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WORLD MARITIME UNIVERSITY

Shanghai, China



A Comparative Study on Port Integration in Different Areas in China

By

Li Jiaqi

China

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

(INTERNATIONAL TRANSPORT AND LOGISTICS)

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Declaration

I certify that all the material in this research paper that is not my own work has been identified, and that no materials are included for which a degree has previously been conferred on me.

Abstract

The competition and cooperation of ports has always been an existing problem. Since China's reform and opening up, especially under the background of One Belt And One Road, in recent years, China's port group experienced several rounds of integration. This research paper focus on three major including the Yangtze river delta in mid China, the Bohai bay in north China and the Pearl river delta in south China.

This paper mainly uses the literature research method, the qualitative research method and the comparison research method to analysis the issue. Through previous studies, the literature research provides basic views and concepts for the background and reasons of port integration. Through qualitative analysis, the changes of port service level and port scale before and after port integration are analyzed. The comparative study is complemented to find out the processes and results of port integration in different port groups and summarize the future trend of port integration and relevant suggestions.

Starting from the literature research, this paper studies the background and necessity of port integration. In order to find out the similarities and differences of port integration in the Yangtze river delta, Bohai bay and the Pearl river delta, the integration process of these three areas is summarized respectively. Finally, some conclusion and suggestions are put forward to the future development of port and port integration recommendations.

Key words: port integration, One Belt and One Road, port competition and cooperation

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1. Introduction

1.1 Research Background

The port resource is scarce which means in a certain geographical region, ports are monopolistic. The homogeneous competition in ports is fierce and the balance of port cooperation and competition is hard to keep. In recent years, many ports of China have been integrated and although most of the integration has received the active results, some outcome is not as good as expected. After the port integration, the intensive and efficient utilization of port resources in some provinces and the development pattern of joint port enterprises and the level of intensive and large-scale operation have been further improved. However, port integration is a long-term mission and there are some new requirements and worth-noted points in port integration with the times changed.

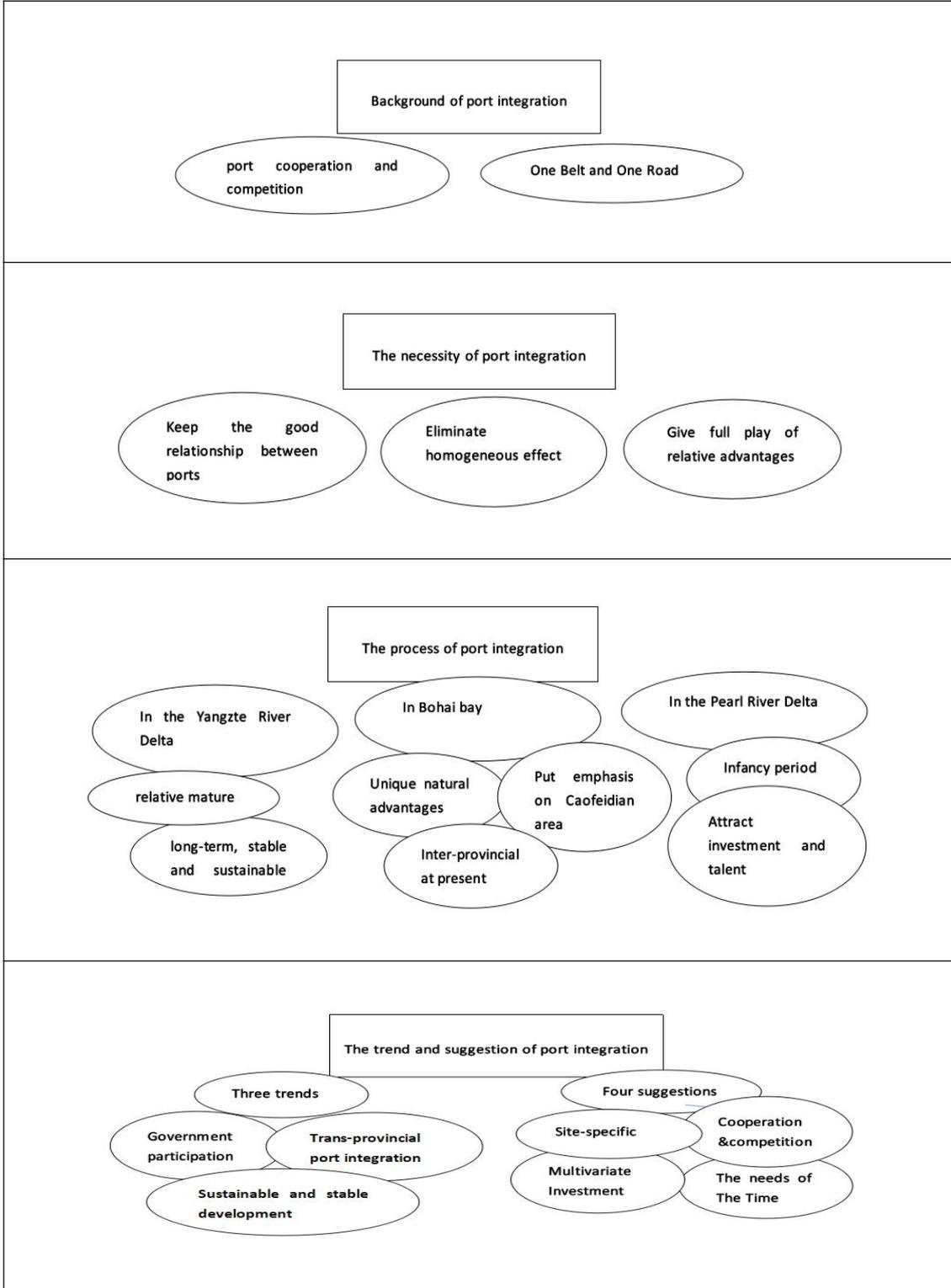
Additionally, "One Belt and One Road" is a major national strategy promoted by general secretary Xi Jinping and pushed by the central authorities. It is a core component of China's all-round opening and development strategy in the new era. The strategy highlights the clear direction of our government's increasing emphasis on win-win cooperation and development with many developing countries.

After reformation and opening, under the background of One Belt and One Road, the development of port integration has been raised and deepened, State Council and local governments have issued a series of response measures and policies. Different port groups in China have experienced port integration and achieved certain results.

1.2 Research Objectives

- a. As China has so many ports so the first step is to choose those special port area or some typical port to be make further analysis.
- b. Analyze the different characters of the port areas from the side of the regional factor , the leader of the port integration and the port city's economy and technology level and so on to classify those ports in China.
- c. Compare the port integration experienced recently and find out the meaning and how to make the integration has better influence to those ports areas .
- d. Make a conclusion and suggestion according to the era requirement and future trend from the side of the world and the country.

