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WORLD MARITIME UNIVERSITY

Shanghai, China

ITL – 2006

**THE STUDY ON CONTAINER SHIPPING LINE
BUINESS OF DALIAN PORT**

By

ZHANG Fan
China

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

MASTER OF SCIENCE

(INTERNATIONAL TRANSPORT AND LOGISTICS)

2006

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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 material is included for which a degree has previously been conferred on me.

The contents of this research paper reflect my own personal views, and are not necessarily by the University.

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After great effort of over than six months, my dissertation, which is the study on container shipping line business of Dalian port, has finally come to the end. This dissertation is completed under the instructions of my supervisor, Professor SHI Xin. As Professor SHI's strict requirements of study, great passion for working and respectable high efficiency at the process of this work, I can complete my research with required quality and quantity. Hence, these influential personalities will continuously affect my attitudes towards study and work tremendously in my life. I have also benefited quite a lot from the instructions and ability trained by Professor Shi during the daily communication in the progression of this dissertation.

Meanwhile, the finish of this dissertation can't leave the contribution of all professors from WMU and SMU, who help me building a completed knowledge network, and assessors, who give me a lot of benefit suggestions.

During the progression of this dissertation, I have also got enormous help from many classmates and friends and they have contributed to my dissertation very much as well. Hereby, I give my sincere thanks to them.

Finally, I am going to thank my parents and all the people caring for me, who give me strong support both in life and study during these years.

ABSTRACT

Title of Research paper: THE STUDY ON CONTAINER SHIPPING LINE BUSINESS OF DALIAN PORT

Degree MSc

The rejuvenation of industrial base of Northeast China is one of the major tasks of China. There exist great strategic meanings in construction Dalian into the international shipping center of Northeast Asia.

This article, according to the current status of Dalian port, by analysis the demand and the supply of containers in Dalian port, discuss the outline of Dalian's future container shipping line business and provide some suggestion to the authority of Dalian port.

In fact, according to former experience, the setting up of the shipping center is the basic of a financial, trade and economic center. This is because the form of the shipping center will also promote the development of the port, the economy, and the trade of the city.

There are 7 parts in my paper, including introduction, five mainly chapters, and conclusion, in order to analysis the current container status of Dalian port and predict the future development of container shipping line business in Dalian port.

The introduction describes the background of China rejuvenation of northeast rust-belt industrial bases and the opportunity and challenges what Dalian port faces.

The Chapter two analyzes the basic condition of Dalian port, including the geographic position, the cargo volume and the near port in northeast Asia.

The Chapter Three discusses economy development of the city of Dalian and the interior zone of Dalian port.

The Chapter Four is about the development condition of container shipping line business in Dalian port, including the advantages, disadvantages, and environment

factors in competition.

The Chapter Five according to the relationship between economic development and container throughput predicts the container cargo throughput in Dalian port in future and make up container shipping line program, including layout, ship number, and ship style and so on, according to the above data and analysis.

The Chapter Six is the action to develop container shipping line business in Dalian port to achieve the goal of forecast.

The final chapter is the conclusion of the dissertation.

KEYWORDS: Container shipping line, Container throughput, Economic development, Dalian international shipping center, export trade, GDP

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LIST OF ABBREVIATIONS

GDP	Gross Domestic Product
NVOCC	Non Vessel Operating Owning Common Carrier
TEU	twenty-foot equivalent unit

Chapter I

Introduction

1.1 The background of Dalian port container shipping line business development

The strategy of the rejuvenation of northeast China's rust-belt industrial bases brings opportunity and challenge to Dalian Port Construction into an International Shipping Centre for Northeast Asia.

In October 2003, China adopted strategy of the rejuvenation of northeast China's rust-belt industrial bases. In this strategy, we should make full use of the natural condition and advantage of northern china and build Dalian into one of the greatest shipping center of the world. The great step, which is formed by the central government, is towards the rejuvenation of the northeast china's rust-belt industrial base and also inevitable to the development and opens up of the northeast china.

In the first year of adopting the strategy, Dalian, has launched an ambitious plan for construction into an international shipping centre for northeast Asia. Under the plan, the Dalian port is expected to handle 80 million tons of petroleum, 20 million tons of ores and 10 million TEU each year by 2010.

When building Dalian into the national shipping center of northeast china, this great strategy will considerate China as a whole, and a great shipping center will be formed with base port of Shenzhen, Hong Kong, Shanghai and Dalian, thus the transportation layout of China will be wholly changed. The three shipping centers in China will connect not only China herself but also the whole world with even closer relationship with each other, which will boost and promote world economic

cooperation in the future.

At present, the port throughput rose rapidly. The navigation trade market which started operation this year, upgraded the port function in China. The Dalian port-zone interactive area passed the examination and approval by the nation, which is the second one of its kind in China, and bears great significance for increasing tradition capacity of the Free Trade Zone and international competitiveness of Dalian port.

1.2 The significance of dissertation

The purpose of dissertation is to make some strategic suggestions to Dalian port in order to position the Dalian container shipping line business and get great development. And the port could according to research result improve the construction of infrastructure, port service, information network and so on. The most important is that Dalian port can make well prepare to attract more home and international shipping companies to Dalian port open new container shipping line business according to forecast result.

Dalian base port is lack of strong competitive advantage compared to other base ports in east north ports. The main cause is lack of ocean going shipping line to outside world, while its near-sea shipping lines could only serve as a feeder port but not as a base port. If Dalian wants to be the shipping center in the Northeast Asia, the port has to build itself to a base port of ocean going container shipping line of big shipping companies.

1.3 The research approach of dissertation

The container shipping line business plan is the founded with the aim to study the technical management of the shipping line, one of its main task is to finalize the number of the container shipping line in the port, the make up of the cargo of each line, and its route of the shipping line with the analyze of the condition of the port and the volume of cargo in a certain period in a navigational area.

As an international shipping center and hoping to development container shipping line business, the cargo is the basic and the most important. The strong support of Dalian port is the wide interior zone, including the three provinces in northeast China, and east region of Inner Mongolia province. So by analysis to Dalian port interior zone economic status and characters, the future container cargo volume can be forecast, and according to cargo volume proportion of different container shipping line businesss in Dalian port and the carriage power of each shipping line, the final container shipping line program can be calculated, which is the base of providing strategic suggestion and research to make development plan.

