academia in recent years. Some scholars believe that the traditional logistics supply chain often brings problems such as environmental pollution and resource waste while realizing benefits. The concept of green supply chain should be introduced into the international logistics supply chain. To reduce the negative impact on the environment (Goor et al., 2019). In addition, there is an increasing number of studies on the application of information technology and IOT in the international logistics supply chain. Some scholars believe that the application of information technology and the Internet of Things can effectively improve the efficiency and reliability of the supply chain (Bardakci, 2020). Through the application of information technology and the Internet of Things, information sharing and real-time monitoring of all links of the supply chain can be realized, and the visibility and operability of transportation can be improved (Branch, 2008). At the same time, information technology and the Internet of Things also provide big data analysis and prediction capabilities, which can help enterprises make more informed decisions and improve the flexibility and response speed of the supply chain. Based on the above

different theoretical perspectives, some other scholars put forward the risk control and optimization measures of international logistics supply chain. In order to improve the efficiency and reduce the cost of international logistics, a series of optimization methods need to be adopted (Mittal and Sarkar, 2023). For example, the layout and network structure of the international supply chain should be optimized, the level of informatization should be improved, and warehousing and distribution management should be strengthened (Sundram et al., 2020).

To sum up, scholars at home and abroad have studied the characteristics, influence, application and optimization measures of international logistics supply chain from different perspectives, which have important theoretical value for this paper to study the new strategy of international logistics supply chain development. More relevant views can be obtained by further reading the literature according to the list of authors in **Table 2**.

Table 2. Literature related to development and optimization of international logistics supply chain.

Theories	Authors
Full traceability of international logistics supply chain	Long, 2003; Tien et al., 2019
Green international logistics supply chain	Goor et al., 2019
Application of information technology and Internet of Things in international logistics supply chain	Branch, 2008; Bardakçi, 2020
Risk control and countermeasures of international logistics supply chain	Rushton, 2007; Pan, 2020; Sundram et al., 2020

However, most of the existing literature studies the international supply chain development of the whole country qualitatively from a macro perspective, lacking the support of quantitative and realistic data. Therefore, this paper will build SWOT model based on real regional data, combine qualitative and quantitative analysis research methods, and conduct a case study on the development status of international logistics supply chain in Ningbo City, and put forward a new strategy for the development of international logistics supply chain according to the conclusions found in the model, so as to accelerate the construction of a new development pattern and modern economic system in which domestic and foreign cycles promote each other.

3. Research method

This paper adopts the comprehensive research method of qualitative analysis and quantitative analysis. The qualitative analysis is reflected in the use of literature reading and theoretical analysis to summarize the supply chain theory, international logistics theory and the relevant viewpoints of international logistics supply chain development, which provides theoretical support for the research on the development status of international logistics supply chain in Ningbo in this section. The quantitative analysis method is to take the specific statistical data of Ningbo city to quantify the development of international logistics supply chain. In addition, this study focuses on business analysis due to the limited references on international logistics supply chain research at the micro level, so it is adopted. SWOT analysis is a commonly used strategy analysis tool, which can help enterprises or regions to comprehensively evaluate the strengths, weaknesses, opportunities and threats of internal and external

environments, so as to formulate corresponding development strategies (Leigh, 2009; Gurl, 2017).

In the case study of Ningbo international logistics supply chain development, this paper mainly uses the official data of Ningbo Municipal Bureau of Statistics, National Bureau of Statistics, China Federation of Logistics and Purchasing, China Logistics Information Center and so on to quantify the influencing factors of the internal and external environment of Ningbo international logistics supply chain. In order to formulate feasible development countermeasures (Puyt et al., 2023). Specifically, follow the following steps: first, analyze the internal environment of Ningbo international logistics supply chain, that is, the advantages and disadvantages; Secondly, the external environment of Ningbo international logistics supply chain is analyzed, including opportunities and threats; Finally, a comprehensive analysis is carried out to determine the strategic direction of the development of international logistics supply chain in Ningbo on the basis of comprehensive internal and external environment analysis, such as further development on the basis of advantages and opportunities, and improving the overall competitiveness by improving the disadvantages and responding to threats.