1.3 Layout



2 Literature review

2.1 Port competition and corporation

The port resource is scarce which means in a certain geographical region, ports are monopolistic. Cooperation among port groups, especially the integration development, has eliminated competition in the region, and regional monopoly has been fully manifested. Port operators lacking market competition no longer have the pressing pressure to improve efficiency, which results in the contradiction between port capacity and performance. Ports have throughput capacity, but service and efficiency can not be improved synchronously, because the enhancement of port strength is not only to deal with competitors, but also to safeguard their own interests. If the port interests are taken into account, service prices will be raised. It is inevitable to reduce costs, and the service quality is difficult to be optimistic, and it will involve serious consequences such as violating market rules, infringing shipowner's and cargo owner's right of choice.(Cui and Xia,2017)

By analyzing the port integration and competition of Japan, Korea and China ,we can find out that collaborative competition is a moderate competition mode between cooperation and confrontation, and it will become the key choice for port operators to gain competitive advantage.(Li,2006)

With the rapid development of international maritime trade, the competition among ports has intensified, especially those with similar geographical location and overlapping hinterland. However, the differentiation of port business types (such as

container business, bulk dry bulk cargo, crude oil and liquefied products) will reduce the excessive investment and vicious competition. In order to avoid the competition for cargo sources, hinterland, and expand investment and production scale, ports will compete with each other and they must constantly seek business cooperation to enhance its competitiveness.(Guo,2017)

The management of port enterprises are rational, that is to say, the parties participating in the struggle or competition want to benefit. In order to achieve the goals and interests, we must consider all possible action plans of the opponents and try to select the most favorable or reasonable plan . (Duan,2014)

At the same time, due to the lack of unified and coordinated management among the ports in the inland port group and the unclear division of the functions and levels of the ports, the homogenization competition within the port group has become increasingly fierce, resulting in the waste of social resources, which is not conducive to the sustainable development of inland shipping. In view of the urgent need for the formation of strategic planning of inland port groups, there is a lack of an optimization model that can provide theoretical explanation and strategic guidance for port-to-port collaboration. It is necessary to put forward specific optimization methods of port functions from the point of view of cargo distribution, to propose a hierarchical division method of port groups based on the factors affecting port development and layout, and to consider the competitive and cooperative relationship among ports.(Xu,2018)

2.2 One Belt, One Road

"One belt and one road" is a major national strategy promoted by general secretary Xi Jinping and pushed by the central authorities. It is a core component of China's all-round opening and development strategy in the new era. The strategy highlights the clear direction of our government's increasing emphasis on win-win cooperation and development with many developing countries. (Gan,2017)

Under the background of "one belt and one road", Beibu Gulf, as one of the important regional cooperation platforms on the "maritime Silk Road", faces many new factors in the face of new opportunities and challenges. For example, there is a lack of coordination and cooperation between the three major ports.(Wei,2018)

Guangzhou is the birthplace of the Maritime Silk Road and the pioneer of reform and opening up. Guangzhou Port is located at the mouth of the Pearl River. Its main channel is connected with the vast inland river system of the East-West-North River in the north and directly to the South China Sea in the south. Since the reform and opening up, it has gradually developed into a national shipping hub. The proposal of "one belt and one road" has brought a rare opportunity for development along the port cities.(Gan,2017)

Under the background of "one belt and one road" initiative, the overall layout and function of the Yangtze River Delta shipping center should be organically combined with the major economic and industrial layout and the spatial pattern of cities and towns, so as to promote the transformation of the shipping center to service-oriented and knowledge-based, improve the collection and distribution system, expand the hinterland of the port economy, and give full play to the construction of the shipping

center in the Yangtze River Delta, which is an effective support for the urbanization strategy of the Yangtze River Delta. Bracing. In particular, Shanghai should give full play to its shipping advantages, base itself on regional and national strategic overall situation, and strive to play a more important role.(Hao,2017)

2.3 Port integration

Based on its own characteristics and problem orientation, there are many ports in China, and their development stages, basic conditions and hinterland economic structure are different. We should determine the timing and ideas of port resource integration based on our own characteristics. Based on its own characteristics and problem orientation, there are many ports in China, and their development stages, basic conditions and hinterland economic structure are different. We should determine the timing and ideas of port resource integration based on our own characteristics. (Su et al.,2018)

Based on the analysis of the current practice mode of port resources integration in provinces, the author concludes that the integration of port resources within provinces has gradually become the mainstream trend of Port Reform in China, which is the inevitable result of the development of port industry in a certain stage and the co-driving of multiple factors in a specific era.(Zhang, Zou and Harry,2017)

(a) The Yangtze River Delta

In the process of resource integration, the port groups in the Yangtze River Delta have some problems, such as difficult integration and disorderly development, which are caused by the lack of cooperation mechanism in administrative division,

excessive capacity of port handling and structural capacity, excessive capacity of regional ports and unbalanced structural capacity, unreasonable regional port planning and duplicate construction. According to the development characteristics of ports in the Yangtze River Delta, the author puts forward specific integration strategies. The three administrative regions have different emphasis on port business; Shanghai focuses on container business, and accelerating the construction of container terminal automation has become the focus of Shanghai port group construction; Jiangsu focuses on bulk cargo business, focuses on planning and layout of bulk cargo terminals; Zhejiang focuses on transshipment and high-end logistics services, improves water flow conditions and strengthens the construction of multiple transport facilities. It has become the key point for the development of Zhejiang port group. Reasonable division of labor makes the Yangtze River Delta region form a virtuous cycle of importing a large number of raw materials and producing a large number of finished products, which is conducive to sustained and healthy economic development.(Peng,Liu and Zhao,2013)

In this paper, the author elaborates on the integration measures of each specific port in Shanghai Port Combination and uses specific data to show that the throughput of each port after integration has increased compared with the previous year. It is pointed out that the advantages brought about by the ports combination are obvious on the surface, but need to be analyzed concretely. (Du, 2017)

The author points out the significance of Jiangsu Port to the whole Yangtze River Delta, points out the advantages of Jiangsu Port Integration, and uses specific data to show that after the port integration is really make benefit to Jiangsu , also means the integration make sense to the whole Yangtze River Delta. (Wu, 2018)

(b) the Bohai Bay

At present, the Bohai Bay has initially formed a group of ports with 100 million tons of large ports as the main body and rapid development of small and medium-sized ports. The scale of ports is constantly expanding and the overall level is constantly improving. But some special wharves, such as large crude oil and large ore wharves, are rather tense. At the same time, many places focus on the development of containers, which makes it difficult for many container terminals to take advantage of local economic development and small supply of goods in the hinterland.(Liu,2010)

The author points out that blind integration can not achieve the goal of port development by analyzing the different characteristics of large and small ports around Bohai Sea.(Liu,2006)

Caofeidian's unique geographical advantage is located at the top of the Bohai deep trough in China's largest inland sea. It is a natural "diamond class" port, which can build 300,000 tons of large berths without excavating channels and pools. The resource advantages of the Bohai Bay area coincide with those of Caofeidian Port Area, so the development of Caofeidian Port Area has become an important step in the integration of the Bohai Bay Area. (Cao, 2009)

(c)The Pearl River Delta

The major ports in the Pearl River Delta play their core competitiveness, realize the maximum utility of resources, establish a long-term win-win competition and cooperation relationship, avoid destructive competition between ports, and

strengthen the ability of both sides to resist external risks, so as to maintain the overall competitiveness of the port group in the Pearl River Delta. Joint investment should be made to strengthen the links with the hinterland of the inland economy and build an inland waterless port. The government should rationally plan the port layout in the triangle area, develop scientifically and avoid duplication of construction and structural contradictions. Give full play to the role of trade associations, set up a professional committee to coordinate and negotiate the cooperation and development of the seaports in the Pearl River Delta region, in order to cope with the possible surplus of container terminals.(Tu and Zeng,2018)

In this paper, the author clearly points out that Shenzhen Port relies on low logistics costs, high customs clearance efficiency as its own advantages to successfully attract foreign investment ,establish the balance relationship between other ports nearby and finally achieve win-win results with other ports in Pearl River Delta.(Yan, 2010)

3 The analysis of source problems that the ports faced in different areas

3.1 Current situation of source problem

Port cooperation and competition is a permanent, ineradicable fact. “Port operators lacking market competition are no longer to improve port efficiency, but to have the intense pressure on the predatory behaviour of similar function ports nearby, which results in the contradiction between port capacity and performance.” (Cui and Xia,2017)

Over time, port companies had to find “special” ways to re-attract the customers. Some even take malicious low-price policy which means the price is much lower than the demand of normal cost for the development of shipping enterprises to cater for the shippers. “Port integration is a moderate mode between cooperation and confrontation, and it will become the key choice for port operators to gain competitive advantage.”(Li,2006)

Port resources can not be fully used and the waste is inevitable and those ports can not reveal comprehensive application functions. Different port areas has it's own need for further development which leads to the different way for port integration. “China has so many ports and according to the characteristic and region , and we can divided ports of Chian into three main port areas.” (Su and Xue, 2018)



Figure 1: Chinese map

Source : Chinese map English Edition

From figure one, the three port areas are the Bohai Bay in north China, the Yangtze River Delta in mid China and the Pearl River Delta in south China.