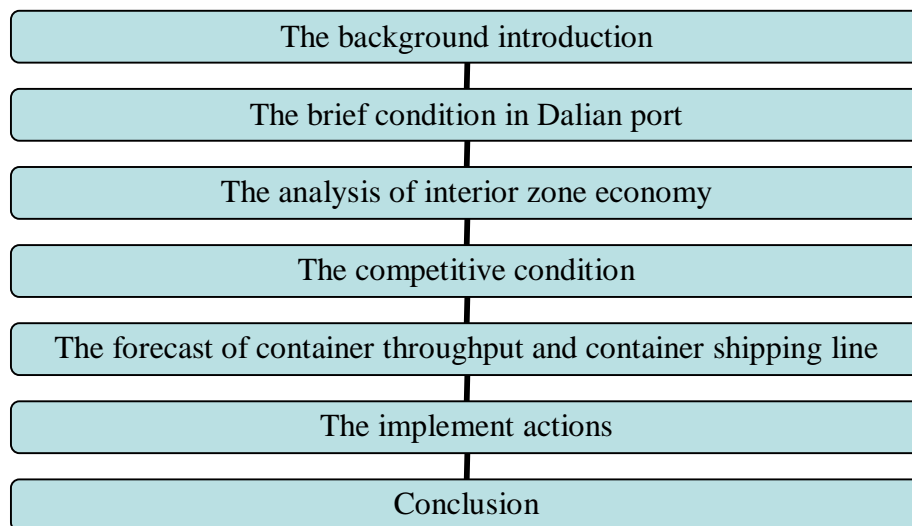


FIGURE 1-1 THE STRUCTURE OF DISSERTATION

Chapter II

The Brief Introduction of Dalian Port

2.1 The actuality of Dalian port

2.1.1 The geographic position

On the east coast of Eurasia continent and the southern tip of Liaodong peninsular in northeast China, Dalian stretches from 120°58' to 123°31' east longitude and 38°43' to 40°10' north latitude, with the Yellow Sea on the east, Bohai Sea on the west, 1,906 kilometers length of coastline, facing the Shandong peninsular across the sea on the south and backed up by the vast Northeast Plain on the north. Dalian is the marine gateway of northeast China, North China, East China and the whole world. It is also an important port, and a trade, industry and tourism city.



Source: <http://www.chinaports.com.cn/>

FIGURE 2-1 THE LOCATION OF DALIAN (i)



Source: <http://www.chinaports.com.cn/>

FIGURE 2-2 THE LOCATION OF DALIAN (ii)

Dalian covers an area of 12,574 square kilometers, among which 2,415 square kilometers of area is the old city. This area abounds with mountains and hills, while plains and lowlands are rarely seen. The terrain, high and broad on the north, low and narrow on the south, tilts to the Yellow Sea on the southeast and the Bohai Sea on the northwest from the center. The region which faces the Yellow Sea is long and gentle. The Qianshan Mountain range of Changbaishan Mountain system passes through the whole region from north to south. Mountain regions and long eroded foothills are widely dispersed within the region. Plains and lowlands are only interspersed near the confluence and in some valleys.

2.1.2 The distribution network of Dalian port

The distribution network is one of the most important infrastructures. Northeast China area has the consummate railway network, mature highway network, relatively

completed aviation transport system and run-through south and north pipeline system. It has formed the integrative and complex interactive transport network with reasonable layout and completed function, connecting with home and abroad network, in which, port as the gateway, railway as the artery, highway as the framework, and cooperated with civil aviation, pipeline and maritime transport.

The railway network can connect Dalian with Shenyang, An'Shan and other northeast cities and Dalian port, Dayaowan port, Lvshun port and other two ports, and access to national railway network. The length of railway is up to 1,384 kilometer and the cargo volume about 24 million tons. The opening of 4 container railway lines to interior zone of northeast China and the establishment of 3 interior hub ports form the container cargo network in northeast area. The construction of railway plus ferry from Dalian to Yantai through Bohai channel makes Dalian become the hinge city connecting northeast and eastern railway.

The length of highway is 4,560 kilometer, including 429 kilometer freeway and the first rank highway, and 1,476 kilometer the second rank highway. The cargo annual cargo volume is up to 155 million tons and turnover 3.48 billion tons kilometer. By integrated highway system, the port forms the economic activities zone where are circled as the time of from boundary to Dalian city within 2 hours.

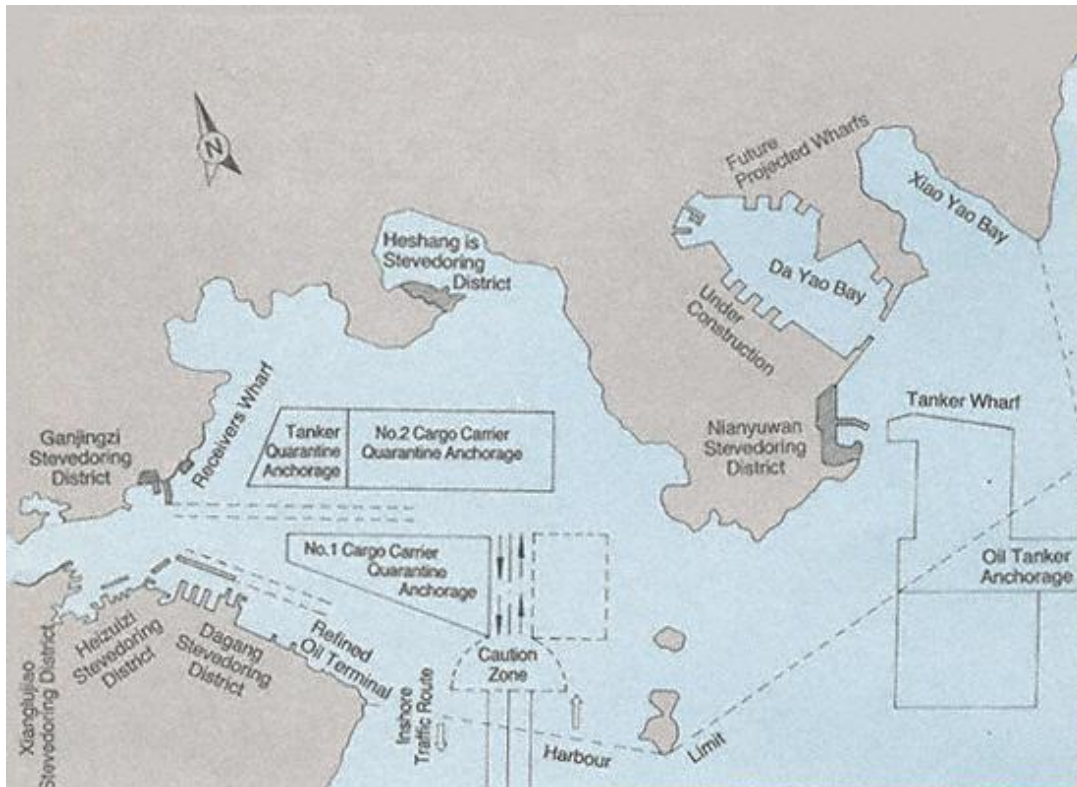
Dalian international air port has 80 airlines, including 12 international lines, as the fourth in nation. The annual number of throughput passenger is 3 million, and cargo 80,000 tons, which is the first air port in northeast China.