4. Case analysis

Development status of international logistics supply chain within Ningbo: First of all, Ningbo, as an important port city, has performed well in terms of freight volume. According to the data of the National Bureau of Statistics, the cargo throughput of major coastal ports above designated size is shown in **Table 3**. The data show that the cargo throughput of Ningbo-Zhoushan Port (including Ningbo port area and Ningbo-Zhoushan port area) ranks first nationwide, indicating the important position and influence of Ningbo city in the domestic logistics industry (Lin et al., 2023). Secondly, Ningbo city has a sound logistics infrastructure, including railway, highway, waterway and civil cargo and other modes of transportation, these different modes of transportation constitute a convenient logistics network, providing all-round support for the international logistics supply chain. According to the data of Ningbo Municipal Bureau of Statistics, the total freight volume in Ningbo showed a trend of continuous growth from 2018 to 2022, as shown in **Table 4**. Among them, road transportation volume accounts for the largest proportion, followed by waterway transportation and railway transportation, and the various transportation modes with complementary advantages make the logistics system of Ningbo City sounder and more efficient. Relatively speaking, the transportation volume of civil aviation cargo is low, which may be due to the relatively high transportation cost of civil aviation and the limited volume of cargo. In addition, Ningbo also pays attention to the training of logistics talents, and the number of logistics talents is relatively large, which provides favorable conditions for the stable operation of the supply chain. Data from Ningbo Human Resources and Social Security Department in 2022 show that the total number of logistics employees in Ningbo is 301,300, and the number of logistics talents reaches 242,100. However, the level of logistics informatization in Ningbo is not high, logistics efficiency and service quality need to be improved, and there are related structural problems in logistics talents.

Table 3. Cargo throughput of major coastal ports above designated size from 2018 to 2022.

Indicators of (ten thousand tons)	**2018**	**2019**	**2020**	**2021**	**2022**
Cargo throughput of major coastal ports	922392	918774	948002	997259	1013102
Cargo throughput of Dalian Port	46784	36641	33401	31553	30613
Cargo throughput of Yingkou Port	37001	23818	23821	22997	21118
Cargo throughput of Qinhuangdao Port	23119	21880	20061	20053	19269
Cargo throughput of Tianjin Port	50774	49220	50290	52954	54902
Cargo throughput of Yantai Port	44308	38632	39935	42337	46257
Cargo throughput of Qingdao Port	54250	57736	60459	63029	65754
Cargo throughput of Rizhao Port	43763	46377	49615	54117	57057
Cargo throughput of Shanghai Port	68392	66351	65105	69827	66832
Cargo throughput of Lianyungang Port	21443	23456	24182	26918	30111
Cargo throughput of Ningbo-Zhoushan Ports	**108439**	**112009**	**117240**	**122405**	**126134**
Cargo throughput of Shantou Port	3963	3155	3351	4138	4019
Cargo throughput of Guangzhou Port	59396	60616	61239	62367	62906
Cargo throughput of Zhanjiang Port	30185	21570	23391	25555	25376
Cargo throughput of Haikou Port	11883	12447	11781	12159	11118
Cargo throughput of eight ports	1396	1507	1501	1652	1646

Source: Annual data of the National Bureau of Statistics of China - Indicators - Transport and Posts and Telecommunications - Cargo throughput of major coastal ports above designated size (2018–2022).

Table 4. Freight volume of various modes of transportation in Ningbo from 2018 to 2022.

Unit: ten thousand tons	**2018**	**2019**	**2020**	**2021**	**2022**
Total freight volume	61454.2	68406.9	71898.1	78747.1	80100.4
Railway transportation volume	2689	2835	2977.5	3298.2	3502.9
Road transport volume	32424	35757	38860	43923	45310
Waterway transport volume	26324.5	29797.9	30044.9	31510.7	31279
Civil aviation cargo throughput	16.7	17.1	11.9	11.3	8.5

Source: Statistical Bulletin of Ningbo National Economic and Social Development from 2018 to 2022 by Ningbo Bureau of Statistics.

Development status of external international logistics supply chain in Ningbo: First of all, according to the data of CNET.com, the scale of cross-border e-commerce logistics industry has grown rapidly in recent years. In 2022, the transaction scale of China's cross-border e-commerce industry will reach 15.7 trillion yuan, with a year-on-year increase of 10.56% compared with 14.2 trillion yuan in 2021, as shown in **Figure 3** below. In 2022, China's cross-border e-commerce transaction volume accounted for 37.32% of China's total import and export value of goods trade of 42.07 trillion yuan. Ningbo is one of the first batch of cross-border e-commerce service pilot cities and the second batch of comprehensive cross-border e-commerce pilot zones in China. It has a solid foundation for the development of cross-border e-commerce and can give full play to its potential and advantages in the field of cross-border e-commerce, so as to promote the steady growth of foreign trade. At the same time, the implementation of the Belt and Road Initiative has improved China's international logistics level. The total amount of social logistics in China from 2018 to 2022 is

shown in **Figure 4**. The data show that the total amount of social logistics in China shows an increasing trend year by year. As a coastal city, Ningbo can give full play to its geographical location and advantages in international logistics and provide more convenient logistics services. However, the implementation of trade protection policies in recent years has brought some pressure and changes to the international logistics supply chain in Ningbo City. At the same time, compared with Shanghai, Hangzhou and other developed cities, Ningbo still has a certain gap in some aspects, such as logistics technology level and service quality need to be further improved.

