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WORLD MARITIME UNIVERSITY

Shanghai, China

RESEARCH ON THE VERTICAL INTEGRATION OF PORTS AND SHIPPING ENTERPRISES: VIEWPOINT FROM THE SHIPPING LINES

By

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A research paper submitted to the World Maritime University in partial fulfillment of the requirements for the award of the degree of

MASTER OF SCIENCE

in

INTERNATIONAL TRANSPORT AND LOGISTICS

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DRECLARATION

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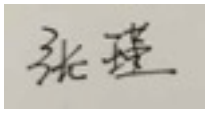
ZHANG JIN



Supervised by

Professor ___Zheng Shiyuan____

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ABSTRACT

Title of Integrative paper: **Research on the vertical integration of ports and shipping enterprises: viewpoint from the shipping enterprises**

Degree: **MSc in International Transport and Logistics**

During the recent years, with the development of the economic integration, the competition in the shipping market is becoming more and more fierce. Ports and shipping enterprises play important roles in the shipping industry. Shipping enterprises are closely associated with the port, shipping enterprise management cannot leave the port. In order to deal with such competition, the vertical alliance is the inexorable trend. This vertical integration can achieve a win-win situation, it has become a development trend of shipping industry. This paper starts with this background, describes the current situation of the vertical integration. The main problem this dissertation discussed is from the viewpoint of the shipping lines to analyze the vertical alliance situation and the strategic decision about cooperation with the ports.The author will based on the vertical alliance theory to discuss the reasons and models of the shipping liner to get vertical integration with the ports. According to this trend, the author will use also the Analytic Hierarchy Process combining the quantitative and qualitative methods to build a model of decision

analysis. This model will help the shipping enterprises to make strategic decision about choosing suitable ports investment locations.

In conclusion, the vertical integration between the shipping lines and ports has already becomes the inexorable trend. shipping lines as the leadership of the vertical alliance relationship should play the leading role to formulate a perfect integration strategy.

Keyword: integration between the ports and shipping enterprises, vertical alliance theory, strategic decision

Content

1.Introduction

1.1Research background

With the high speed of the development of the globalization, the trade between each country is getting more and more frequent. The transportation as the central link plays a significant role in the international economy. Especially since China joined the WTO, the seaborne trade volume keeps increasing rapidly which greatly promoted the domestic port enterprises getting upgraded and developed.

International logistics center is one of the basic characteristics of the 3G port .The port, which is the important joint of efficient sea-land transportation and hub of comprehensive transportation network, has unique dominance and strategic status.

In the 1990s, more mature container transport, shipping companies operating in the field and expanding the scale. The fourth generation, fifth generation container liner generally forming a global joint venture extensively. Currently the world's major shipping company's strategic is primarily focused on the development of strategic alliances, improve customer service levels, to carry out a full range of logistics systems and services, reduce costs and strengthen the construction of information systems. This proposed development of the port update request.

As the modern ports, the container throughout put in an important indicator to show evaluate the international logistic center. Therefore, the ports and shipping liner

companies especially in the field of container shipping company has a broad prospects for cooperation and collaboration through variety of ways.

At the position of China, the China's economy is export-oriented and in the long term will be in a dominant position. From the trade situation,China’s foreign trade will continue to grow and promote the development of container-oriented general cargo business.Therefore, in the foreseeable decades, the Chinese port and shipping companies are still faced with strong market demand situation, foreign trade cargo throughput and container throughput will continue to grow, shipping enterprises will meet an unprecedented opportunity for development.

In the highly competitive international port and shipping industry background, ports and shipping companies is setting up business cooperation alliances.Integration is the inevitable result no matter for their survival or the development. From the entire logistics supply chain perspective, the shipping liner focus one providing maritime transportation services for customers shippers while the port companies mainly provide the service such as handling, storage, packaging, distribution and other logistics services for the customers. The both two sides get cooperation to provide customers service during the supply chain. Without doubt they both get value-added benefits from different division of work.Thus, the port companies and shipping lines is an interdependence, shared interests, symbiotic relationship.

1.2 Research purpose and methodology

Making a general survey of the shipping market, we can see the competition in the shipping industry is getting increasingly fierce. Both the ports and the shipping lines are trying to gain a foothold during the competition, as a result the enhance of the competitiveness and the enlarge of the market share are the difficult problems they have to face. In order to solve the problem , the trend of the vertical alliance appears.In this dissertation, the author based on the vertical alliance theory and the integration theory to introduce the main ports and related shipping shipping enterprise development present situation and the competition situation, and the main forms and existing problems will also be analyzed in this dissertation.The main goal of the dissertation is to illustrate that this vertical alliance will be concluded that, ports and shipping lines' vertical integration is the essential choice of the industry to keep advantage in competition, and will become the inevitable trend for the future development of port industry and shipping industry. Moreover, the author will especially take the view point from the shipping lines to analyze the integration situation and the strategy we choose to develop the vertical alliance.The author will build a suitable model combine the quantitative and qualitative methods to analyze how the shipping enterprises to choose suitable ports to invest.

Above all, through the theory and model analysis, the author will discuss the trend and future development of this vertical integration between the shipping enterprises and ports. From the viewpoint of shipping enterprises, under this condition the author will also analyze some existing problems and give some good suggestions.

This dissertation will use several famous theory to analyze the situation.Firstly, from the qualitative methods, the author will use the vertical alliance theory which is one form of the Strategic Alliance. Based on this theory, we will specifically analyze how the ports and shipping lines apply this theory into practice,including the vertical alliance model and influence of this vertical alliance.Secondly, from the quantitative method, the author will use the Analytic Hierarchy Process which is a related easy method for some more complex and fuzzy problems to make decisions.Based on this model, the author will typically analyze the strategy of choosing which ports to invest.

According to these two quantitative and qualitative methods, the author can fully explain the necessity and trend of the vertical alliance between the ports and shipping lines. Especially under the trend of vertical alliance, for the shipping enterprises, how to make strategy to get cooperation with the ports.

1.3Literature review

1.3.1Recent research of the vertical alliance between the ports and shipping lines

Both abroad and Chinese scientists have done a lot of research on the vertical alliance and some of them also have done several analysis about applying the vertical alliance to the ports and shipping lines.