2.2 The infrastructure and shipping industry of Dalian port

2.2.1 The status of infrastructure of Dalian port

At present, Dalian port has 209 port berths, including 175 productivity port berths, 34 non-productivity port berths, with 24,611 meters and 5,316 meters length of coastline. In the productivity port berth, there are 166 berths of 500 tons level, 55 deep berths of 10,000 tons level, 9 deep port berths of 50,000 tons level, 1 deep berth

of 100,000 tons level, 2 deep berths of 300,000tons level. The annual overturn capability is 107.56 million tons, and the container throughput capability is 1.9 million TEU.



Source: <http://www.chinaports.com.cn/>

FIGURE 2-3 THE CONSISTANCE OF DALIAN PORT

Dalian port has 9 seawalls, with 7000 meters long. There are 7 sea-routes in Dalian port, in which, the hub port sea-route with -10.5 meters depth, 270 meters width and 2,500 length, the Xianglujiao port with -8 meters depth and 100 meters width, the new port crude oil dock with -17.5 meters depth and 300 meters width, the Dayaowan port with -13.5 meters depth and 210 meters width, the Dalianwan dock with -9.5 meters depth and 100 meters width.

Dalian has the most predominant port and shore resource. Above 80% deep water shoreline converges in Dalian area. The port has wide sea-route and deep water without frozen and silted. Dalian has formed special deep water berths including 300,000 tons crude oil dock, 300,000 tons ore dock and Dalianwan port container dock. At present, the centre of Dalian port has begun move to the north and expand

to the west, and with the assistant of Twins island bay and Changxing Island, the Dalian ports group is constructed.

2.2.2 The status of Dalian shipping companies

There are many national famous shipping enterprises in Dalian, including COSCO Dalian, China Shipping, Sinotrans and total having 110 companies. There are 350 vessels, 1.6 million tons carrying capacity, the scale of carrying power occupying above 90% of the whole province, annual carrying passengers 6.2 million person times, cargo 30 million tons, occupying 60% and 30% respectively of Dalian port throughput. Dalian has international container shipping line about 70 lines and 11 inland lines.

There are 14 international shipping enterprises setting up branches in Dalian, including Mearsk Sealand, OOCL, NYK, MOL, NOL, APL, P&O Lloyd, CMA CGM, Hanjin, Hyundai, and Evergreen and so on.

Dalian as a port city has formed completed shipping industry system, supporting the development of shipping companies. At present, Dalian has about 1200 companies relative with shipping industry, including 600 international freight forwarders, 25 shipping agencies, 9 shipping management companies, 40 companies of NVOCC, 52 branches of international enterprise, 320 building and mending shipyards.

TABLE 2-4 CARRYING POWER OF DALIAN SHIPPING COMPANIES

Unit	number of company	number of vessel	deadweight	teu	passenger
National Company	3	107	1,100,000	800	10,000
Local Company	107	243	500,000	1,600	11,000
Shipping Management Company	9	80	1,000,000		
Total	119	430	2,600	2,400	21,000

Source: Collect data from Internet

The capacity of transport and storage is high quality and quantity, with 8.5 million square meter storage capacity, having a national foodstuff warehouse which is the biggest and most modern with 900 million kilogram cubage. Dalian port cooperated with Japan, Norway and Holland, constructs a 60,000 cube meter liquid pot, as the most modern liquid chemical industrial products transport base in Asia area.

Chapter III

The Analysis of Economy and Export trade Status of The City of Dalian and the Zone of Interior

3.1 The core market - Dalian region's trade and cargo volume

Dalian is an important national industry base with integrated industry sorts, forming the industry system mainly for machine production, electronic production, textile, costume, metallurgy, petroleum chemical, foodstuff, medicine and so on. The production of ship, gas engine, refrigerant device, and axletree has become national head horse. The scale and output of breeding shrimp, shellfish, echinus, sea cucumber and edible seaweed occupied 90% of national total output. From the year 2000, the gross production value of industry and agriculture of Dalian still hold on the top of Liaoning province. In 2005, Dalian GDP is up to 229.0 billion RMB.

Dalian has perfect geographic environment because it is the nearest point from the circle Bohai Sea area and Liaodong peninsular to abroad countries and the convenient gateway of Northeast Asia entering into the Pacific Ocean. This provides great opportunity and environment to the economy development of Dalian.

With the assistance of port economy, the export trade of Dalian city is well developed. According to the statistic data in 2002, 2003, and 2004, the proportion of Dalian export trade value is account for 60%, 65%, and 60% of Liaoning province respectively. In 2005, the import and export value of export trade is up to 25.6 billion USD, as 45% of the total value of the three provinces in northeast China. The development of industry related with port, such as building and mending ship, petroleum & chemical, chemical industry, fishery, simulates the container throughput

of Dalian port. In 2004, half of the cargo throughput in Dalian port comes from the city itself export trade, playing dominant role.

At present, Dalian is wholly executing the strategy of internationalization by enforcing information, technology system construction and harmony development. It is planned that per capita GDP of Dalian increase to 7,000 USD and the proportion of service industry value-added above the half of GDP, the proportion of output value of high technique products up to 40% of the whole city industry output value and the civilization about 70%.

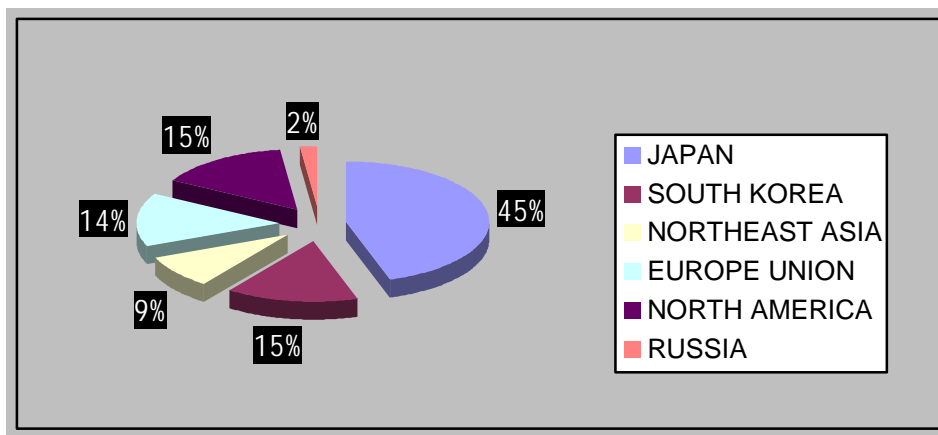
3.2 The second layout market - Liaoning provinces, especially the five major cities' trade and cargo volume

Recent years, the economy development of Liaoning province keeps on rapidly increase; GDP up to 800.5 billion RMB in 2005, increasing 12.3% compared 2004. The area has abundant high utility mineral resources with the reserves of iron ore, andalusite, magnesite, boron, diamond and boulder as the first in the nation. Meanwhile, the reserves of cuprum, plumbum, zinc, gold, coal and petroleum also play important roles in national mineral reserves. The salt field area in Liaoning is about 10 million square meter; with annual output 20 million tons, occupying 1/7 of nation.