3.1.1 In Yangtze River Delta



Figure 2: The map of Yangtze River Delta

In Yangtze River Delta, there are three main port administrative provinces involved : Shanghai , Jiangsu and Zhejiang. “The Yangtze River Delta is an important intersection zone between "One Belt and One Road" and the Yangtze River economic zone. It not only plays an important strategic role in China's overall modernization and opening up pattern but also in China's participation in international competition. It is one of the best foundations for urbanization in China. The economic hinterland of the Yangtze River Delta has modern river and sea ports and airports.

We can see from the Yangtze River Delta Urban Agglomeration Development Plan indicates that the Yangtze River Delta Urban Agglomeration should build a world-class urban agglomeration facing the whole world, radiating the Asia-Pacific region and leading the whole country. Build a resource allocation center with the most economic vitality, a scientific and technological innovation highland with

global influence, an important modern service industry and advanced manufacturing center in the world, an important international gateway in the Asia-Pacific region, a new round of national reform and opening-up pioneer, and a beautiful China construction demonstration zone. ”

(http://www.ndrc.gov.cn/zcfb/zcfbtz/201606/t20160603_806388.html)

“On September 27, 2018, the Yangtze River Delta National Seminar on Cultural Exchange in Civilized Cities (Areas) was held in Shanghai. In January 2019, "Yangtze River Delta Integrated Development Demonstration Zone" was first proposed. ”(http://www.ndrc.gov.cn/dffgwdt/201905/t20190528_937045.html)

In recent years, the resource integration mode of Yangtze River Delta has bring some benefits ,it’s true that there are still some problems needs to be further studied. As far as the current mode of operation is concerned, Shanghai Port, Suzhou Port and Ningbo-Zhoushan Port only superimpose the throughput. By increasing the port size to enhance the international ranking and self-negotiation ability, the benefits of resource integration are still on the surface, and the situation of sharing a win-win situation has not been fully achieved.

Duplication of positioning and vicious competition among ports is a serious problem. Ports in the Yangtze River Delta region have overlapping economic hinterlands. In order to gain more goods, ports resort to price measures to attract customers, resulting in vicious competition among ports. In the process of resource integration, the port groups in the Yangtze River Delta have some problems, such as the unbalance relationship of corporation and competition “At the beginning of 2006, Ningbo-Zhoushan Port announced the waiver of expressway tolls to the port, and promised to reduce the loading and unloading charges by 5% to the international

transshipment company. On May 10 of the same year, Shanghai International Port Group significantly reduced the costs of Yangshan Port Area in order to attract shippers. ”(Peng and Liu, 2013) Further more, the rapidly development of Yangtze River Delta at the cost of exposure to environmental problems . This is not the only because of the environmental problem government ignored when making Yangtze River Delta development decisions but also because all of the citizens has not pay enough attention on the circumstances of Yangtze River.

These problems indicated the lack of cooperation mechanism in administrative division, excessive capacity of port handling, unbalanced structural capacity, unreasonable regional port planning and duplicate construction.

3.1.2 In Bohai bay



Figure 4: The map of Bohai Bay

"Bohai Bay" refers to the coastal economic zone around the Bohai Sea in , Liaodong Peninsula , Shandong Peninsula and Jing-Jin-Yi port group which extends to Liaoning, Shandong, Shanxi and the central and Eastern Inner Mongolia, accounting for 13.31% of the national territory and 22.2% of the total population, respectively. The ports in Bohai Bay includes Beijing, Tianjin, Tangshan, Cangzhou, Shijiazhuang, Baoding, Shenyang, Dalian, Jinan, Qingdao, Yantai, Qinhuangdao , Huludao and so on.”(<https://baike.baidu.com/item/%E7%8E%AF%E6%B8%A4%E6%B5%B7%E5%9C%B0%E5%8C%BA/1779752>)

In recent years, the development of regional port groups has been rapid, the scale of ports has been expanding, and the overall level has been continuously improved. Ports around the Bohai Bay are speeding up construction in an effort to promote rapid economic development. At the same time, after the decentralization of ports, the enthusiasm of local governments has been greatly mobilized. Many places have put forward the development strategy of "developing the city with ports" to play a window role in the opening of ports and port cities to the outside world. Intensive market competition requires resource integration. Since 1979, China's port industry has developed rapidly, and the competition among ports has become increasingly fierce, especially around the Bohai Sea. With the improvement of inland transportation conditions, the original concept of hinterland has become fuzzy and because of overlapping hinterland of ports, it increased the further competition between ports. The structural contradictions of ports highlight the need for resource integration. Bohai Bay is rich in oil and gas resources. Bohai Bay is the natural extension zone of Huanghua oil-bearing depression on land, the area of oil-generating depression is large, the tertiary deposits are thick, and the oil-bearing

prospect is great. It is one of the sea areas with abundant oil and gas resources in China.

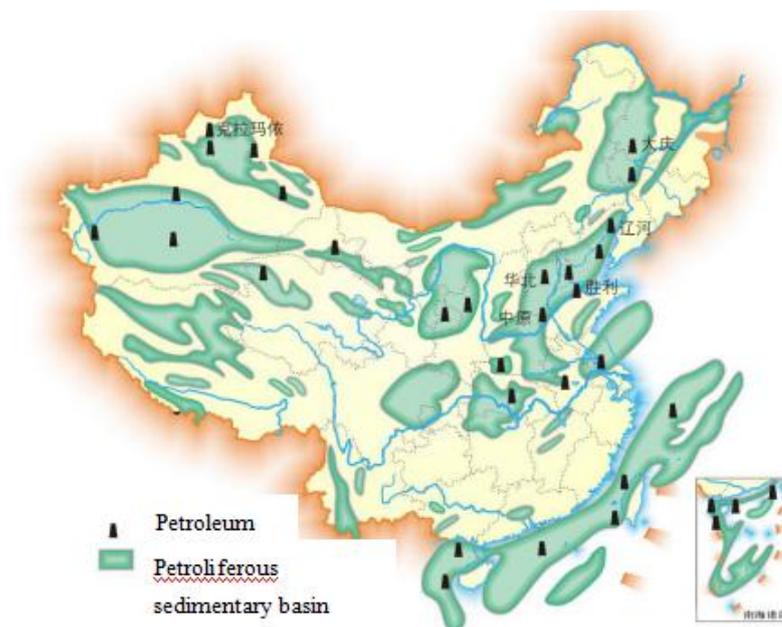


Figure 4: Petroleum Resources and Distribution of Major Oilfields in China

Source: <http://www.dljs.net>

In the figure 4, the green area indicates the major oilfields and the small black ladder-shaped means the main petroleum resources in China. We can notice that Bohai Bay is in the area of major oilfields and because of the special and advantage region factors, Bohai Bay is main export zone of oil and petroleum and we have known that the need of shipping is based on the demand of trade.