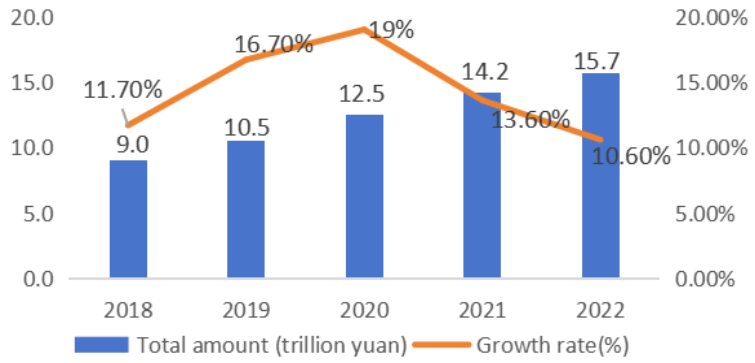

Figure 3. Transaction scale of China's cross-border e-commerce industry from 2018 to 2022.

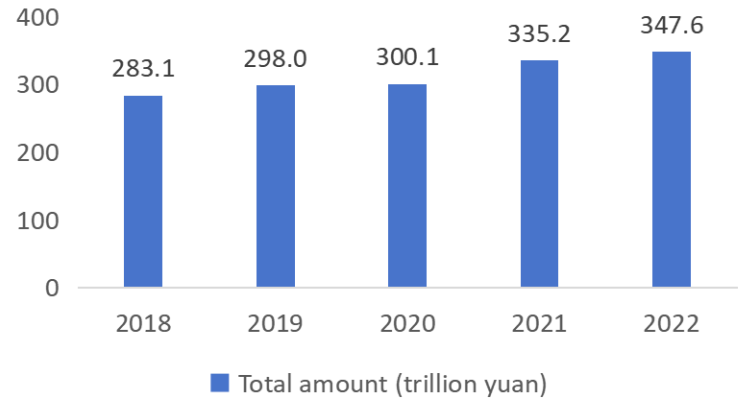

Figure 4. Total social logistics in China from 2018 to 2022.

In addition, for a long time, third-party logistics (3PL) plays an important role in improving the service level and cost control of enterprises, and is the engine of supply chain operation. But times have changed, and they are far less effective than they used to be, even failing to meet customer expectations. Fourth party logistics (4PL), first proposed by Accenture, brings strategic capabilities and customer collaboration, planning capabilities and experience, as well as resource supply integration capabilities that third-party logistics does not have, playing a comprehensive role of collection architect, domain expert, information integrant and resource provider. At present, China's fourth party logistics electronic port has gradually developed into a cross-department, cross-region, cross-industry, port customs clearance law enforcement management and logistics services as one of the unified customs clearance information platforms, among which Ningbo International Logistics

Development Co., Ltd. is gradually established on the electronic port platform of the fourth party logistics enterprise. In 2022, Zhejiang Big Logistics Platform will decide to take the four-party logistics trading market as the "template" and promote the "Ningbo version" in the whole province, which is also a great opportunity for the new development of Ningbo international logistics supply chain.

5. Results

The present situation of Ningbo international logistics supply chain is analyzed from the internal and external environment. In this part, the SWOT model is constructed to summarize the results of the case analysis, and the specific analysis is carried out from the advantages, disadvantages, opportunities and threats, so as to draw valuable conclusions for promoting the development of Ningbo international logistics supply chain. The results of SWOT analysis are shown in **Table 5**.

Table 5. SWOT result identification.