The research about the vertical alliance

In Michael E Porter.'s book Competitive advantage he analyzes the reasons of the enterprise get vertical alliance to from the angle of the business operation value chain.

From the position of an enterprise, the relationship between the suppliers and the enterprises will directly affect the costs and benefits of the enterprise operation.Thus, if the suppliers and the enterprise get the vertical alliance it will greatly improve the stability of the cooperative relationship.This vertical alliance strategy will increase the competitiveness of the enterprise and make the enterprise and the suppliers both get benefits.Based on this theory, we can analyze the vertical alliance between the ports and shipping lines.

The research about the ports and shipping lines integration

Evangelista(1999) thinks if the ports and shipping lines can establish vertical alliance cooperative relationship, it will bring a more stable and convenient comprehensive logistics service.This kind of integration can reduce the costs and increase the efficiency of the cargo handling, which greatly improve the shipping lines competitiveness and will help them attract more customers. The Chinese scholar Wang Xingang(2004) also does research about the necessity of the ports and shipping lines integration.He pointed out that the competitiveness of a ports is mainly reflected in attracting effective cargo and providing high-quality for the shipping lines.The influence brought from the change of the shipping market to the ports business can be found in the article from He Xian, based on this he specifically

explain the necessity of the ports and shipping lines vertical alliance.

The research about benefits gained from the vertical alliance

Based on the Game theory come up with by John von Neumann, many scholar use this model to analysis if this vertical alliance will reduce the costs and bring benefits to the ports and shipping lines.

1.3.2Existing problems

- ✧ *Quantities of research focus on arguing about the necessity of the vertical alliance between the ports and shipping lines but put less on analyzing the during the vertical alliance the relationship between them.*

Many articles just analyze the trend of the vertical alliance between the ports and the shipping lines and emphasize the necessity of the vertical alliance. Most of them have pointed out the following ideas.Building the vertical alliance between the ports and shipping lines can increase the competitiveness and bring more benefits to both sides of them.This point of view was pointed by many scholar T.HEAVER et al (2001),Ross Robinson(2002),Carlors Perez- Labajos(2004),Wang Xingang(2004).

They didn't do much research about the relationship between them, such as who plays a dominant role in this relationship.

- ✧ *The most articles discuss about the present situation about the vertical alliance*

but do less about the forecast of this vertical alliance trend.

Based on the research about the reasons which will affect the vertical alliance relationship between the ports and shipping lines , the mainly reasons are the high market share and the scale effect.The author will through doing research about the earning of the enterprises after vertical alliance to further analyze the other reasons that result in the situation of the vertical alliance and do some forecasting about the future development of this kind of alliance.

✧ *The most current research is about the abroad vertical alliance between the ports and shipping lines.*

The author will mainly take evidence and examples from the Chinese cases to analyze the situation about the alliance in China.As China is in the midst of transformation, the experience of the abroad possibly is not accord with the situation of China.The author will according to the Chinese special situation to analyze the vertical alliance.

✧ *The most current research is about the comprehensive analyzing the vertical alliance but less choose one of the sides to specifically discuss.*

The most former articles mainly analyzed the comprehensive vertical alliance situation between the shipping lines and ports. The author will take the point view of the shipping enterprises to discuss under the vertical alliance situation, how the

shipping lines to apply strategy to face this vertical alliance trend.

2.Related vertical alliance theory about the integration of shipping enterprises and ports

2.1The theory of the vertical alliance

The formation of the integration of the shipping enterprise and ports is based on the vertical alliance between the shipping enterprise and ports. Thus, before analyzing the integration we need to understand the conceptions of the strategic alliance especially the vertical alliance.

For the conception of the strategic alliance, many scholars think that the strategic alliance is composed by two or more enterprises, which have equal economic strength and capital scale. The motivation of this kind of alliance is to get cooperation and achieve the goal of decreasing the operation costs, sharing the resource and sharing the market risks. In generally the main goal of this strategic alliance is to exchange the resource and information in order to expand the effective scope of the supply and demand chain. Relying on the strategic alliance, both the shipping enterprise and the ports get the opportunity to find the cooperative partner, which has the same benefits goal. From the point of view of the resource theory, the resource is the foundation of an enterprise to keep competitive advantage during the enterprise competition. The integration between the shipping enterprise and the ports aims to through the cooperation they can optimize the allocation of resource.

In this article I will typically focus on discussing the vertical alliance. The vertical

alliance is one of the forms of the strategic alliance. It means the enterprises, which in the different links of the value chain get strategic alliance with each other. This kind of vertical alliance happens in the enterprise getting cooperation with other enterprises, which in the up and down value chain. This kind of vertical alliance can effectively decrease the opportunity costs and transaction expenses to achieve the specialized division and coordination. Finally it will get the stable supply and demand relationship to share the risks and better meet the needs of the ever-changing market. Under such vertical alliance both sides of the alliance will work together to develop the market, share the resource, share the risks. Thus the two alliance enterprises work as a whole to provide a more professional and integrated 'one-stop' service.

2.2 The theory of the integration of the shipping enterprise and ports

The integration between the shipping enterprise and ports means that the shipping enterprise builds cooperation relationship with the ports, relying on the relationship it will provide quicker, more convenient and more individual service to the shippers. According to the above, this kind of vertical alliance can be applied to all kinds of links in controlling the supply and demand chain in a more extensive extent.

Based on the vertical alliance theory, the author will from the point view of the shipping enterprise to analyze the integration between the shipping industry and ports. During several years, many global major shipping enterprises contributed to the

cooperation and construction with the ports. For example, the major Chinese shipping enterprise COSCO has paid attention to the container terminal development and investment since 1980s. With the high speed of the economic globalization, the shipping market competition becomes more extensive; seeking for the cooperation partners has been a consensus. In terms of the modern shipping market, getting vertical alliance with the ports is the inevitable trend.

Above all, according to the theoretical analysis about the vertical alliance we can conclude that the main motivation of the shipping vertical integration is through sharing and integrating the resource to maximize the benefits and decrease the operating risks.This vertical alliance has widely applied to the shipping industry. In order to enhance the core competitiveness, more and more shipping lines choose to get vertical cooperation with the ports to develop the modern advanced logistics service.