At present, the Bohai Bay has initially formed a group of ports with 100 million tons of large ports as the main body and rapid development of small and medium-sized

ports. The scale of ports is constantly expanding and the overall level is constantly improving. However, some special wharves, such as large crude oil and ore wharves, are rather tense. At the same time, many places focus on the development of containers, which makes it difficult for many container terminals to take advantage of local economic development and small supply of goods in the hinterland. Modern international shipping centers are increasingly demanding large-scale ports, functional coastlines, specialized wharves and large berths. The coastline resources of the main ports around the Bohai Sea, especially the deep-water coastline resources, have been largely or even completely consumed, and need new coastline resources . The pressure of small-scale port development is great, which also requires resource integration. Some small ports around the Bohai Sea have been built late and have not got good development opportunities. Although they have advantages in coastline resources and geographical location, they are facing many difficulties in the competition with neighboring big ports. The integration of port resources will create opportunities for these ports to use their own advantages and break through in the new round of port development. It has become a consensus to integrate port resources, dislocate development, avoid homogeneous competition, give full play to the overall advantages of adjacent ports and achieve sustainable development among ports.

3.1.3 In Pearl River Delta



Figure 5: The map of Pearl River Delta

Source: writeopinions.com

Pearl River Delta is located in the central part of Guangdong Province including Guangzhou, Foshan, Zhaoqing, Qingyuan, Yunfu, Shaoguan, Shenzhen, Dongguan, Huizhou, Shanwei, Heyuan, Zhuhai, Zhongshan, Jiangmen and Yangjiang.

The Pearl River Delta is close to the sea, where the three rivers converge (The Pearl River Delta is an alluvial plain composed of the three rivers of the Xijiang, Beijiang and Dongjiang downstream), the river network is dense and the ports as well. "Since the ports are too concentrated, there is a really such a high degree of competition in the supply of goods, routes and supporting services.

At the same time, those cities in the Pearl River Delta are actively looking for their own sea ports, which makes the competition among ports more seriously. Among other small and medium-sized ports, Zhongshan, Zhuhai, Dongguan, Jiangmen, Foshan and Zhaoqing all open up routes to Shenzhen. Due to the restrictions of water depth, channel and berth, these ports mainly exist as feeding ports for Guangzhou and Shenzhen ports. Under this mode of construction, regional ports are facing such problems as fierce homogenization competition and poor allocation of public resources. Ports are large but not strong, and the development of modern port logistics and modern shipping services is relatively slow.

“The main disadvantages of Guangzhou Port are poor natural conditions, silt deposition, lack of international shipping environment and talent.”(Yan, 2010)

3.2 The conclusion of the problems port areas faced

Without the port integration, the competition of homogenization of ports is intensifying. The resulting disordered competition has brought more difficulties to the development of ports. “How to effectively improve the present situation of homogenization and disorderly competition of ports in China is not only related to the economic development of port areas in China, but also to the overall situation of coastline economic development in China, which deserves our deep consideration.” (Zhang and Zou, 2017)

Without the port integration, the port area seems to be “one province, one port”, and in that mode of operation, homogenization could not be avoided, the utilization of port source will drop considerably.

Without port integration, port and port shows much more in competition than corporation. Excess throughput capacity will lead to a decline in the profitability of port enterprises. As we mentioned before, port enterprises had no choice but to try to give the most “best” of hire or freight idea for carriers and if they always take that action to try to keep customers, those port would go into bankrupt eventually. And from the long point of view, less enterprises can alive then the carriers need to pay more because at that time , the monopoly would be exacerbated .

Without port integration, small ports are always in the weak position that they can not even show their relative advantage. Those small ports can not have the ability to compete with those large ports nearby but to only become the feed ports. But the question is the country can not be built by such a few outstanding provinces even though those provinces had shown a high level in financial , educational , cultural , technological and so many other parts, and it’s the same to the development of port areas. Cooperation between those ports nearby and reach the goal of “win-win” is the correct answer. Each port should shows its own.

Port integration is aimed to eliminate homogenization effects to greatly increased the rate of resource utilization . Additionally, port integration is good of building a reasonal relationship between port competition and port cooperation. Also, port integration gives those small ports the chance of playing an important role to development themselves in a higher level.

However, the problem is not all the same. Considering the different region and characteristic of ports, those three port areas also faced different problems. For example, the development process of the Yangtze River Delta is fast, but the result of the rapid progress is the further exposure of ecological problems. The Yangtze River Delta is faced with a major problem of how to make the “green and sustainable development” come true. To the Bohai Bay ,the most question is how to explore some special wharves, “especially those large crude oil and large ore wharves, are rather tense.”(Liu, 2010)The integration time of the Pearl River Delta is relatively late, and there is a lack of powerful shipping talents. “The relevant government departments should intensify efforts to build shipping professional research institutes and relevant units. ”(Tu and Zeng, 2018)

4 The analysis process of port integration in different areas

4.1 The different ways of port integration

“From the classification point of view, the integration of port resources can be divided into government-led, enterprise-led and two-linked according to the different leading forces of integration. Additionally, according to the degree of the scope of port integration , it can be divided into inter-provincial integration and trans-provincial integration.” (Wei, 2018)

4.2 The process of port integration in different areas

4.2.1 In Yangtze River Delta

“Since 1997, the Yangtze River Delta region has involved four major port integration process including the establishment of the office of the Shanghai Port Combination, the integration process of Jiangsu Port, the merger of Ningbo Port and Zhoushan Port and the "Yangtze River Development Strategy" .(Hao, 2017)

(a)

Shanghai is known as the financial center, maritime centre in China, and the government always put emphasis of the development of Yangtze River Delta which leading the port integration in m.china is more complicated.

The first step is Shanghai Port Management Committee and the first batches to enter Shanghai Port are Waigaoqiao, Beicang, Nanjing Port, Zhenjiang Port, Zhangjiagang Port, Nantong Port, etc. Container terminals have showed below.

Table 1: Overview of container berths involved in Shanghai Port Combination

	Nan jing	Zhenj iang	Zhangjiag ang	Nant ong	Waigaoqiao	Ningbo
The number of berth	2	1	2	2	3	3
The length of shoreline	516	233	510	440	900	900
Berthing capacity (ten thousand tons)	1.5	2.5	2.5	2.5		

Design ability (ten thousand TEU)	11	11	10	11	12	13.5
The number of loading-discharging bridge	10	1.5	20	16	60	50
Container yard area (meter square)	4	1	3	2	5	6

Source:Chinese ports,1999.(8)

The construction of Shanghai Port Combination will take the port as the growth point of economic development, better play the leading role of Shanghai Pudong, and promote the economic development of the Yangtze River Delta and the whole Yangtze River Basin. Shanghai Port Combination is trans-provincial port integration which take Shanghai as the centre and Jiangsu and Zhejiang as the wings. Shanghai Port Combination put the existing and planned container terminals together, by reasonably allocation of port resources to make every effort to conduct complementary advantages and avoid the duplication of port construction. From

table 1, we can notice that all of the six ports have the increase on the number of berth and the length of shoreline. It is mainly resolved the problem of the shortage of port resources and with the increase on the berthing capacity, design ability ,loading - discharging bridge and container yard area, the ports' standard level of service can also be developed.

“In 1997, the above-mentioned container terminals completed a total container throughput of about 1.13 million TEUs, an increase of 12.6% over 1996. Among them, each dock in Jiangsu Province has completed 382,600 TEUs, an increase of 6.8% over the previous year.” (Hao, 2017)

The establishment of Shanghai Port Combination is conducive to making full use of the advantages of various ports, attracting container transport sources, expanding container throughput of ports in the Yangtze River Delta, forming an international container hub with Shanghai as the center, and participating in the international competitiveness of the international market. It is of great significance to the port and economy of Shanghai, Jiangsu and Zhejiang provinces, citizens and even the whole country.

The establishment of Shanghai Port Combination is a government-lead mode of port integration. The government involved in the port integration and take the leading status to establish the the Office of Shanghai Port Management Committee. The committee is resolutely followed by Party Group of the Ministry of Transport, actively play the role of organization and coordination, greatly improve the high-quality development of regional economy and significantly contribute to the Yangtze River Delta and even the whole country.