Strength	**Weakness**
1. Superior geographical location, with the country's largest port; 2. The cargo throughput of Ningbo-Zhoushan port ranks first in China, and the development potential of international logistics is great; 3. Ningbo City has perfect logistics infrastructure, efficient and convenient logistics system; 4. Ningbo has a large number of logistics talents; 5. The cross-border e-commerce logistics industry is developing rapidly. Ningbo has advantages in the field of cross-border e-commerce and has great potential for foreign trade growth.	1. There are relevant structural problems in logistics talents, such as large talent mobility, lack of high-end logistics talents and scarcity of professional talents; 2. The level of logistics informatization is low, and logistics efficiency and service quality need to be improved.
Opportunity	**Threats**
The development of fourth party logistics (4PL) brings new opportunities for Ningbo to innovate the international logistics supply chain; The implementation of the Belt and Road Initiative has improved the level of China's international logistics, which is conducive to the development of international logistics in Ningbo City.	The implementation of trade protection policy brings some pressure and changes to the international logistics supply chain of Ningbo City; The competition of international logistics supply chain is fierce, and there is a gap between Ningbo and some developed cities in international logistics level and service quality.

Ningbo has many unique advantages that make it an ideal logistics center. First of all, Ningbo's superior geographical location is an important cornerstone of its logistics development. The city of Ningbo, on China's southeastern coast, is very close to Shanghai, one of the country's largest economic centers. In addition, the geographical location around Ningbo city makes it easy to connect with major domestic and foreign logistics hubs, such as Hangzhou, Nanjing, and other cities in Zhejiang, as well as major ports and logistics centers in foreign countries. This convenient transportation network provides unlimited opportunities for the development of logistics in Ningbo city. Secondly, Ningbo city has a complete set of logistics infrastructure, which can meet the needs of modern logistics industry. At the same time, Ningbo has also invested a lot of capital and human resources to develop modern transportation facilities such as railways, highways and airports, making its logistics infrastructure more complete and advanced. In addition to its superior geographical location and sound logistics infrastructure, Ningbo is also known for its rich logistics talents and expertise. Over the years, Ningbo city has always attached great importance to the training of logistics professionals, and has established a set of

sound logistics research institutions and training system. This has transported a large number of professionals for the logistics industry in Ningbo city, who have rich practical experience and comprehensive logistics knowledge, and can provide professional suggestions and support for logistics enterprises. The vigorous development of cross-border e-commerce in Ningbo is also a major advantage for its development of international logistics supply chain. Because efficient and convenient logistics services are one of the keys to the success of cross-border e-commerce, as a city with perfect logistics infrastructure, Ningbo can provide fast, safe and reliable logistics services for cross-border e-commerce to meet consumers' demand for goods from other places. Under the background of current globalization, the development of logistics informatization has become an important means to improve logistics efficiency and reduce costs. However, compared with some developed cities in China, the level of logistics informatization in Ningbo is relatively low and needs to be further improved. First of all, the lack of efficient logistics information system support in Ningbo city makes logistics enterprises face problems such as poor information transmission and difficult data sharing. Secondly, the traditional logistics management mode is also one of the reasons why the level of international logistics supply chain in Ningbo cannot continue to improve. Compared with some foreign developed cities, the logistics organization and management mode of Ningbo city has not fully applied advanced logistics management technology and methods. In addition, although the number of logistics talents in Ningbo City is large, there are serious structural problems, such as a serious lack of high-end talents and professional talents, which is not conducive to the innovation and development of international logistics supply chain. As one of the important node cities of the Belt and Road Initiative, Ningbo is facing great development opportunities. Under the strong promotion of national policies, Ningbo City has the opportunity to enhance the competitiveness of the international logistics supply chain by strengthening international cooperation. At the same time, the rise of the fourth party logistics (4PL) concept is also a great opportunity for Ningbo city to develop its international logistics supply chain. Ningbo International Logistics Development Co., Ltd. can rely on its 4PL identity to drive further innovation of international logistics supply chain in Ningbo city. However, the uncertainty of international trade policy brings challenges to the further development of international logistics supply chain in Ningbo City. And as a logistics center, Ningbo city bears the competitive pressure of logistics centers in other surrounding cities, and needs to constantly innovate to bring customers more convenient and fast logistics and distribution services, improve the reliability and flexibility of logistics supply chain, and further optimize its international logistics supply chain.