3.The situation of shipping lines getting vertical integration

3.1The relationship between the shipping lines and port

In generally, the basic function of the shipping company is to finish the shipping transport work with the ships. The object of this service is the cargo. While the basic function of the port is using the handling machine to fulfill the loading and unloading operation and storage work. The object of the port service is also the cargo. Thus, no matter the shipping enterprise or the ports, their service object is the cargo. So to speak, the relationship between the shipping enterprise and the port is interdependent, they through division and cooperation to provide logistic service to the shipper.

3.1.1The relationship of service

The shipping companies as the customer of the ports, they need the ports to supply the ship leaving and approaching the berth, loading and unloading operation and piloting service. Thus, as the ports they will concentrate on increasing the service level to gain more competitiveness in the market. In this way, they will attract more shipping companies to choose them as the port of call. While the shipping company as a serviced object, we can see simply the shipping company as the buyer and the port as the seller. In such relationship, the shipping company is always in the active position. However, the buyer-seller relationship between the shipping company and

the port is different with the normal relationship in the commodity market. Although the port as the seller is providing the service, the number of the ports is limited. Thus, both the shipping company and the port should be careful about the cooperative relationship. The shipping enterprise cannot be blindly depend on the active position and ignore the cooperation with the port, and the port should also realize that the core competitiveness of the port is the quality of the service it provided.

3.1.2The relationship of division and cooperation

Differing from the independent service chain of the traditional logistic, the modern logistic service is the organic integration of several separated traditional logistic service. From the point of view of the modern logistic, both the shipping company and the ports provide the service to the shippers and only the type and division of the service are different. In order to provide the shippers of higher quality the shipping the company should build clearer and more effective division and cooperation relationship with the ports.

3.1.3 The common interest relationship

From the shipping transportation network, the service provided by the shipping company can be seen as the link and the service provided by the ports can be seen as the hybrid. The link connects with the hybrid and forms the network. No matter the

link or the hybrid is indispensable, the shipping company and the port have the same benefit and independent relationship.

3.2The significance and impact of the vertical integration for the shipping lines

Firstly, the development of the globalization and economic integration result in the shipping demand increasing sharply. According to statistics, the global quantity of shipment has reached 5.1 billion tons by the end of the 20th century. As we all know, the port is the key point of the global trade development. In order to enhance the core competitiveness, almost every shipping enterprise will pay attention to the cooperation with the port. Secondly, the increasing of the trade volume directly results in the trend of large-sized vessel. Especially the market demand of containerized transport is increasing constantly; the maximization trend of the container ship is obvious. While the development of ships involves in the large-scale, high-speed and specialized way, the demand of for the ports has also been changed. The large-sized vessels always will choose the ports, which have advanced equipment and high work efficiency to be their port of call. The change of demand for the ports will attract more and more shipping enterprise to invest in the construction of ports. Due to the increasingly fierce shipping market competition, getting vertical alliance with the ports will be considered as a significant strategy by many shipping enterprises. Through getting the integration with the ports, the

shipping enterprise can effectively control and manage the ports so that decreasing the ports expenses and maximizing the benefits.

In this article, the author will mainly from the point view of the shipping enterprise to analyze the reasons of the formation of this kind of vertical integration.

1) Increasing the service quality, expanding the market share

The shipping enterprise can design the individual service for their liners. To be specific, when the vessel arrive they can have their full autonomy to choose the terminal. The one-stop service will also provide the shippers value-added service, which will benefit consolidate the supply of goods. The service of port is a significant segment of the supply and demand chain. Thus, enhancing the construction of the ports will provide reliable guarantee for the high-quality service.

2) Cut the transportation costs

In order to enhance the competitiveness in the shipping market, the trend of vessel large-sized is gradually obvious. Because of the high expense for constructing the large-sized vessel, decreasing the costs is a quite important issue for every shipping enterprise. Thus, the port charge is an important factor for the costs. According to statistics, the port charge accounts for about 25% of the operation costs of a shipping enterprise, becoming the most expense of the transportation costs. By getting cooperation with the ports, the shipping enterprises will have the priority to entering and berthing. This priority is quite beneficial for the shipping enterprise. It will

shorten the time the vessel staying in port to ensure the shipping date and also decrease the costs in ports.

3) Accelerate the speed of transforming to the modern comprehensive shipping enterprise

The service provided by the shipping enterprise and ports is dispersed. As a result, this kind of service always brings low service efficiency and high costs. Then the shipping enterprise and the port make their service integrated extended. It formed a new modern logistic service, which provides better service quality and better service price to the shippers.

4) Share the operation risks

According to the constant changing of relationship of the demand and supply in the shipping market, the freight is following the changes. In the shipping market, the relationship of the demand and supply is always at a unbalances situation, the shipping enterprises can not immediately change their strategic plan to adapt to the unstable shipping demand. This unbalanced situation will bring the global shipping enterprises bigger operation risks. Investing the ports will help the shipping enterprises to gain stable income and share the risks.

3.3 The vertical integration model of shipping enterprise getting alliance

3.3.1Sole proprietor business model

Generally speaking, only the famous global shipping enterprises, which have abundant financial resource, will pay for the ports. This kind of integration model means the shipping enterprise own the absolute right to plan, develop and operate the ports. Such big global shipping enterprises choose this kind of vertical alliance aims to own and develop their enterprise wharf. Based on this situation, they will ensure their own large-sized vessel entering, departing and berthing smoothly and quickly. Take Maersk as an example, it invested 200billion in the extension of the new jersey port and build a world-class deep-water port as the main port in the eastern US coast. However, under this kind of vertical alliance the shipping enterprise will invest a big amount of money, which results in only a few big shipping enterprises will take.