According to the principle of "deep-water deep-use, shallow-water shallow-use", the committee comprehensively coordinate the planning , constructing and developing of the berth of container port and relevant enterprises make adjustments according to the requirement and need of the committee to redesign the utilization of those container ports.

However, if we only put sight on the increase of the number of container berth, the number of cranes and equipment on ports and the design capacity, it is not enough. The increase only represented the short-term advantage of Shanghai Port Combination. From the comparison of number between 1996 and 1997, the total throughput of container ports really increased. The committee made the voice that what the Shanghai Port Combination really need is the sustainable, stable and long-term development.

(b)

The process of port integration in Jiangsu is an inter-provincial one. From the report of Jiangsu Port Integration, we can see that Jiangsu is located in the north of the Yangtze River Delta along the river and the sea. It has advantages in geographical conditions and port resources. Jiangsu section of the Yangtze River has a long and relatively stable coastline, a flat area, a vast inland environment and good urban resources.

Table2: The overview of Jiangsu port

	statistics	Naitonal rank
Total throughput capacity(billion tons)	1.94	1
Cargo handling capacity((billion tons))	2.41	1
The number of berth >10,000tons	480	1
The number of berth >50,000tons	218	1
The number of ports(annual throughput >100 million tons)	7	1

The number of ports(annual throughput >200 million tons)	3	1
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Source :http://jsnews.jschina.com.cn/shms/201705/t20170522_540717.shtml

It is worth noted that port comprehensive strength of Jiangsu is recognizable, however, when we from the perspective of efficiency, Jiangsu province can not show its strength any more. The report also said that “Although the annual throughput in Jiangsu is nearly the same as the ones in Shanghai and Zhejiang, the net profit for port enterprises in Jiangsu is only 1/12 of Shanghai’s and 1/5 of Zhejiang’s.” The reason for eliminating port advantages in Zhejiang is that the ports in Zhejiang have been discrete for a long time and lack of overall coordination, which leads to homogeneity and low-level development of ports, weak overall competitiveness and low utilization efficiency of coastal resources

It’s the time for Jiangsu port intergration. In May 22,2017, Provincial port and shipping enterprises, as well as eight state-owned port enterprises including Nanjing, Lianyungang, Suzhou, Nantong, Zhenjiang, Changzhou, Taizhou and Yangzhou, have been integrated into the provincial port group which means the beginning of Jiangsu’s port integration.

Jiangsu’s port integration is enterprise-lead over all. By using the capital as the bonds, a series of port enterprises in Jiangsu cooperate with each other and jointly promote the construction of Jiangsu port.

The reform of port integration along the Yangtze River in Jiangsu is a key step to build a regional hub port in the Yangtze River Delta. And there are three main questions need to be discussed in the process.

Table 3: Three main questions in Jiangsu Port Integration

	Question	Answer
1	How to improve the liquidity of port resources?	Speed up the adjustment period Enhance external cohesion
2	How to keep the balance of ports along the river ?	Develop the management of port Build and invest the port infrastructure Make proper and reasonable port plan

3	How to avoid the homogeneous competition	<p>Improve port shoreline appropriately</p> <p>Bring the relative advantage of different ports</p>
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As shown in table 3, there are three main questions and these questions actually need to consider together. Improve the liquidity of port resources and keep the balance of ports can help the port avoid the homogeneous competition, or put it another way, avoid the homogeneous competition make influence to the liquidity of port resource and the balance of ports involved in integration.

In the 13th Five-Year Plan, the reform process of promoting regional port integration is emphasized. At the same time, the development strategy of the "Marine Silk Road in the 21st Century" and the Yangtze River Economic Zone provides an opportunity for port resource integration in Jiangsu along the Yangtze River.

With the implementation and development of the "one belt and one way" initiative, Jiangsu's port along the Yangtze River will usher in a strategic opportunity to upgrade and develop its industrial structure.

(c)

And another main process of port integration regarding Yangtze River Delta is the merger of Ningbo -Zhoushan port.

“On the afternoon of 29th September ,2014, the unveiling ceremony of Ningbo Zhoushan Port Group Co., Ltd. was held in Ningbo Global Shipping Plaza, which marked the substantial integration of Ningbo Zhoushan Port with assets as a link. Ningbo Zhoushan Port Group is formed by Ningbo Port Group (the major shareholder of listed company Ningbo Port) and Zhoushan Port Group through equity equivalence transfer. Zhoushan SASAC transferred 100% equity of Zhoushan Port Group (including Zhoushan Port Share) to Ningbo Port Group without compensation. At the same time, Ningbo SAC transferred the equivalent equity of Ningbo Port Group to Zhoushan SAC without compensation. Ningbo Port Group was renamed Ningbo Zhoushan Port Group. Next, Ningbo Zhoushan Port Group will be injected into Zhejiang Haigang Group.

In 2014, the annual cargo throughput of Ningbo-Zhoushan Port reached 870 million tons, an increase of 7.9% over the same period last year, which continued to rank first in the world. The container throughput of Ningbo-Zhoushan Port reached 19.45 million standard boxes, an increase of 12% over the same period last year, ranking fifth in the world for the first time. It is reported that in the future, Ningbo-Zhoushan Port will become the world's largest port, with 19 ports and more than 600 productive berths. Container throughput in 2015 is expected to exceed 20 million standard boxes and reach a new level. ” (<http://shanghai.xinmin.cn/msrx/2015/09/30/28675923.htm>)

Ningbo-Zhoushan port integration is an intra-province port integration.

Although the port integration is finished by the joint capital of Zhoushan Port Group and Ningbo Port Group ,this is can be seen as enterprise-led form of port integration measures. But the government also make the contribution. And we can intuitively feel that the integration of ports can really drive the development of ports.

In order to fundamentally solve the problems of duplicate construction and homogeneous competition in Ningbo and Zhoushan related ports, and better participate in the implementation of national strategies such as "One Road and One Belt", "Yangtze River Economic Zone" and the construction of Zhoushan River-Sea Intermodal Transport Service Center, Zhejiang Provincial Party Committee and provincial government have recently made major decision-making arrangements to accelerate the integration development of the province's marine ports. Among all, the establishment of Ningbo Zhoushan Port is an important part.

The merger of Ningbo Port and Zhoushan port can not be simply defined as the “Ningbo Port plus Zhoushan Port.”. The intended result is not to double the benefit, but to achieve the goal of “1+1>2”.

Actually, we made the dream come true.

“In 2018, the annual cargo throughput of Ningbo-Zhoushan Port exceeded 1 billion tons, and continued to maintain the world's only super-large port of more than 1 billion tons, ranking the world's "ten consecutive champions". Meanwhile, the annual container throughput exceeded 26 million standard boxes, ranking the top three in the world's ports ranking for the first time.”

(<https://baijiahao.baidu.com/s?id=1622958111549243329&wfr=spider&for=p>)

(d)

Then let's focus on the development strategy of Yangtze River.

The strategy of Yangtze River is mainly government-lead. Through a series of

relevant policies, laws and regulations, the government has put forward different requirements for the construction of the Yangtze River Economic Zone at different stages, which fully indicates the enthusiasm of government participation. Besides, the strategy of Yangtze River is also an trans-provincial port integration process. “The Yangtze River Economic Zone, which spans three major regions of China, has unique advantages and great potential for development. Since the reform and opening up, the Yangtze River Economic Zone has developed into one of the regions with the strongest comprehensive strength and the greatest strategic support. ”

(http://www.gov.cn/xinwen/2014-09/25/content_2756090.htm)

The Yangtze River Economic Zone includes Jiangsu, Zhejiang, Anhui, Jiangxi, Hunan, Hubei, Sichuan, Yunnan, Guizhou, Shanghai and Chongqing. These provinces and municipalities are required to govern together to promote the upgrading of China's economic quality and efficiency so as to form the complementary advantages of upper, middle and lower reaches ,short the gap of regional development between the east, the mid and the the west in China.