As the earliest founded heavy industry base, Liaoning has completed sorts and solid foundation industry system, and heavy petroleum chemical industry has great sense of the whole province development. The mainly industrial products include coal, crude oil, concrete, steels, wood, chemical fiber, paper, cloth, sugar, tobacco, dairy production, and so on. The output of raw iron, steel, steel processing are the second of China, and the output of crude oil, alkali, and crude salt are the fourth.

The import and export value of export trade keeps on increasing. In the year of 2002, 2003, 2004, the import and export value of export trade value of Liaoning account for 72.9%, 72.3%, and 71.7% respectively in northeast China. In the category of export products, primary products include aquatic products and frozen

chicken, industrial finished products includes cotton cloth, silk, machine and so on. In the year of 2005, total export value reaches 41.0 billion USD, including import value 17.6 billion USD, export value 23.4 billion USD. International trade mainly with around countries and area, the first five trade partners are Japan, America, South Korea, Holland and Hong Kong, in which, the trade with Northeast Asia area occupied about the half, mainly including Japan, South Korea, North Korea, and Russia.



Source: <http://www.daliandaily.com.cn>

FIGURE 3-1 THE RATIO OF EXPORT TRADE VOLUME OF LIAONING

In the scope where the capital city of Liaoning province, Shenyang, as core, 150 kilometer as the radius, there are four big cities, which is An' Shan as the steel city, Fushun as a coal city, Benxi as the coal and oil ore city, and Liaoyang as the fiber city. In the year of 2003 Shenyang GDP is 160 billion RMB, import and export value of external is 4.26 billion USD; An' Shan GDP is 80.1 billion RMB, export value is 400 million RMB; Fushun GDP is 31.45 billion RMB, export value is 240 million USD; Benxi GDP is 23.46 billion RMB, export value is 93.7 million USD; Liaoning GDP is 20.3 billion RMB, export value is 65.02 million USD. Total GDP of above five cities is 315.4 billion RMB, occupying 73.8% of Liaoning province GDP except Dalian city; the international trade value is 5.84 billion US dollar, occupying 70% of Liaoning province except Dalian city. In conclusion, the five cities have important effect on Dalian port container throughput and the whole Liaoning province,

especially 5 major cities, is defined as the second layout market of Dalian port.

TABLE3-2 THE CARGO VOLUME OF THE FIVE MAJOR CITIES THROUGH DALIAN PORT IN 2002(million tons)

City	Shenyang	An' Shan	Fushun	Benxi	Liaoyang
The cargo volume	19.36	9.75	2.95	2.69	2.51

Source: Collect data from Internet

3.3 The third layout market – Heilongjiang, Jilin provinces' trade and economic volume

Both of Heilongjiang and Jilin provinces are in the middle of Northeast China, with abundant natural resources and developed industry of agriculture, forestry and energy source. Except the frontier trade with Russia and South Korea, the main trade of this area is achieved by Dalian port. However, according to GDP and the principle of 'far distance, less contribution', two provinces have less effect than the five major cities of Liaoning provinces, so this area is circled as the three layout market.

The provinces of Heilongjiang and Jilin have abundant natural resources, with 120 kinds of found mineral resources, occupying 64% of China. There are 91 billion coals, accounting for 10% of national reserves, 50% national petroleum reserves, 12 billion iron ore, accounting for 25% national reserves. Meanwhile, there is 20% national plantation, with 70.29(1999) million foodstuff output of three provinces, occupying 13.8% national title output, including rice, wheat, corn, broomcorn, millet, soybean, beet and so on. Heave industry take an important role, especially excavation and raw material processing.

GDP of Heilongjiang and Jilin province in 2005 were 551 and 361.5 billion RMB, accounting for about 30% and less than 20% of the three provinces in northeast China.

During the year of 2000 to 2004, the import and export of Heilongjiang and Jilin provinces keep on growth. Heilongjiang import and export value in 2003 is 5.33

billion US dollars, increasing 22.5% by 2002. The value of Jilin is 6.172 billion US dollars, increasing 66.7% by 2002. However, as the lower cardinal number, the year (2003) with highest value only occupied 14% and 17% in the three provinces.

3.3.1 Heilongjiang province

The economy development tendency of Heilongjiang province keeps on rapidly increasing. The main export products include mineral production, accoutrements, textile, electronic elements, frozen food, electronic equipment, fruit, medicine, and production of soybean and corn. The products mainly export to the countries such as South Korea, Japan, Germany, France, America, Russia, Sweden, Hong Kong, Korea, Taiwan, Pakistan, and so on, in which, Russia, Hong Kong, South Korea, Japan, America are the first five countries. In 2005, Heilongjiang province achieved import and export value of external 9.6 billion USD, increasing by 47.6% compared 2004.

**TABLE 3-3 THE MAJOR ECONOMIC RATIO OF HEILONGJIANG PROVINCE
FROM 2000 TO 2005**

	2000	2001	2002	2003	2004	2005
GDP (billion RMB)	325.3	356.1	390.2	443.3	530.3	551
Increasing by last year (%)	----	----	10.30	10.30	11.7	9.2
Per capita GDP (RMB)	8,562	9,349	10,235	11,623	13,810	14,430

Source: Collect data from Internet

3.2.2 Jilin province

The middle area of Jilin province is the economic development center, also is the keystone in the future development, especially the city of Changchun and Jilin. The industry orientation is high quality and effective ecotype agriculture, agricultural products processing, production of automobile and accessory, petroleum chemical, further production and high technology industry. In 2005, Jilin province has completed the external value 6.6 billion. The main export production includes

soybean, corn, alive cattle, Panax, cotton yarn, log, paper, costume and automobile. Japan, South Korea, Southeast Asia are Jilin main trade partners.