3.3.2 Joint venture model

In this model, the shipping enterprises and ports will through joint venture to operate, develop the ports together. To be specific, the ports will utilize their geographical advantage to take their land, berth, storage yard, and some related equipment as the capital to invest. The shipping enterprises mainly directly choose the capital invest. As the result, the vertical alliance is built. Both the shipping enterprise and port will join in the ports' daily operation, development and maintenance. So far, this vertical

alliance is the most popular applied by the shipping enterprises and ports. Under this vertical alliance model, both sides of the shipping enterprises and ports will enjoy the benefits and share the risks. This more reliable and normal strategic alliance is beneficial for both the shipping enterprises and ports. For the ports, this alliance broadens the financing channels and attracts the foreign capital. At the same time, it also controls the cash flow to utilize the saved money to carry on the developing and technological updating. For the shipping enterprises, they will effectively take advantage of the ports' resource to satisfy the own vessel fleet requirements, for example the berthing, loading and unloading and the transiting. Moreover, it also will share the operation income of the ports.

3.3.3Leasing the ports

Leasing the ports for operation is the shipping enterprises and ports through signing the leasing-management contract to get the vertical alliance model. Leasing the ports means during special period, the shipping enterprises enjoy the rights of managing and operating the business of the berth, yard and related equipment. Comparing to other models, this vertical alliance model is more flexible, and it is suitable for the shipping enterprises that does not have enough abundant capital resource. To some degree, although the shipping enterprise is leasing the ports, it also can develop the individual and professional operation strategy to earn benefits and enhance the working efficiency.

3.3.4 Business cooperation model

From the point view of the business, the business cooperation model concludes the ports business cooperation, agency business cooperation and logistics business cooperation.

1.The ports business cooperation

The scope of cooperation is mainly about the loading and unloading, storage yard and transiting. This business cooperation benefits the shipping company to arrange their vessels' approaching, departure, berthing, loading and unloading.

2.Agency business cooperation

The cooperation scope is about the shipping agency and freight forwarder. The shipping enterprise and port through cooperation establish the agency enterprise. This kind of agency enterprises will have more advantages comparing to the normal agency enterprises. Except providing first-rate service to their own shipping enterprise, they will depend on the supports from the shipping enterprise to develop the public agency market.

3.Logistic business cooperation

This business includes the logistics plan designing, the logistics information system developing and the extra value-added service. This logistics business cooperation

will bring the customers the modern logistics service. The shipping enterprises and ports use this special logistics cooperation to achieve sharing resource, complementary of advantages. By integrating each service, the new modern logistic chain will be extended and expanded. It is also helpful for the modern logistics service to change from the basic service provider to the high value-added service provider.

4.The analysis of shipping enterprises' strategy of choosing invested ports

4.1 The situation of the shipping market

In the process of the shipping transportation, the shipping enterprises always play the leading role. Without the fleet of ships provided by the shipping enterprises, the international exchange of goods cannot be achieved. During recent years, the economic crisis resulted the over-capacity situation, which intensified the competition between the global shipping enterprises. In order to get rid of this competition, they choose to accelerate the speed of changing the operation model.

Thus, they began to choose take strategic alliance with the ports. According to this situation, how to make an accurate and suitable strategy is quite important for the shipping enterprises.

4.2The situation of the shipping lines invest in ports

According to the above vertical integration alliance analysis, the author will combine the theoretical analysis with the practical situation to verify if the vertical integration theory is appropriate for the shipping lines.

Under investigation, the global shipping giant Maersk group, maersk logistics Terminals (APM Terminals) bought the French port of Dunkirk Nord France

container terminal. Both the maersk and French CGM got Nord NF TIou equity the France terminal operators, but the major stake held by maersk. After the cooperation, the Maersk concentrated on expanding the construction of the ports and arrange several shipping lines to this ports. With the increasing utilization of this ports, the throughput of the ports kept increasing. For the shipping lines, they get the earnings produced by the ports and enjoy the priority service. Relying on the strategic alliance, both the shipping enterprise and the ports get the opportunity to find the cooperative partner, which has the same benefits goal. Thus, more and more shipping lines choose to through investment to get cooperation with the ports. Combining with china s reality, in 2003 China's ship company Cosco group and Maersk concluded a cooperation agreement about the construction of the Qingdao container terminal.

In conclusion, investing and cooperation with port can increase the income of the shipping companies. This vertical integration has significance for the shipping enterprise's global business strategy. Based on the above present situation of the shipping lines invest in ports, we can get the conclusion that the above theory about analysis of the shipping vertical alliance is correct and consistent with the actual situation.

4.3The analysis of the strategy of choosing the port location

Before the shipping enterprising making a specific strategy to cooperate with the ports, the first step should be realizing the situation of each ports and deciding the

ports location. In this dissertation, the author will typically analyze the strategy of choosing the port location. Through the investigation, there are many evaluation systems for shipping enterprises to evaluate the ports situation. In this article, the author will combine the qualitative and quantitative analysis together to build the evaluation model for shipping enterprises and guide them to choose a suitable ports getting cooperation.

4.3.1 the influencing factors of choosing port location

1) Economic factors

When the enterprises evaluate the location of investing port, the first influencing factor will be the level and potentialities of economic development. A lot of research shows the invested regions' economic developing level and potentialities have a positive impact on attracting the investor. The main goal for the shipping enterprises to get vertical integration with ports is to enjoy the resource. Thus, the level of specialization, the related industry developed degree are the factors the shipping enterprises will consider. Above all, these influencing factors can be collectively known as the economic factors.

2) The infrastructure situation factors

Although, the infrastructure will not bring benefits directly, it will affect the investing return to a high degree. As a shipping enterprise, it will inspect the

infrastructure situation of the ports to evaluate if this ports have enough advanced infrastructure to carry out ports operation.

3) The physio graphic factor

The weather condition is a quite important factor of the physio graphic factors. The weather condition not only will affect the transportation condition but also affect the market potential. Another significant factor of physio graphic factors is the geographic location. Whether the geographic position of the ports is near the main shipping routes will greatly influence the enterprises investment. As we all know, there are many ports without high volume of trade and advanced industry, just relying on the superior geographical position being the world-shipping center. Thus, the physio-graphic factors cannot be ignored.

4)Regional policy factors

Many governments will put forward some preferential policy for the investors of the ports. As a result, they will attract more shipping enterprises to getting cooperation with the ports. And it will bring more benefits for the country. From the viewpoint of the shipping enterprise, they would like to cooperate with the ports that have preferential policy about low port charge.