Generally speaking, the development strategy of the Yangtze River can be divided into two stages.

On the first stage, the key words of Yangtze River Strategy is “rapidly development”.

In July 2013, General Secretary Xi Jinping proposed that “the Yangtze River Basin should strengthen cooperation, give full play to the role of inland navigation, and turn the whole basin into a golden waterway.” This is the first time that national leaders put forward the concept of "Golden Waterway".

In March 2014, Premier Li Keqiang explicitly put forward "relying on the golden waterway to build the Yangtze River Economic Zone" for the first time in his "Government Work Report". This marked that the Yangtze River Economic Zone has become a national strategy and its strategic position has been further improved. Speeding up the development of Yangtze River Economic Zone has been highlighting and the status of Yangtze River Economic Zone has been formally affirmed.

In November 2014, The Yangtze River Economic Zone has been defined as three major national strategies in China which means the Yangtze River Strategy has been up to the national level and development of Yangtze River Strategy has been further deepened.

In March 2015, at the National Two Sessions, Premier Li Keqiang's "Report on the Work of the Government" once again put forward "Promoting the construction of the Yangtze River Economic Belt".

However, with the rapid development of the Yangtze River Economic Zone, there are inevitably some urgent problems to be solved. The most prominent one is ecological protection. Some regions and enterprises blindly pursue economic development, ignoring the need to improve the ecological environment in the development, which leads to the deterioration of the ecological problems in the Yangtze River Basin and seriously restricts the development of the Yangtze River Economic Zone.

From then, the Yangtze River Economic Zone has stepped into the phase II.

In September 2016, according to the publication of the Outline of the Development

Planning of the Yangtze River Economic Zone, protecting and restoring the ecological environment of Yangtze River has been in the first place.

In the 13th Five-Year Plan of the State ,the strategic orientation of ecological priority and green development was emphasized again and the question of how to make to the “green and sustainable development ” in Yangtze River Zone has been further cleared.

In recent years,"The Yangtze River Economic Zone Ecological Environment Protection Plan", "the Yangtze River Coastal Line Protection and Development and Utilization Master Plan", and "Guiding Opinions on Strengthening the Green Development of Industry in the Yangtze River Economic Zone" have been issued one by another.

From the two steps of Yangtze River strategy, we can notice that the strategy requirements is not accelerating but green development. Actually, it also fits China's national conditions and meets the requirement of overall economic and social development.

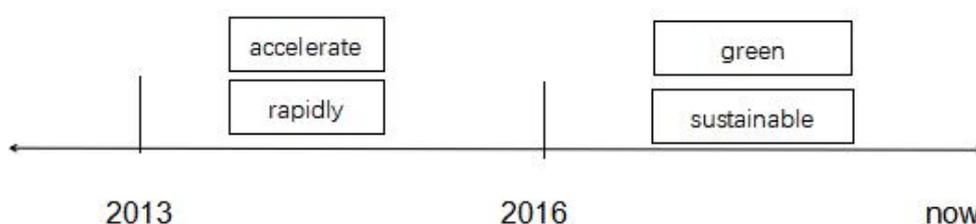


Figure 6: The two steps of Yangtze River Strategy

Table 4: The conclusion of four main steps in Yangtze River Delta.

	Lead force	Scope of port integration	Outcome at present
the Shanghai Port Management Committee,	Government-lead	Trans-provincial	the short-term advantage , need to find the sustainable, stable and long-term development.
the integration process of Jiangsu Port.	Enterprise-lead	Inter-provincial	Speed up the adjustment period, and try any effort to keep the balance of ports in Jiangsu port to let the Jiangsu stand out in the Yangtze River Delta
the "Yangtze River	Two-linked	Trans-provincial	Had made some achievement and

Development Strategy"			now need to focus on the environmental protection
the merger of Ningbo-Zhoushan port	Enterprise-linked	Inter-provincial	Keep the advantages of container ranking

Comparing to the Yangtze River Delta, the port integration appears in Bohai Bay and Pearl River Delta is later and seems less complicated

4.2.2 In Bohai bay

The main process of port integration in the Yangtze River Delta includes both inter-provincial and trans-provincial ways. The situation in Bohai Bay is not the same. So far, three main port integration appeared in Bohai bay are inter-provincial ones which has showed in the table 5:

Table 5: Three main port integration in Bohai bay

step	Province	time	description
i	Shandong Peninsula	In May 2003	Port integration of Rizhao and Lanshan
		In 2005	Port integration of Yantai Port, Penglai Port and Longkou Port
		In 2007	Yantai Port has realized the integration of ten ports.
		In 2006	Qingwei Container Terminal Co., Ltd
		In 2007	Riqing Container Terminal Co., Ltd
		in August	Port integration of

ii	Liaodong Peninsula	2006	between Yingkou port and Panjin port
		in September 2006	Port integration of between Dalian port and Jinzhou port
iii	Jing-jin-ji port group	In 2012	30-ton great port in Caofeidian area

(a)

The earliest case of integration in Bohai Bay is the integration of Rizhao Port and Lanshan Port appeared in Shandong Peninsula. In May 2003, Rizhao Port Authority and Lanshan Port Authority jointly reorganized into Rizhao Port (Group) Co., Ltd. The two ports realized the effective integration of resources from the system, which not only broke the impasse of the previous management system, but also helped the unified planning and coordinated development of the port.

Table 6: Port data of Rizhao port in 2003 and 2004

Port	2003	2014
The number of berth	27	37
Terminal length (meter)	5514	6114
The number of 10,000tons berth	17	19
Throughput (10,000tons)	4507	5108

Source:National data in 2003,2004

<http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0G0P02&sj=2003>

The port integration of Rizhao and Lanshan is intra-provincial process. They are both in Shandong Peninsula.

In 2005, Yantai Port Group realized the reorganization and integration of Yantai Port, Penglai Port and Longkou Port. In 2007, the Master Plan of Yantai Port was approved by the relevant state departments. Yantai Port has realized the integration of ten ports. The existing ports are collectively called Yantai Port. They are under the

jurisdiction of Zhifu Bay, Yantai Port West, Longkou, Penglai East, Penglai West, Luanjiakou, Laizhou, Haiyang, Changdao and Muping.

Table 7: Port data of Yantai port during 2005-2008

Port	2005	2006	2007	2008
The number of berth	43	53	82	85
Terminal length (meter)	7357	8769	13151	14220
The number of 10,000tons berth	23	25	39	42
Throughput (10,000tons)	4506	6076	10129	11189

Source:National Bureau of Statistics of China during 2005-2008

<http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0G0P02&sj=2003>

From the table 6 and 7, we can notice that after the port integration, port resource and the throughput had all been put into a more higher level. From the statistics , it indicated us that the port integration is really make sense.

In 2006, Qingdao Port and Weihai Port established Qingwei Container Terminal Co., Ltd. in Shandong Province. In 2007, the Riqing Container Company, a joint venture between Qingdao Port and Rizhao Port, was officially listed and operated. “There are two container berths in Rizhao Port cooperating with Qingdao Port, each of which has 50% equity.” (Liu Y., 2006)

(b)

There are two strategic Collaboration Agreement between ports nearby appeared in Liaodong Peninsula as the second process of port integration, .It included two agreements, the one is between Yingkou port and Panjin port and the other is Dalian port and Jinzhou port.