**TABLE 3-4 THE MAJIOR ECONOMIC RATIO OF JILIN PROVINCE
FROM 2000 TO 2005**

	2000	2001	2002	2003	2004	2005
GDP (billion RMB)	182	203.25	224.30	252.18	295.82	361.5
Increasing by last year (%)	9.20	9.30	9.50	10.20	12.4	12.2
Per capita GDP (RMB)	6,842	7,640	----	----	10,922	13,310

Source: Collect data from Internet

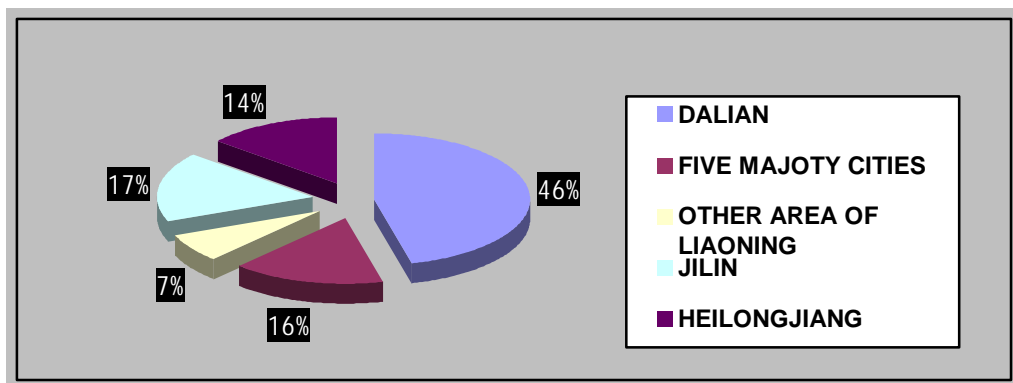
3.4 The conclusion

From above analysis, as the core market, Dalian city accounting for 2% area and 5% population of Northeast China, products 13% GDP and 46% export trade value. In the secondary market, the five major cities of Liaoning province accounting for 6% area and 14% population products 24% GDP and 16% export trade value of Northeast China. The third layout, Jilin and Heilongjiang provinces, accounting for 92% area and 82% population, only product 63%GDP and 38% export trade value. As a result, the Dalian city is the mainly interior zone of the development of Dalian port, and the five major cities are the important interior zone.

TABLE 3-5 THE STATUS OF INTERIOR ZONE OF DALIAN PORT(2005)

	THE CORE MARKET	THE SECOND LAYOUT MARKET	THE THIRD LAYOUT MARKET
Ground Area (square km))	12,574	46,655	734,071
Account for Northeast China	2%	6%	92%
Total population (billion)	5.60	15.93	85.64
Account for Northeast China	5%	14%	81%
GDP (billion RMB)	229.0	571.5	912.5
Account for Northeast China	14%	33%	53%
Export Trade Value (billion USD)	25.6	15.4	16.1
Account for Northeast China	45%	27%	28%

Source: Collect data from Internet



Source: Collect data from Internet

FIGURE 3-6 THE RATIO OF EXPORT TRADE VOLUME OF NORTHEAST CHINA

Chapter IV

The Development Condition of Container Shipping Line Business in Dalian Port

4.1 The competitive advantages of container shipping line business development in Dalian port

4.1.1 The strategic geography position of Dalian port in northeast region

On the southern tip of Liaoning peninsular, the northeast three provinces and east region of Inner Mongolia province in the north, abutting Korea peninsular, Japan island, and far east region of Russia, Dalian port is the junction point of both home and international trade radiation sectors, is the most important international port in northern China, also is the door of northeast China to world market.

Traditional interior zone of Dalian port is Liaoning, Jilin, Heilongjiang provinces and east region of Inner Mongolia province, with 1.2 million square kilometers, accounting 13% area in China. But with the development marine transfer service, Dalian has covered both the northeast China economic zone and circled Bohai sea area economic zone as its interior zone. So Dalian has become one of the most important containerized cargo production areas in China. And the wide interior zone provides the guarantee of container throughput increase with high speed in Dalian port.

For long time, Dalian container shipping line business keeps on 90% of total export trade container volume of all Liaoning coastal ports, holding the position of north China biggest deep water port. In additional the factors as wide sea-way and

deep water, Dalian port have become the most potential port in circled Bohai sea area, even in Northeast Asia.

4.1.2 The rapid speed of economic development in the city of Dalian

Dalian is the pioneer of economic development in Northeast China. As the junction of Northeast China economy zone and circled Bohai Sea economy zone, Dalian has the highest economic development speed in the Northeast China region, including the gross output value of industry and agriculture, achieve profit, direct investment value of foreign company, export value and so on.

TABLE4-1 THE COMPARISON OF ECONOMIC RATIO OF DALIAN AND LIAONIG PROVINCE IN 2003

	Liaoning province	Dalian city	Dalian account for Liaoning
GDP (billion RMB)	600.25	163.26	27
Increasing by last year (%)	11.50	15.20	----
Per capita GDP (USD)	1,724	3,529	----

Source: Collect data from Internet

Dalian has high opening degree of economic development. In China, Dalian as one of the first opening coastal cities, attracted most foreign investment, and as the ‘window’ of Northeast China, made full use of home and international market to formed mature economic environment. The number of using foreign investment in 2004 is up to 19.43 billion USD.

Dalian has well port industry foundation. The development of Dalian emphasizes the interaction of the city and the port, and the industry of building and mending vessel, petroleum & Chemical, heavy machine, and so on has formed big scale. The corporation as SinoPEC, WEPEC, Dalian PEC, and Dalian Shipyard has become the stanchion corporations of Dalian port industry.

Dalian is the bridge of international trade of Northeast China. Dalian is the most active area in northeast China economic development, for connecting local and

international market by the import of raw material and light industry products and the export of finished production need Dalian port, which is the gateway of northeast area. On the other hand, Dalian as an international metropolis, have had famous reputation in the world market, and the products of northeast area entry international market competition can use Dalian as a platform. Meanwhile, Dalian can use foreign investment and advanced skills to form a new industry chain to expand to northeast area and accurate the development of the whole northeast China economy.

4.1.3 The basic scale of the modern port logistics service system

The competition of modern container shipping line business has changed from only terminal handling and cargo volume to the whole value chain competition. Base on this principle, Dalian port has operated multi-business and formed a complex logistics service system consisted by port industry, distribution industry, IT industry, and logistics industry.

The container transportation began in the year of 1980. In 1996, with the cooperation of Port Authority of Singapore (PSA), Dalian port introduces advanced management principle and modern port management model to construct special export trade container terminal in Dayaowan area. In 1999, with the cooperation of China Shipping and PSA, Dalian port formed special import trade container terminal, with modern infrastructure and information system.

In the back region of Dalian port and Dayaowan port, Dalian international logistics zone was built and become the important logistics base in Dalian.

In the near future, the programming area of Dalian international logistics zone is 3.15 square kilometers; in the far future, the area will expand by 3 square kilometers. In the middle of August in 2004, the country government authorizes 1.5 square meters in international logistics zone as a Free Trade Zone to interact with Dalian port and nearby port, sharing the free trade zone policy, which is internal cargo into logistics zone as export trade and applied tax refund policy, and in the zone, cargo

free currency without value-added tax and consumption tax. The operation of port and zone interaction provides the base of free trade zone construction.

As a result, the development of Dalian logistics zone will provide more potential to containerized cargo increase in Dalian port.

4.1.4 The developing circled Bohai region transfer network

Compared with other ports in circle Bohai region, Dalian port is on the tip of Bohai sea Gulf, and as nearby main sea-route, has short transfer distance to sea, which can satisfy the customer demand, lower operation cost, and collect cargo more effective. So there are comparatively completed transfer network in circled Bohai sea region.