4.3.2Qualitative analysis of the invested ports

In this paper we will take Qingdao, Dalian, Tianjin ports as examples, through the practical comparing and analyzing these there ports to help the shipping enterprises do the best strategy of investing the ports.

Firstly, from economics perspective to compare these three ports.

Qingdao economic hinterland mainly includes the Shandong province and Midwest provinces along the Yellow River. Shandong province as the hinterland of Qingdao port has advanced industry which accounts for a greater proportion in the national economy. At the same time, Shandong province has concentrated on developing the export-oriented economy and the global trade. It will be a significant manufacturing base in the north of China. The all above will provide Qingdao port a advanced and with sufficient supply hinterland.

Dalian port relying on Dalian, its economic hinterland includes Heilongjiang province, Jilin province, liaoning province and eastern Inner Mongolia autonomous region.

So far, the 95% shipping cargo supplied of the Heilongjiang province and the 75% cargo supplied of the Jilin province is transported through the Dalian port. The northeast China Region is the traditional heavy industry and agricultural base. This region relies on agriculture and animal husbandry and the light industry is relatively weak. As a result the economic hinterland of the generated container freight volume is small.

Tianjin port economic hinterland mainly four provinces Beijing, Tianjin, Hebei and Shanxi. The Gross domestic product (GDP) and trade occupy respectively accounts

for 12.1% and 10.5%.

Secondly, from the infrastructure situation perspective:

The infrastructure construction of Qingdao port is quite advanced. The loading and unloading machinery and equipment has completely achieved the separating workers from the machines. The mechanization level is very high. From the water transportation aspect, Qingdao port has business relationship with almost every port of China .At the same time, it also owns the largest in China's coastal ports electronic data exchange center which represents the high level of information.

The Dalian port’s transportation is also convenient. It has about 84 modern specialized berths. The formation of the modern transportation network has provided advanced conditions for the Dalian port to develop shipping industry.

Tianjin port is located in the north China hub of land and water transportation, communication with Jing-Haerbing, the Beijing-shanghai two big trunk railway lines.Port highway connecting Tianjin, around Beijing and Hebei road. After the completion of the Beijing and Tianjin Tang highway, the container transportation becomes more convenient. Air transport is also available in Tianjin airport. So far, including a variety of specialized berths and discharged the sixth generation of container ship of more than 140 kinds of berth, including 53 berths.

Thirdly the physio graphic perspective:

Qingdao port is located in the central coast of the north China is the largest port

along the Yellow River basin in China, and Kobe, Japan, South Korea Pusan famous port only late-inning comeback, three main course is close, is an important hub ports of the west coast of the Pacific rim. Jiaozhou bay of Qingdao port is located in Shandong peninsula, and the tides of Jiaozhou bay is a semi-closed show that bay, has the good condition, the cover of the waves, the winter is not cold, self-purification ability, sedimentation mild, bay mouth ebb flow velocity is greater than the flow velocity, can be naturally maintain channel depth, and quickly eliminate pollution from port operations.Qingdao port into the deep water channel, channel depth is 12.3 m - 21 m, is the best of the three water depth condition of port to port, conform to the container ship the sixth generation and the future development of container ship docked requirements, with international famous shipping center port water depth are basically identical

Dalian port is located in the southern tip of the Liaodong peninsula in Liaoning province, east is near yellow sea, the Bohai sea in the west.On the south bank of Dalian in Dalian bay, bay mouth toward the east.Dalian bay is a tectonic basin, the entire bay north, west and south is surrounded by mountains on three sides;Bay mouth outside piece, there are three mountain island located there become natural barrier of harbor, the gulf waters is calm.Port of Dalian port, vast water area of more than 300 square kilometers, QQCT total length of 13000 meters, the maximum depth of 14 meters, basically meet the demands of the development of container ship in the future.No river flows into the gulf coast, is no sea sediment flow effect near, harbor no sedimentation phenomenon.The mild climate, port not freeze in winter.Dalian

port is a four seasons navigable natural harbor in the north of China.Relatively far distance but Dalian three main course, to the European countries such as port of west route than Qingdao far 153 nautical miles, even if the travel route also far around 10NM.

Tianjin port is located in the west of bohai bay, is located in the downstream of Haihe river and its mouth in the bohai sea, north China and northwest inland ports with the shortest distance is the capital of Beijing sea portals, the starting point is the shortest east Asia-Europe continental bridge.Tianjin port distance three routes more far, Qingdao has the advantage.Tianjin port was low, around outside the port no barrier islands, whole battle breakwater cover, the bottom surface of liquid mud, the approach channel deposition, want to rely on dredging maintenance.Tianjin city dock, Tanggu port and new port reason of three parts, the original city terminal can only be docked boats, large-tonnage ships can dock outside the Tanggu bar, rely on a barge for transfer.Biggest channel depth is 11.4 m, meets the requirement of future container transport development.Port of natural conditions limit is a big obstacle in the development of tianjin port

Finally, from the regional policy perspective:

Three port in order to attract foreign investment are scrambling to formulate preferential investment policies.Qingdao to encourage foreign investment in infrastructure construction and service trade.To the Chinese-foreign equity joint ventures engaged in port construction, the operation period of 15 years or more, upon

application of the enterprise, the local tax authorities of provinces, autonomous regions and municipalities directly under the approval of the profit from start of the year, the first year to the fifth year shall be exempted from enterprise income tax, in the sixth year to the first ten years of enterprise income tax shall be levied in half.Dalian is the revitalization of northeast old industrial base of the key cities, Dalian to investors in addition to enjoying national revitalization of the northeast old industrial base and opening to the outside of the preferential policies in northeast China, also can enjoy, Dalian city, liaoning province, and related areas, industry specific preferential policies.Tianjin port of investors to investment of enterprise income tax preferential policy is the same as Qingdao, investors from the business items

In the profits to invest in infrastructure projects, after approval by the relevant department to return the enterprise income tax already paid on the reinvested amount again, 40% tax.