The agreement between Yingkou Port and Panjin Port in Liaoning Province was signed in August 2006. The two sides will jointly develop and construct Panjin New Port Area by establishing joint ventures. At the signing ceremony, representatives of Panjin and Yingkou jointly signed the joint venture contract. According to the contract, Panjin Port Authority and Yingkou Port Group Co., Ltd. decided to set up joint ventures in Panjin on the principle of complementary advantages and mutually beneficial cooperation to speed up the construction and development of Panjin Port. The first phase of construction will form a port handling capacity of more than 6 million tons; four berths will be built in the period. After the completion of the new port area, its main functions are loading and unloading, storing and transporting, barging crude oil and refined oil goods, supplemented by loading and unloading, storing and transporting groceries of import and export ports, and at the same time, the old port area of Panjin Port will be revitalized, including wharf, equipment, machinery, storage tank area, land, civil construction, power supply, water supply,

drainage, fire fighting, heating and other phases. Assets including supporting facilities should be used to improve the cargo handling capacity and throughput of Panjin Old Port Area and strive to increase the throughput of the Old Port Area to 2 million tons by the end of 2008. This cooperation will be of great significance to the rapid development of the two ports. (Liu Y.,2006)

In September of the same year, Dalian Port and Jinzhou Port signed the Framework Agreement for Strategic Cooperation, which will carry out comprehensive cooperation in the areas of capital market, port logistics and the development and construction of the western waters of Jinzhou Port. As the brother port of Liaoning Province, Dalian Port and Jinzhou Port have cooperated in container capital and achieved good results. After the establishment of the strategic partnership, the two sides will make full use of the brand, service functions of the two ports and the resource market in the Bohai Rim and related hinterland to promote the common development of the two ports. They will give priority to each other as partners in capital expansion, business development and cargo transfer, and give priority to meeting the business development needs of the other. The establishment of the strategic cooperation relationship between the two ports will be conducive to speeding up the construction of Dalian Northeast Asia International Shipping Center, giving full play to the comparative advantages of the two ports, realizing management docking, complementary functions and expanding the core competitiveness of the two ports.

Both the integration in Shandong Peninsula and the one in Liaodong Peninsula are enterprise-lead. The integration are all formed by joint ventures. These joint ventures reconstruct the capital structure and balance the equity of enterprises to cooperate so that the ports involved in the port integration reasonably share port

resources ,eliminate homogeneity effect to bring the advantage to all ports and realize the multilateral benefit.

(c)

The third main step of port integration in Bohai Bay appeared in Jing-jin-ji port group which is the establishment of Caofeidian Industrial Development Co., Ltd.

Hebei Province requires Qinhuangdao Port Group to shoulder the responsibility of port resources in Hebei Province and participate in the construction and operation of other ports in the province with the market-oriented mode of capital operation and asset grafting. In 2012, Qinhuangdao Port, together with Shougang, Hebei Construction Investment Company, Tangshan Port Investment Company and Tangshan Port Investment Company, established Caofeidian Industrial Development Co., Ltd. in the form of joint stock system to jointly develop Caofeidian Port Area.

Caofeidian attracts much attention because of its unique geographical advantages. Caofeidian is located in the junction zone of Northeast, Northwest and East China Economic Zone. The hinterland around the port area is the most concentrated area for the production of energy raw materials such as coal, steel, building materials, electric power, chemical industry and so on. It is also one of the energy raw material industrial bases that the state strives to build. Under this background, Caofeidian area can exactly complete the important task of "coal transportation from north to south". Caofeidian is located at the top of the Bohai deep trough, the largest inland sea in China. It has formed a road network system connecting Beijing, Tianjin and Bohai Sea, facing the three north areas and connecting the whole country, with low comprehensive transportation cost. Caofeidian Port Area has 69.5 kilometers of deep

water coastline. Moreover, the port has not been frozen or silted up all year round. It is the only "diamond class" port in the Bohai Sea. It can build 300,000 tons of large berths without digging channels and pools. We have already mentioned that the Bohai Bay is rich in petroleum gas resources, and natural ports like Caofeidian can just complete the construction of oil and gas special terminal. At present, Caofeidian Port has built 24 berths, such as ore terminal, crude oil terminal and coal terminal. Deepwater harbor has begun to take shape, with design throughput capacity exceeding 190 million tons.(Cao, 2009)

Table 8 : The conclusion of port integration in Bohai Bay

	Lead force	Scope of port integration	Outcome at present
Liaoning / Shandong Peninsula	Enterprise-lead	Inter-provincial	the establishment of joint companies, has achieved benefit partly
Jing-Ji-Yi port group	Two-linked	Inter-provincial	Attract government attention , build-up 300,000 tons of

			large berths
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The port integration in Bohai Bay are mainly finished by the joint companies which belong to enterprise-lead according to the classification. And the government has paid close attention to the establishment of Caofeidian port group, and now Caofeidian port group has built as an “diamond-class” harbour which has 300,000 tons of large berths.

4.2.3 In Pearl River Delta

Compared with the Yangtze River Delta and the Bohai Bay, the integration process of the Pearl River Delta is relatively slow.

In December 2008, the National Development and Reform Commission promulgated the Outline of the Pearl River Delta Regional Reform and Development Plan (2008-2020). It is pointed out in the outline that efforts should be made to develop the Pearl River Delta into a major dry bulk concentration area in South China within 3-5 years. Its greatest significance lies in breaking the past situation of the Pearl River Delta as an independent administrative region and making it a comprehensive development of the national will. Accelerating the process of integration of the Pearl River Delta will provide a broader space for the development of maritime transport, and the port of the Pearl River Delta will also get new sources of goods to mitigate the impact of the financial crisis.

Before the integration, the Pearl River Delta belonged to "one city, one port". There are fierce homogenization competition and inadequate allocation of port resources among ports. There are a large number of ports, but due to the lack of effective

management, centralized port functions and fierce competition among ports, the Pearl River Delta has a quantitative advantage in ports, but lacks a breakthrough in quality.

After years of development and construction, Guangdong has basically formed a global port development pattern with Guangzhou Port, Shenzhen Port, Zhuhai Port, Shantou Port, Zhanjiang Port, Foshan Port and Zhaoqing Port as the leading ports. By the end of 2017, there were 2715 productive berths in the provincial ports, of which 309 berths were over 10,000 tons, accounting for about one eighth of the country, ranking second in the country. Container throughput is 66.27 million standard boxes, ranking the first in the country. ((Yan, 2010)

Take Hong Kong Port and Shenzhen Port for example, "Hong Kong is one of the busiest and most efficient international container ports in the world, and is also the main hub port in the global supply chain. Hong Kong harbor brings together a large number of internationally renowned ship owners, whose tonnage of ship ownership, control or management reaches 48.2 million tons, accounting for 10% of the global total. Hong Kong Port is becoming an "UK" international shipping center. Its successful transformation depends on the rapid development of Shenzhen Port and the effective sharing of international container logistics. Compared with Hong Kong, Shenzhen's construction and operation costs are relatively low, which also attracts Hong Kong's port and shipping industry to invest in Wharf construction. The complementary role of the two ports in the bilateral hub strategy is increasing. Hong Kong and Shenzhen are complementary and indispensable. In the process of integration, Hong Kong and Shenzhen have made a clear division of labor, restructured their functions and allocated resources rationally. Shenzhen provides an economic basis for the development of Hong Kong, and Hong Kong brings trade

demand for the growing growth of Shenzhen. Just like the integration of Zhoushan Port in Ningbo in the Yangtze River Delta, the mutual cooperation and sharing between ports is a win-win mode.” (Yan, 2010)

The Guangdong Provincial Department of Transport clearly put forward the "Guangdong Port Resources Integration Scheme" (draft) in the "Reply to Proposal No. 20180201 of the 12th Guangdong Provincial Committee ". The integration plan follows the principles of government guidance, enterprise leadership and market operation. It is proposed that Guangzhou Port Group and Shenzhen Port Group should be the two main bodies of 14 coastal cities and Foshan City to integrate state-owned port assets.