As the expand of port business, Dalian port export trade transfer container volume has increase from 2,000 TEU, to more than 10,000 TEU, accounting Dalian about 8% of export trade container market, in which, deep sea cargo transfer container cargo occupied above 50%, and greatly promote the economic and trade development of circled Bohai sea region to the world. At present, the circled Bohai sea container shipping line, calling Tianjin, Jinzhou, Qinhuangdao, Yingkou, Weihai, Yantai and other hub port, get greatly confident by international shipping company.

As an interior zone style of port, creating smooth inland distribution network is an important tache for container logistics service. In 1997, Dalian port tried to operate Dalian-Haerbin container train by cooperated with railway company, and the advanced railway network began to use in container transportation and effectively expend Dalian container shipping line business.

By development of inland container port, achievement of fast customs entry of sea-rail transportation, Dalian port sea-rail transportation gets rapid growth. At present, Dalian port container railway lines covered northeast China, the transport volume as the top in China coastal ports.

As the further cooperation with Chinese railway, Dalian port has to build more mature and advanced sea-rail transport network, and providing more efficiency

service for inland cargo transferring to international market by Dalian port. And the network of sea-rail transport can promote the construction of Dalian multimodal transportation system, including seaway, airway, highway, fresh water and pipeline transport.

4.2 The existing problems in development of Dalian port container shipping line business

4.2.1 The low contribution of export trade to container throughput in Dalian port

Compared with South costal port, the contribution of interior zone export trade to port container throughput is relatively low in Dalian port.

For example, the contribution of import and export value of export trade in Shanghai port to Shanghai port container throughput is much higher than the northeast region interior zone to Dalian port.

Analyzing the reason, the first is that Shanghai port interior zone which expands to Yangzi River valley is larger than Dalian port. The condition of interior zone economy, export trade development information technology, human resource, shipping market, port infrastructure, distribution network in Shanghai port all are the most advanced in nation. In the middle of the 1990's, with the opportunity of construction shanghai as an international shipping center, the container throughput achieved a great overfly, and became the third large container port in the world with 11.28 million TEU in 2003.

The second but the more important is that the industry system in the Yangzi River delta mainly is light industry which improves the proportion of containerized cargo. Meanwhile, with the economic development of middle reaches of Yangzi River, more containerized cargo will be produced, such as motorcar in the city of Chongqing, beverage in Hubei province, farm produce and medicine in Sichuan

province, textile and china in Jiangxi province, foodstuff and electronic machine in An' hui province, and so on.

But in the Northeast, the industry structure prefers heavy industry which has lower proportion containerized cargo. So the industry structure could be adjusted properly to improve the proportion of product more containerized cargo in order to raise the Dalian port container throughput.

4.2.2 The port infrastructure can not satisfy the demand of marine transport development

At present, Dalian port infrastructure can satisfy the demand of container throughput, but there exists contradiction in the infrastructure system. The mainly problem as following:

Firstly, in the consistence of terminal berth, proportion of old and small berth is high and lack of the deep berth which can fit the development large-size container trend and provide high quality service. There are only 2 big special berths with 200 thousand, not forming scale.

Secondly, as the operation depending on old port and infrastructure, the reform and development space is very limited, and hard to restructure to a modern container port. A part of berths in Dalianwan port and Dayaowai port with deep sea-route, don't harmony with the planed function as a base port.

On the other hand, port is the junction point of multimodal transportation as railway, highway, pipeline and river, so the low quality of any kinds of transport way infrastructure will become to the bottleneck of the port development. At present, Dalian port lack of quick distribution channels especially connecting with highway. There are great distance to the demand of large scale container transport and high level logistics service, and construction of the new city zone transport network is slowly.

On the aspects of logistics development, compared with the logistics service level and potential demand of international modernized port, Dalian port exists long

distance in logistics and information service. For example, Dalian port doesn't formed advanced information system, information of shipping trade or cargo trade not issuing in time. Dalian port lacks of main body of logistics operation with strong organized and cooperation capability and large service scale. Now, existing logistics companies in Dalian area usually are small scale, low service level and scattered layout.

4.2.3 The port layout and relationship between the city and the port need to regulate

The integration of the port and the city is a trend in modern port development. How to achieve benign interaction and continuable development of port and city is a though trial to city government and port authority. Currently, the coastal line and seaside resource have been covered by port, shipyard, and heavy marine chemical industry. As the modernization of the city, the old port area has become the center of the city. So the contradiction is obvious, which is the port daily production cause the great pressure to city environment, transportation and become the obstacle to municipal programming. Meanwhile this kind of layout also limited the development space, potential and distribution network.

As a result, in the process of new modernized international metropolis and container port, adjustment of port layout and research the strategy of port development direction.

4.2.4 The competition capability of Dalian port needs to enhance

Facing the challenge and competition from international advanced port, such as Japan, South Korea, and circled Bohai sea region port, such as Qingdao, Tianjin, the competitive advantage of Dalian port is decreased, which form obvious contrast with strong development of other new port in interior zone.

Analyzing the reason, there are five points as below. Firstly, the time on decision and implement of large and important projection is too long. Secondly, the different power and profit of authority, corporation, and industry makes port programming and development restricted. Thirdly, National enterprise has heavy historic and social burden and lacks of market activity. Fourthly, the service level of government, custom and port need to enhance. Fifthly, the function of port attracting and supporting port industry doesn't be exerted effectively. These reasons cause competitive advantage of Dalian port hard to bring quality change in traditional transport industry. And the natural resource and city economic advantage can not convert to market competitive advantage.

4.2.5 The management system of Dalian port should be consummated

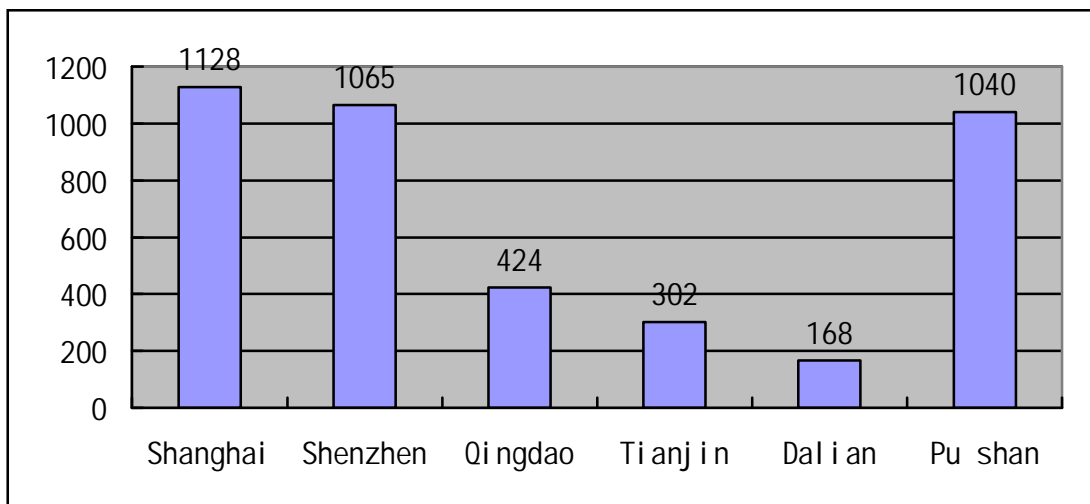
On January 1st, 2004, Port Law of The Peoples Republic of China began to actualize, which form the port management system of macroscopically control by nation, idiographic management by municipality, and division of government and corporation function. For the late start of Dalian port system reform, the function and effect of port government have not fully exerted, such as the port coastal line construction and development lack of strong regulate, or government lack of financing to infrastructure construction.