4.3.3 Quantitative analysis of the influence factors of the invested ports

AHP (Analytic Hierarchy Process, the AHP for short) is a related easy method for some more complex and fuzzy problems to make decisions .The analytic hierarchy process is through the adoption of a certain scale to people's subjective judgment objectively quantify the qualitative problem is transformed into quantitative analysis.It is a rare simple and practical evaluation method. Factors that are included

in the analytic hierarchy process based on the analysis of complex systems and related relations, the system is decomposed into different elements, and will these elements into different levels, which objectively formed a hierarchy analysis model.Each level of each factor are compared, and two judgment of a certain scale, the comparison of the relative important degree scale, to establish judgment matrix, by computing the judgment matrix eigenvalues and corresponding eigenvalues, the largest elements for all levels of importance order, so as to establish the weight vector.And then through the hierarchy total sorts have further investment scheme of the comprehensive weight, according to the overall weight of multiple size to choose satisfactory decision scheme.

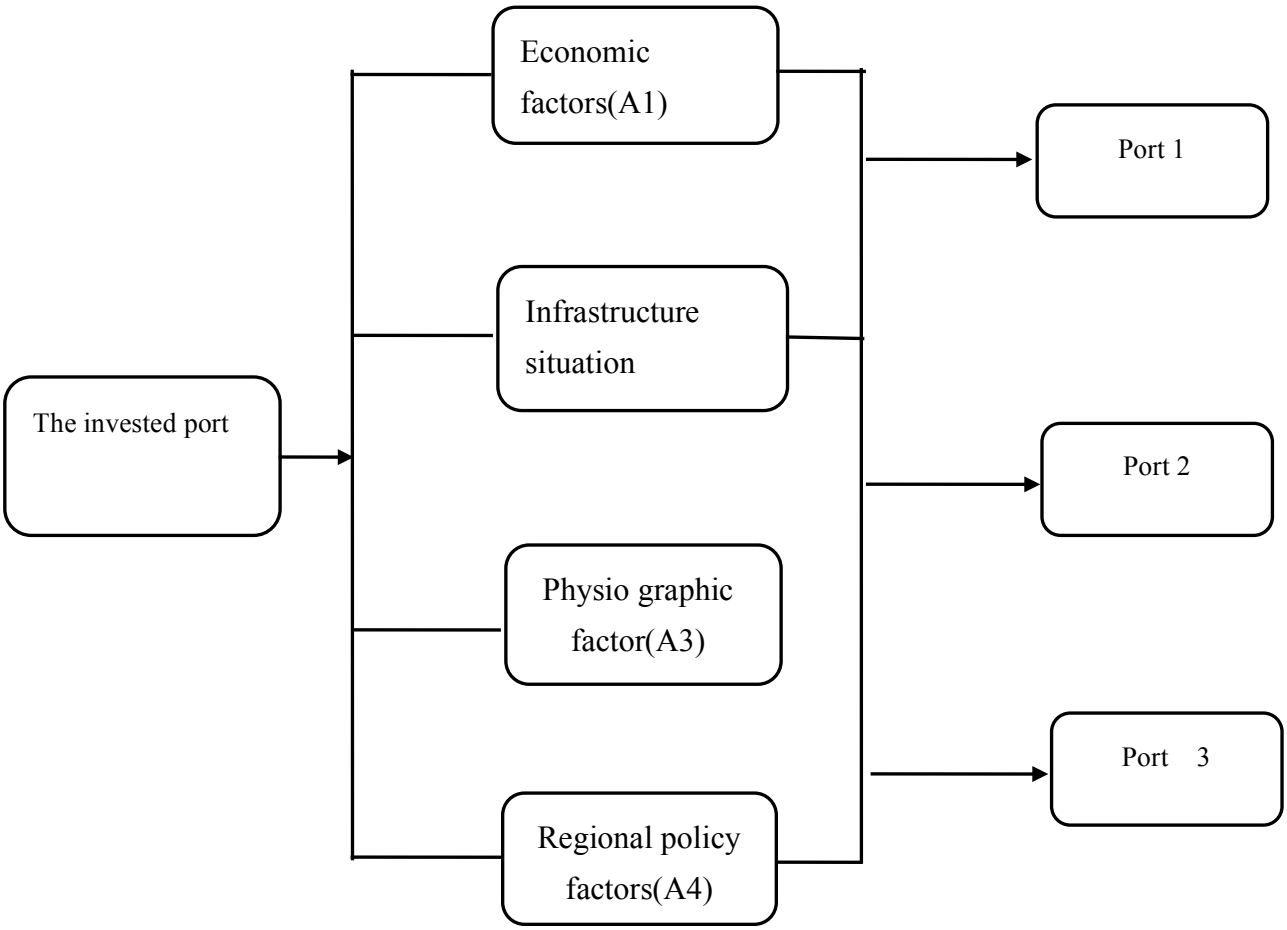
In the following , the author will take Qingdao, Dalian and Tianjin ports as the examples. Through this AHP method to help the shipping enterprises to determine which ports is better for them to do investments.

a) building the hierarchical structure of the model

Hierarchy is generally divided into three layers, the top as the goal layer, middle as the criterion layer, bottom layer for solution.Target layer is only one element, generally it is the intended target or ideal results to analyze the problem;Rule layer contains a involved for the realization of the goal of the intermediate links, it can be composed of several layers,

This article select ports as the goal layer;The economic factors, infrastructure conditions,the physio graphic factor and the regional policy the five evaluation index

as the criterion layer.Hierarchical structure is as follows:



b) The structure of double matrix judgment and level of sorting and consistency check

Hierarchical analysis is the most important part of the code for the target layer of

judgment matrix and the rule of each layer of judgment matrix, and at all levels and the influence weight of each index for overall goal that is the basis of the analytic hierarchy process.Largely due to the formation of the judgment matrix based on policymakers' degree of awareness and understanding of the specific issues, with a larger subjectivity, to avoid the subjective role of policy makers on the result of final judgment, hierarchical analysis approach is usually adopts expert judgment method, in this paper, the judgment matrix is also made on the basis of expert judgment. The author made the questionnaire for the teacher to give the judgment. The questionnaire is in the appendix.

The index layer judgment matrix A:

	A1	A2	A3	A4
A1	1	8	6	5
A2	1/8	1	1/5	1/3
A3	1/6	5	1	1/2
A4	1/5	3	2	1

Through calculating, we can get that $\lambda = 5.1245$, CI=0.0311, RI=1.12,

CR=CI/RI=0.0311/1.12=0.0279<O.1

In conclusion,CR < 0.1, so the judgment matrix A, through the consistency check.