It has been clearly mentioned in the reply that following the guidance of the government means that the whole contract in the Pearl River Delta can not be separated from the participation of the government.

As far as another integration path is concerned, although the Pearl River Delta only includes one province regionally, cross-provincial integration also exists.

The development of the Pearl River Delta started late and lacked powerful shipping talents. If we can get professional guidance from foreign countries, we believe that this will greatly accelerate the development of the Pearl River Delta. Hong Kong and Macao used to be foreign colonies. After returning to China, Hong Kong and Macao implemented "one country, two systems", and a large number of foreign-funded enterprises stayed in Guangdong Province. Therefore, compared with the Yangtze River Delta and the Bohai Bay, the Pearl River Delta has the advantage of attracting foreign investment. Actively attracting foreign capital and private capital, combining

with state-owned capital investment, and establishing diversified investment, compared with state-owned capital, these capital urgently need to seek the integration of port resources, with lower transaction costs. Diversified investment can diversify the investment risk of state-owned enterprises. More importantly, diversified investment helps attract foreign professionals. Establishing transnational operation in the Pearl River Delta can be regarded as another kind of "cross-regional integration". Foreign capital provides financial needs for the development of the Pearl River Delta, foreign capital invests in the economic infrastructure of the port, foreign commissioners provide technical support for the development of the port. With the growing of the Pearl River Delta, the demand for trade has steadily increased, and foreign investment has been reported. With the mutual benefit of foreign enterprises, the development of the Pearl River Delta is expected to be better and better.

5 Conclusion of the port integration

5.1 The trend of port integration

5.1.1 Government participation

Government participation is a trend for port integration. If not, joint enterprises and companies may have benefit in a short time, but this good relationship is purely based on interests which is not stable enough for further development. The participation of government can actually stabilize this relationship. The government and the port enterprises supervise and restrict each other. According to the relevant regulations issued by the government and the actual development needs, government and port enterprises can complement the other side's strengths to make the outcome of port integration achieve win-win goals even better.

Government participation marks port integration draw more and more attentions which can greatly enhance the confidence of port enterprises in the process of port integration. In other words, government participation exert an imperceptible influence on the process of port integration. Those enterprises have the reason to believe that port integration is really good for themselves and helpful for the district and even to the whole province, the whole country.

No matter in Yangtze River Delta, Bohai bay or in Pearl River Delta, government has involved in the process of port integration more or less.

5.1.2 Trans-provincial port integration

Although in the previous process of port integration, we can see that the process is still mainly based on inter-provincial integration, but in the future, trans-provincial integration is inevitable. It is far from enough if we just stay in the province as a unit and only aim at the provincial economy . Trans-provincial integration requires a gradual process. Starting with the integration within the province, when the advantages and benefits of integration within the province accumulate to a certain extent, then it's time for us to rise port integration to a larger scale .

5.1.3 Sustainable and stable development

By comparing the process and outcome of port integration, we can find that port integration has more or less brought advantages to port development, but this advantage is only short-term. The so-called integration benefits we really want and pursue is long-term, sustainable and stable.

At this point, the most obvious integration process is the Yangtze River development strategy which changes from the rapid development of the first stage to the green development and sustainable development of the second stage. If the development can be finished at the price of ecological problems , even if short-term economic benefits can be obtained, such benefits are meaningless in the long run. Port integration is not an event that happens at a time point, but a period of time, from now on to the future. Any decision-making and strategy is born for sustainable and stable development, and port integration is no exception.

As mentioned in the previous article, some ports in order to attract customers, special measures such as malicious price reduction are taken to attract customers on the surface, but in the long run, for the enterprise itself, the cost can not be covered ,

profits can not be reflected, and ultimately there is only bankruptcy.

Sustainable and stable development is not only the inevitable trend of port integration, but also the realistic need of China's national conditions. Since China's reform and opening up, we have always adhered to the strategy of sustainable development and taken the road of socialism with Chinese characteristics. As a shipping power, China's shipping development should be pay much attention.

5.2 The suggestion of port integration

5.2.1 Site-specific recommendation

China is a big port country, but the development of ports is not balanced, and the geographical advantages of each port area and transport demand are also different.

The integration of the Yangtze River Delta was the earliest and reached a relatively mature stage, while the port integration of the Bohai Bay and the Pearl River Delta has accelerated significantly this year.

The pollution problem in the Yangtze River Delta has become a fatal problem that can not be ignored. In recent years, the government has also issued relevant regulations on green governance. It is necessary for the relevant departments to investigate the pollution and other phenomena on the shoreline or wharf. This also deserves the attention of the other two port groups.

The Bohai Bay region needs to rationally develop coastline resources, strengthen the construction and maintenance of port facilities, speed up the construction of large oil and gas terminals, make use of its own resource advantages, give full play to port

characteristics, and make it more prominent in the position of China's port groups. The Pearl River Delta should make use of its advantages of foreign capital resources, establish foreign investment, and integrate its own ports with the successful cases of mature ports in developed countries.

According to local conditions, the ports should be re-positioned in terms of function and division of labor, so as to achieve coordinated development of dislocation. So-called, big ships enter big ports, small boats enter small ports, deep water deep, shallow water shallow, port cooperation and mutual cooperation, to achieve the optimal use of coastline resources in the province, from the planning level to avoid low-level duplication of needs, this is not only for the needs of the profitability of ports, but also for the development of China's major port groups, and even to enter the international arena in the future.

5.2.2 Cooperation and competition

Competition and cooperation in ports have always been a problem in ports. If we abandon the spirit of cooperation, the competition between ports will inevitably be chaotic and disorderly. Neighbouring ports have similar functional zones and homogeneous competition has always been a hidden danger of port development. Port integration is just for the better development of ports, to achieve the purpose of mutual benefit, that is to say, the win-win model. Therefore, in the process of port integration, special attention should be paid to maintaining the relationship between port competition and cooperation.

Resource sharing enables land, coastline and airline resources to be rationally planned, invested, constructed and managed, thus maximizing the utilization of

resources and eliminating the waste of resources so that there is no longer excessive erosion of adjacent hinterland or malicious price reduction.

5.2.3 Multivariate Investment

In the process of integration in the Pearl River Delta, it has been mentioned that diversified investment can share the risk of investment and is conducive to the introduction of foreign professionals and advanced technology. Similarly, in the process of port integration, we should actively learn from foreign successful cases, and then combine with our own actual development needs. With a lesson from the past, the port integration process can be relatively accelerated, and the integration results are often more satisfied.

5.2.4 The needs of The Time

One of the trends of port integration is sustainable and stable development which is the Time need. Paying attention to environmental issues and the establishment of green ports are also the requirements of the Time. Whether the green sustainable development strategy of the Chinese government or the low sulfur emission standards issued by the world or organizations, it reflects the new requirements for port development of the country and even the whole world.

After the integration of several ports, it is obvious that our port integration has achieved some phased results through the statistical growth of TEU and terminal equipment, but at the same time, the problems the ports facing still exist, and the competition and cooperation between ports have not reached a best point, but I believe that in the future, through our step-by-step efforts, we will combine all ports.

According to the development needs and relevant regulations, our port resources will also have opportunities to be better utilized, the port service capacity will be further enhanced, and China's international shipping influence and even national strength will also have opportunities to rise as well.

6 Advantage and insufficiency

In my paper, I mainly analyze the Bohai Bay port group in north China, the Yangtze River port group in mid China and Pearl River port group in south China and by concluding the port integration in those areas, I got some ideas and suggestions about port integration. However, some statistics have not been found and the research did not cover all port groups in China which still need to be further discussed.

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