4.3 Other factors affect the development of Dalian port container shipping line business

4.3.1 The competition from the ports in the same region

I took the four local ports and a foreign port compared with Dalian ports, which are Shanghai, Shenzhen, Qingdao, Tianjin and Pushan. In 2003, the total container throughput of Dalian, Qingdao, and Tianjin is not more than Shanghai or Shenzhen port, which reflects the great differences of economic situation between the north and

the south China. On the other way, comparing the three ports in the north China, Tianjin port is as the 1.8 times as Dalian, and Qingdao port is 2.5 times, which also reflect the distance between Dalian port with Qingdao and Tianjin port.



Source: Collect data from Internet

FIGURE 4-1 THE CONTAINER THROUGHPUT COMPARESION OF DALIAN PORT AND OTHER PORTS

When studying the interior zones of Dalian, Qingdao and Tianjin, Qingdao and Tianjin ports have most aspects in common, thus will cause great competition of cargo, meanwhile, Dalian has not such shortage, the only competition comes only from Pushan. From the distanced of main shipping line, Qingdao port is better than Dalian, Dalian better than Tianjin.

In conclusion, the only troubles now Dalian facing is the source of cargo, especially the inland point of Dalian. As a result, the restructure of the Northern China and economic development will bring more cargo volume to Dalian port and attract more interest of international shipping companies, which will finally boost the growth of Dalian as a base port.

With the great change of the Southeast Asia and rapid development of the third world in this area, it is also witnessed great change in the chosen of base port. Take Trans Pacific as an example in the middle 20th centuries, the main export ports are Japan, Singapore, Korea and Malaysia. When it comes to 1990s, with the foundation

of Grand Alliances of shipping companies, the competition becomes even more severe. In the mean time, China witness great development of both economy and port infrastructure, and shipping line companies have more interest in choosing China hub ports as their base port but not Japan.

In the recent years, many experts have the opinion that with the upsize of the container ship, in future, the base port could only be located in places where the natural conditions are perfect, like water depth and advanced and mature infrastructure. But based on the study of shipping lines and Grand Alliances, the outcome does not look so, and the geographic position and cargo volume are the most important factors, then the handling fee, handling efficiency and berth depth are the second.

4.3.2 The trend of large-size container ship

With the development of container ship, the large-size of container ship has become the inevitable trendy. 8,000 TEU container ships are being constructed; 10,000 TEU container ship (VLCC) is being designed and the 12,000 TEU container ship (ULCC) is be discussed to building. Post-Panmax container ship has become the main ship style in the Asia/Europe shipping line and Asia/North America shipping line.

The significance of large-size container trend of container ship is that this way can complete the cargo carriage with the least time and the lowest cost, which is because increasing container cargo volume and container transport network, especially the perfect cooperated between main shipping line and lateral shipping line. According to statistical data, a 9,000 TEU container ship and two 4,500 TEU container ship transport the same volume and the former can save 40 USD per TEU and decrease total the cost by 17.7%.

So the large-size of container ship is the result of pursuing economic scale by shipping company, but brings great challenge to natural condition, infrastructure, distribution capability, and berth layout of container port. As the limitation of the

Bohai sea gulf, not all the port can receive so large container ship, but with the completion of the third project of Dayaowai port, Dalian can pull in such VLCC and ULCC vessels.

On the other hand, large-size trend requires more containerized cargo volume from interior zone of port. The container ship has to confirm abundant containerized cargo on each line, which increases the demand of containerized cargo production in calling port. Dalian has the support of interior zone of the three provinces in Northeast China, which will stimulate Dalian port to attract more shipping company calling Dalian port as hub port of ocean going container shipping line or opening new container shipping line and satisfy the demand of large-size container ship on each company.

4.3.3 The shipping enterprise alliance

As the fierce competition in container shipping market, every enterprise merge or cooperate with competitor in order to optimize shipping line structure and develop high efficiency logistics, which can get economic scale and survive in competition. The appear of four alliances, Mearsk-sealand, Grand Alliance, New world Alliance, and CKYH, make a great change in international shipping market, accounting for 50% of container transport power. One of the most important characters of these alliances is to expend the service to port and land, which not only change the structure of container shipping market, but also affect the development of container port.

The significance of shipping company alliance is to improve competitive advantage and decrease the business danger, also affect the some regional cargo market. In order to choose more reasonable and suitable calling port, shipping alliance pay more attention to the factors as containerized cargo production in interior zone, geographic position and complex logistics service system.

As the world economic development and the container ship large-size trend, the shipping line plan of shipping companied will change. The large-size container ship

will call less port but will choose base calling port according to cargo volume in different region. So the proportion of international base port as interior zone style will increase and the proportion of transfer container port will decrease. At that time, the international container shipping lines will be consisted of international transfer ports, base ports as interior zone style, and more feeder ports. This will form a benign circle as feeder ports providing cargo to transfer ports and base ports, and base port providing a little cargo to international transfer ports.

This trend is fit to develop the ocean going container shipping line for Dalian port, as Dalian port has good geographic position and abundant interior zone support compared with regional other ports, and the construction of Dalian Dayaowai port will satisfy the requirement of large-size ship and shipping alliance and provide advantaged condition for achieving Dalian port container shipping lien forecast result.

Chapter V

The Forecast of Container Throughput and Container Shipping Line Business Development in Dalian Port

5.1 The tool and content of forecast

According to the analysis of basic historic data, present status, combined quantity and quality method, I use different mathematics predictable tools to get the optimal result, in order to increase the veracity and objectivity. The mainly forecasting objective is about the cargo volume in Dalian port and the container cargo volume development.