For the each port,the secondary index layer of judgment matrix:

Economic factor	Port(Qingdao)	Port(Dalian)	Port(Tianjin)
Port(Qingdao)	1	2	1/2
Port(Dalian)	1/2	1	1/4
Port(Tianjin)	2	4	1

Through calculating, we can get that $\lambda = 3.0623$, CI=0.0312,

CR=CI/RI=0.0538<O.1

Infrastructure factor	Port(Qingdao)	Port(Dalian)	Port(Tianjin)
Port(Qingdao)	1	1	1/2
Port(Dalian)	1	1	1/2
Port(Tianjin)	2	1	1/2

Through calculating, we can get that $\lambda = 3.0124$, CI=0.0062,

CR=CI/RI=0.0107<O.1

Physio graphic factor	Port(Qingdao)	Port(Dalian)	Port(Tianjin)

Port(Qingdao)	1	3	3
Port(Dalian)	1/3	1	1
Port(Tianjin)	1/3	1	1

Through calculating, we can get that $\lambda = 3$，CI=0

CR=CI/RI=0<O.1

Regional policy factor	Port(Qingdao)	Port(Dalian)	Port(Tianjin)
Port(Qingdao)	1	2	3
Port(Dalian)	1/2	1	1/2
Port(Tianjin)	1/3	2	1

Through calculating, we can get that $\lambda = 3.0423$，CI=0.0212,

CR=CI/RI=0.0365<O.1

Hierarchy total sorts and consistency check:

CI=0.1133×0.0312+0.0323×0.0062+0.0167×0+0.0589×0.0212=0.00498

RI=0.1133×0.58+0.0323×0.58+0.0167×0.58+0.0589×0.58=0.128296

CR=CI/RI=0.038816<0.1,pass-test.

c)Comprehensive evaluation of the total order

Port(Qingdao)=0.1133 × 0.2857+0.0323 × 0.25+0.0167 × 0.3333+0.0589 × 0.5374=0.07766

Port(Dalian)=0.1133 × 0.1429+0.0323 × 0.25+0.0167 × 0.3333+0.0589 × 0.1946=0.04129

Port(Tianjin)=0.1133 × 0.1061+0.0323 × 0.5+0.0167 × 0.3333+0.0589 × 0.268=0.0687

Through the calculating:

Port(Qingdao)>Port(Tianjin)>Port(Dalian)

Analysis of the above data can be obtained, Qingdao on attracting international shipping enterprises investment than Dalian and Tianjin is optimal Potential.In Qingdao the geographical position is superior, the hinterland economic development better, huge development potential and Qingdao port service level is higher, although some indicators, there is a certain gap between Qingdao and Dalian and Tianjin, but the overall investment environment significantly more than the other two ports.Two in Tianjin and Dalian port total sorts of numerical approach and numerical slightly larger than the size of Tianjin. Even, it shows that the two port's capacity to absorb shipping enterprise investment is almost equal. This more tally with the actual current ports developments situation.

In conclusion, this AHP model is feasible for the shipping enterprises to analyze the investment strategy.

4.4 The evaluation and conclusion of the AHP model

This paper uses qualitative analysis and quantitative analysis method to establish the evaluation model. Firstly basing on the basis of existing research results, the port investment evaluation index system is proposed. Through the analytic hierarchy process (ahp) obtains the weights of influencing factors, and then using the index system to compare the three different sea port's capacity to absorb shipping enterprise investment .Finally, it is concluded that Qingdao in absorbing foreign shipping companies to invest in one of the most overall advantages. This analysis result has to do with the present status of the three port shipping enterprise investment is the basic. In this paper this kind of model method has verified the feasibility of selecting ports locations ,which can be used to analysis of port choice of transnational investment of shipping enterprises. At the same times ,in the aspect of the ports, they can also based on the analysis of the model to develop itself in attracting shipping companies to invest in the advantages and disadvantages, and take measures to raise, increasing access to foreign shipping enterprises investment attraction.

According to the practical situation, the AHP model is suitable and convenient for the shipping enterprises to make strategy about choosing the invested ports. There are also some imperfection, the judgments of each factors are based on the opinion of

the experts and scholars. Without doubt, sometimes it will with some subjectivity that will affect the accuracy of this evaluation model. At the same time if there are too much data statistic index, the weight is difficult to determine. However, this AHP evaluating model is suitable for applying to solving the problem of determining the invested ports for the shipping enterprises.

5.The problems and suggestions for the shipping integration

5.1The impact and future development of the vertical alliance

We can see through the above analysis, the development of economic integration has brought the unprecedented opportunity to the port and shipping enterprises but also make the port and shipping enterprises face fierce competition.Port enterprises and shipping enterprises of the alliance, both for port enterprises and shipping companies have far-reaching significance, so the vertical alliance integration is very necessary for the shipping enterprises and ports.

First of all, for port enterprises, the features provided by the port enterprise service is loading and unloading, storage, transit, etc., Most of the products difference is small, by cooperating with the shipping enterprises to establish alliance can enhance the differences of service products to a certain extent, help port enterprises cope with the increasingly fierce price competition.

In general, the more close to the bottom in the supply chain to purchase the demand side, the more for its demand can differ according to the purchaser to provide differentiated services, obtained the higher income levels, yields profit maximum.Shipping integration can make the ports enterprise direct contact with the

shippers, so as to obtain higher logistics supply chain value added and higher profits.It is also advantageous to the port at the same time enhancing production and marketing from production source, immediately understand the owner of the specific requirements of the logistics transportation services, increase the number of product differentiation, thereby at a higher level of service customers, win in the competition in the port market.

Second, for shipping enterprises, the vertical integration greatly advances the strategy of the shipping enterprise integrated logistics services business process.Through the vertical alliance, shipping enterprises logistics strategy directly from the Marine transportation extends to land transport, air transport and pipeline transport.At the same time it improves the shipping enterprise's service attached to add functions such as warehousing, distribution, packaging, provide more perfect logistics service for the owners, and to a certain extent, reduce the transaction costs for port.