6. Strategies

6.1. SWOT strategies

Based on the theoretical basis of international logistics and supply chain, the case analysis of Ningbo City and the results of SWOT model, this paper combines the advantages, disadvantages, opportunities and threats obtained, and the four strategies are shown in **Table 6** below. The first is the strategy to make use of the advantages of Ningbo city, such as superior geographical location, great potential for logistics

development, perfect logistics system and great potential for foreign trade growth, in the existing opportunities. Specifically, it includes using the advantages of geographical location and logistics infrastructure to build a logistics network more closely connected with the hub city, actively participate in the "Belt and Road Initiative" and enjoy policy support. Gather logistics talents, follow the pace of e-commerce industry, vigorously develop 4PL enterprises, and further optimize the international logistics supply chain with the development of fourth party logistics. The second is the strategy to resolve the existing threats and challenges through existing advantages. For example, Ningbo can take advantage of its geographical location and logistics talents to strengthen cooperation with surrounding logistics centers through enterprise cooperation, forum summit and other forms, so as to understand competitors and constantly improve its competitiveness of international logistics supply chain. Ningbo city has a major advantage in the field of cross-border e-commerce, and can pay close attention to the changes of international trade policies in the process of cross-border e-commerce development, timely supervise the uncertainty, and reduce the negative impact of trade policy changes on the international logistics supply chain. The third is to use the existing opportunities to minimize their own weaknesses. The main disadvantages of Ningbo city are the low level of information technology and the big problem of logistics talent structure. The action requirements of "The Belt and Road Initiative" and the development opportunities of fourth party logistics (4PL) clearly require Ningbo logistics enterprises to develop into supply chain integrators, and it is necessary to use information technology and logistics information sharing. Integrate social resources to provide enterprise customers with a complete set of supply chain solutions, so the development of 4PL needs professional talents and high level of information integration. Fourth, it is a strategy to change the disadvantages in advance to prevent threats and minimize the potential dangers. By improving the level of logistics informatization, innovating the logistics management mode and training professional logistics talents, the technology and management level of the whole international logistics supply chain can be improved, and the reliability, flexibility and core competitiveness of the supply chain can be enhanced. Thus reducing dependence on international trade policies.

Table 6. SWOT internal relations and strategies.

The strategy of exploiting opportunities through advantage (Strength and opportunity)	**The strategy of preventing threats through advantage (Strength and weakness)**
1. Build a logistics network more closely connected with hub cities by taking advantage of geographical location and logistics infrastructure; 2. Actively participate in the Belt and Road Initiative and continue to enjoy policy support to develop the international logistics supply chain; 3. Gather logistics talents, follow the pace of e-commerce industry, vigorously develop 4PL enterprises, and further optimize the international logistics supply chain with the development of fourth party logistics.	1. Take advantage of its geographical location and logistics talents, strengthen cooperation with surrounding logistics centers through enterprise cooperation, forums and summits, and constantly improve its competitiveness of international logistics supply chain while understanding competitors; 2. take advantage of the major advantages in the field of cross-border e-commerce, timely supervise the uncertainty of international trade policies, and reduce the negative impact of trade policy changes on the international logistics supply chain.

Table 6. (*Continued*).

The strategy of using opportunities to minimize weaknesses (Weakness and opportunity)	The strategy of minimizing the potential dangers that exist (Weakness and threats)
While practicing the "Belt and Road Initiative" and vigorously developing 4PL enterprises, the overall informatization level of logistics enterprises in Ningbo will be improved accordingly, and the number of professionals will also increase in practice.	By improving the level of logistics informatization, innovating the logistics management mode and training professional logistics personnel, the reliability, flexibility and core competitiveness of the supply chain can be enhanced, so as to reduce the dependence on international trade policies.

6.2. New strategies for international supply chain development

In order to promote the further development of international logistics supply chain, based on the four strategies of SWOT model, this paper proposes the following new strategies that can be adopted by Ningbo municipal government and policy makers, supply chain and international logistics suppliers, and international logistics supply chain practitioners.

1) Government and policy makers: First, policy makers should actively implement the Belt and Road Initiative, continuously increase government support for the logistics industry, and introduce policies and measures that are more conducive to the development of logistics. For example, reduce the tax burden of logistics enterprises or provide more financial subsidies to encourage enterprises to invest in expanding business scale and improving service level. Secondly, the government should make good use of geographical advantages, increase investment in logistics infrastructure construction, and build a logistics network more closely connected with hub cities, so as to improve the operation capacity of ports, storage and transportation facilities. For example, speed up port upgrading, increase the capacity of terminals and shipping routes, and improve the handling capacity and transportation efficiency of goods. In addition, the government can introduce foreign capital and international logistics enterprises, optimize the international logistics network and resource allocation, strengthen international cooperation, and reduce the negative effects of international trade policy uncertainty. Specifically, it can establish strategic partnership with international logistics enterprises to share resources, technology and market information, and enhance the competitiveness of Ningbo in the international logistics supply chain.