Since the 1990 s, comprehensive logistics service has become the focus of our customers.In order to save the cost of circulation costs, improve production efficiency, the enterprise strategy began to exchange gradually from the production and sales lead to type to the market and service oriented.Market affects the strategy, the customer asked to product market and service level is higher and higher, shipping companies operating strategy also gradually from a single maritime transport to the whole logistics supply chain services, to meet the needs of its customers to the owner.As shipping enterprise's business scope covers the entire logistics supply

chain of each link, shipping companies also realized the diversification strategy, into a comprehensive logistics service providers.

Again, from the league system, the integration of port and waterway longitudinal alliance can effectively prevent supply chain material flow, cash flow and information flow interruption, and changes in volatility, on the whole supply chain link to strengthen the procurement of products and services, production, marketing and so on process control, source for products and services demand information from supply chain, decline low cost, to improve the effectiveness of the management.By expanding the enterprise scale, can reduce the cost and strengthen the control force, to raise barriers to entry.

Finally, through the ports and logistics integration, port and shipping upstream and downstream enterprises in resource integration, the whole development of port logistics supply chain for port in road transport, rail transport, sea transport, air transport and pipeline transport multimedia transport network core node, and not just a simple loading and unloading and transshipment node.Integration of port and waterway port and shipping companies and so on each node functions of integration, port and shipping companies are no longer as a single node to isolate operation, but through some form of contract on division of labor cooperation, ensures ample supply port, and then to near port competition form competitive advantage, further reducing transaction and handling fees, to some extent bring profits to the port and shipping enterprises.

Above all , the vertical alliance is becoming the inexorable trend both for the shipping enterprises and ports. More and more shipping enterprises concentrate on designing the suitable and competitive strategy to get cooperation with the ports.

5.2 The exciting problems and suggestions for the shipping lines

Shipping companies and port cooperation by means of vertical integration, the development trend of this will be threat for some small shipping companies and port enterprise. Ports and shipping enterprises cooperation is through the purpose of sharing resources and achieve benefit maximization, under such circumstances, they may by price advantage or some preferential policies to achieve a monopoly situation.This kind of monopoly behavior for some more influence of shipping alliance small shipping enterprises.Some of our domestic small and medium-sized shipping companies compared to the international big shipping companies, for port operation and cooperation is in its infancy.Terminal is most a scarce resource, once multinational large shipping companies control manipulation, will limit some small domestic shipping companies in the development on the terminal investment management.

From the viewpoint of the shipping enterprises, under the trend of the vertical integration with the ports, there are some suggestions for them.At present mainly backward integration strategy of shipping companies, enterprises to carry out capital

or investment of container terminals, meet the needs of shipping company own large-scale economic development, as well as the port enterprises put forward higher requirements.As the container terminal company, not content tightly to absorb investment, more should invest in overseas markets, when conditions permit, to implement the forward integration strategy, investment in ship company, the ship company choose the affiliated own dock.

Cooperation with the ports will bring benefit and also the risks. Controlling the risks is also a big problem. As the shipping enterprises, they need to find suitable investment strategy coordinating with their operating situation and developing plan.

6.Conclusion

This dissertation based on the vertical alliance theory to analyze the situation of the vertical integration between the shipping enterprises and the ports, which includes the reasons of the vertical integration , the impact of the vertical alliance and the models of the integration. According to the theoretical analysis, the author mainly take the position of the shipping enterprises to discuss the shipping enterprises' strategy of cooperating with ports. The author combine the qualitative and quantitative methods together. Firstly, the author analyze the influencing factors of choosing the location of the ports. Then based on the influencing factors, the author use the analytic hierarchy process method to build a model to through quantitative method to help the shipping enterprises to choose suitable invested ports locations.

Above all analysis, we have to admit that the development of the economic integration results in the inevitable trend of the vertical integration between the shipping enterprises and ports. So far, the vertical integration has become the basic strategy for both shipping enterprises and ports to gain foothold in the shipping market. As the leading role, the shipping enterprises have to base on their own situation do the right choice of choosing cooperation model and cooperation strategy.

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Appendix I:

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	questionnaire														
2		A1	A2	A3	A4		A1	A2	A3	A4		A1	A2	A3	A4
3	A1	1	7	6	4	A1	1	8	5	3	A1	1	7	7	6
4	A2	1/7	1	1/4	1/3	A2	1/8	1	1/6	1	A2	1/7	1	1/4	1/5
5	A3	1/6	4	1	1/2	A3	1/5	6	1	1	A3	1/7	4	1	1/3
6	A4	1/4	3	2	1	A4	1/3	1	1	1	A4	1/6	5	3	1
7															
8		A1	A2	A3	A4		A1	A2	A3	A4		A1	A2	A3	A4
9	A1	1	8	7	7	A1	1	9	6	3	A1	1	8	8	4
10	A2	1/8	1	1/7	1	A2	1/9	1	1/4	1/4	A2	1/8	1	1/6	1
11	A3	1/7	7	1	1/2	A3	1/6	4	1	1/3	A3	1/8	6	1	1
12	A4	1/7	1	2	1	A4	1/3	4	3	1	A4	1/4	1	1	1
13															
14		A1	A2	A3	A4		A1	A2	A3	A4		A1	A2	A3	A4
15	A1	1	8	5	6	A1	1	6	4	5	A1	1	9	4	4
16	A2	1/8	1	1/4	1/3	A2	1/6	1	1/6	1/5	A2	1/9	1	1/6	1/3
17	A3	1/5	4	1	1/2	A3	1/4	6	1	1/2	A3	1/4	6	1	1/3
18	A4	1/6	3	2	1	A4	1/5	5	2	1	A4	1/4	3	3	1
19															
20		A1	A2	A3	A4		A1	A2	A3	A4		A1	A2	A3	A4
21	A1	1	7	8	7	A1	1	7	9	5	A1	1	7	5	6
22	A2	1/7	1	1/3	1/3	A2	1/7	1	1/3	1/4	A2	1/7	1	1/7	1/3
23	A3	1/8	3	1	1/2	A3	1/9	3	1	1/2	A3	1/5	7	1	1
24	A4	1/7	3	2	1	A4	1/5	4	2	1	A4	1/6	3	1	1
25															
26															
27															