2) Supply chain and international logistics providers: On the one hand, supply chain and international logistics providers can adopt advanced information technology and logistics management systems to improve the traceability and operability of supply chains and promote the application of innovative technologies. For example, the Internet of Things technology is used to realize real-time monitoring and tracking of goods. When goods pass through different nodes, sensors can record the location, temperature and humidity of goods and transmit these data to the logistics management system in real time. Using AI algorithms and big data analytics, each link in the supply chain can be accurately predicted and optimized, thus reducing costs and improving service quality; With the help of cloud computing and blockchain technology, a decentralized supply chain platform can be built to realize information sharing and data exchange among all participants in the supply chain, and improve cooperation efficiency and information security. In addition to advanced information technology and logistics management systems, supply chain and logistics providers

can also actively explore new logistics models and business models to promote the application of innovative technologies in the supply chain. For example, the introduction of drones or unmanned technology can solve the problem of last-mile delivery to some extent and improve delivery speed and flexibility. On the other hand, supply chain and international logistics providers should strengthen the training and education of logistics practitioners to improve the professional quality and innovation ability of logistics personnel. Specifically, by organizing professional training courses and holding industry seminars, we can broaden the professional knowledge of logistics practitioners, so that they can use the latest logistics theory and technology to solve practical problems. By organizing field visits, practice training and other activities, logistics practitioners can participate in the actual logistics operation and improve their practical ability; It can cooperate with enterprises to provide practical project cases for logistics practitioners, so that they can cultivate innovative thinking and problem-solving ability in the process of solving practical problems; International exchange activities can be organized so that logistics practitioners can exchange experience and share ideas with peers from different countries and regions, so as to improve their cross-cultural communication ability.

3) International logistics supply chain practitioners: As practitioners of international logistics supply chain, they should actively learn advanced theories and related technologies, improve their professionalism and comprehensive quality, so as to better cope with the changes and challenges of international logistics supply chain, and make greater contributions to the innovation and development of the industry. Specifically, by attending industry seminars and training courses, I can learn the latest theoretical knowledge and advanced technology of international logistics supply chain, and also participate in some international logistics projects to accumulate practical experience. For example, participate in the organization and management of sea, air or railway transportation, personally experience the whole process of international logistics, understand the challenges and solutions of each link, constantly improve their professional ability and technical level, and contribute to the innovation and development of international logistics supply chain.

7. Conclusion

This paper takes Ningbo international logistics supply chain as a case to carry out SWOT analysis. The analysis results show that Ningbo international logistics supply chain has advantages such as superior geographical location, perfect logistics infrastructure and great potential for foreign trade growth, while disadvantages such as low level of logistics informatization and structural imbalance of logistics talents. The implementation of the Belt and Road Initiative and the booming development of 4PL have brought new opportunities to it, but there are also threats such as fierce competition in logistics supply chains and uncertainty in trade policies. By summarizing and discussing the four aspects of SWOT, this paper puts forward a new strategy to promote the development of international logistics supply chain: Governments and policy makers can take measures such as increasing policy support for logistics, increasing investment in logistics infrastructure construction and strengthening international cooperation. Supply chain and international logistics

providers can use the Internet of Things, big data, artificial intelligence and other technologies to continuously improve the level of logistics informatization and enhance the professional quality and innovation ability of logistics personnel. International logistics supply chain practitioners should improve their professional ability and comprehensive quality by participating in seminars, training, and international logistics projects.

Research innovation and contribution: Taking Ningbo City as an example, this paper studies the development of international logistics supply chain from the micro regional perspective, and makes theoretical contributions to the lack of micro perspective in existing literature. Adopting qualitative and quantitative integrated research methods, it innovates the existing research methods of international logistics supply chain. According to the results and strategies of SWOT model, this paper puts forward three new strategies to deal with the development of international logistics supply chain, which makes theoretical contributions to the research of risk response and solution measures of international logistics supply chain.

Research limitation: There are few studies on the development and management of supply chain in the field of international logistics. Therefore, this paper adopts the port throughput index to measure the international logistics of Ningbo city, and the data adopted are not micro and comprehensive.

Future research extension: In the future research, we will further cooperate with relevant departments to construct international logistics performance indicators through factor analysis and principal component analysis, discuss the comparison between Ningbo's international logistics level and other countries and regions, and provide more targeted suggestions on international cooperation.

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