5.2 The forecast of the cargo volume import and export in Dalian port

The three provinces in northeast China possess great area and abundant natural resource. In the found mineral resource, the reserves of coal, petroleum, iron ore, nonmetal ore and colored metal occupied top of the whole nation. With the development and construction of 50 years, Dalian has found the complete industry system with the main part of steel, machine processing, petroleum & chemical industry, architected material, concrete, automobile and so on. The heavy industrial output value of Dalian occupied 20% of the nation, playing an important role in China. Meanwhile, the three provinces also are the great export trade base of forestry, commercial foodstuff and stockbreeding production.

Dalian port is the core port in northeast China and circled the Bohai sea area, affecting the regional economic development, export trade and multimodal

transportation system. The annual cargo throughput of Dalian port always keeps on about 70% of all the Liaoning ports and the will still increase in the future. It is forecast that after the year of 2006, the annual throughput proportion of Dalian port will increase to 75% of Liaoning province and with the assistant of Dalian port, other port in Liaoning also will raise rapidly. However, as the wings of Dalian port, the throughput proportion in Dandong port and Yingkou port also will increase, so the rising tendency of Dalian port will be slowly and the proportion keeps on the level of 60% to 70%.

The forecast to Dalian port throughput is based on the relationship between economic development level of interior zone and the whole province port throughput increasing volume, meanwhile considering the historic data. The following chart is the Dalian port annual cargo throughput.

TABLE 5-1 THE ANNUAL CARGO THROUGHOUT IN DALIAN PORT

(unit: million tons)

YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Throughput	64.17	64.27	70.44	75.15	85.05	90.84	100.47	108.51	126.02	145.1	170

Source: <http://www.chinaports.com.cn/>

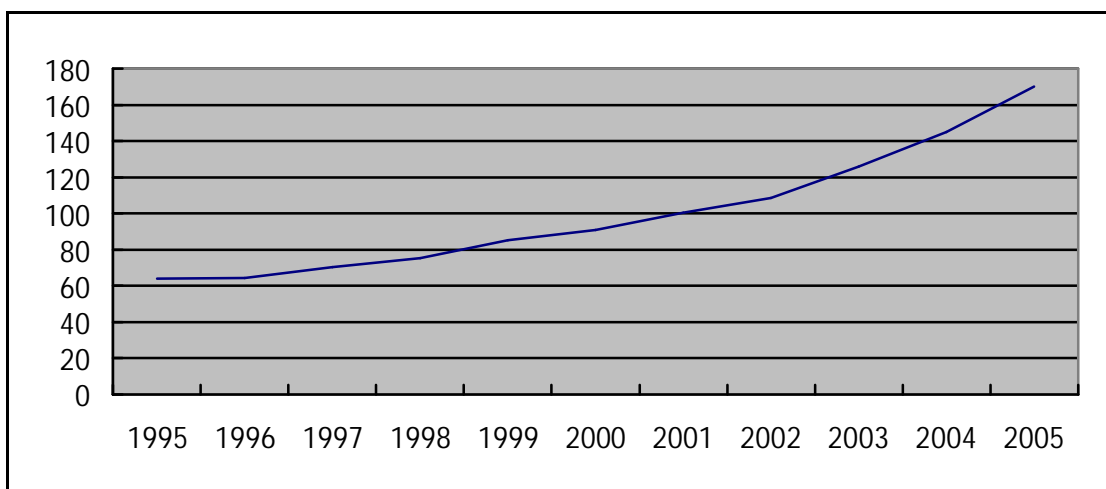


FIGURE 5-2 THE ANNUAL CARGO THROUGHOUT IN DALIAN PORT

5.2.1 The analysis of the contribution of port throughput to the Northeast area economic development

Analyzing the relationship between Dalian port throughput and the Northeast GDP:

$$\text{LOG}(Y_1) = 0.818, 125,179,9\text{LOG}(X_1) + 1.622,985,213$$

Analyzing the relationship between Dalian port throughput and the Northeast export trade value:

$$\text{LOG}(Y_1) = 0.926, 790,477,9\text{LOG}(X_1) - 4.592,453,259$$

From above, the elasticity of Dalian port throughput to the northeast GDP and import and export value of export trade respectively are 0.818,1 and 0.926,8, so Dalian port throughput has high relationship with the Northeast area economy and export trade. The development of the northeast region economy and export trade depend on the Dalian port greatly and the contribution of Dalian port throughput to the Northeast economy development is a little higher than the contribution to import and export value of export trade.

5.2.2 The analysis of the contribution of interior zone to port throughput

Using the data from 1994 to 2003 as the simple made the economic quantity model, gets the liner program of the Northeast GDP (billion RMB) and import and export value of export trade (million USD) to the Dalian port throughput:

$$Y_1 = 59.194, 312,93X_1 + 1.116, 966,24X_2 + 5,646.697,927$$

So, it is known that 1 billion GDP can product 59.1 thousand tons port throughput, and with the development of the Northeast rust-belt industry base, this ratio must be increase more and more.

5.2.3 The forecast of Dalian port cargo throughput

According to the forecast of total throughput of all the Liaoning ports and the

proportion of Dalian port, it is forecast the future Dalian port throughout as following chart:

$$\text{Dalian port throughput} = \text{annual regional cargo volume} \times \text{Dalian port proportion}$$

TABLE 5-3 THE FORECAST OF DALIAN PORT CARGO THROUGHPUT
(UNIT: MILLION TONS)

YEAR	2006	2010	2015	2020
DATUM SITUATION	183.529	254.482	312.564	371.144
LOW INCREASING SITUATION	176.342	225.819	278.1	300.423

Source: *A study on strategy of building up Dalian Port into the international shipping center in northern Asia*

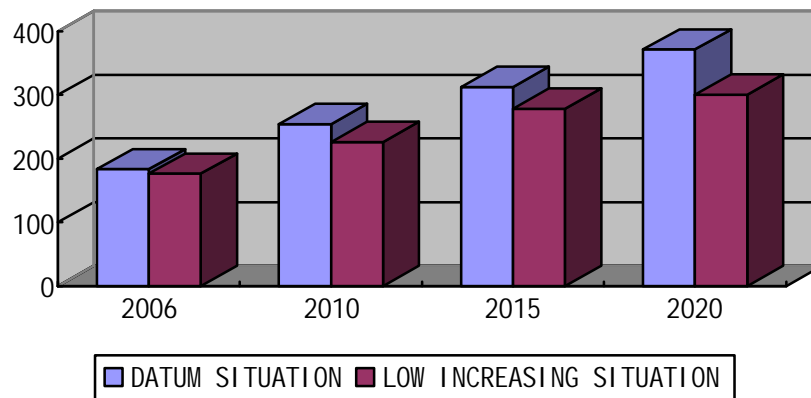


FIGURE 5-4 THE FORECAST OF DALIAN PORT CARGO THROUGHPUT
(UNIT: MILLION TONS)

5.3 The forecast of the container volume import and export in Dalian port

The forecast of Dalian port container throughput also be made on the base of historic data and development trend. The following chart is the annual Dalian port container throughput from the year 1995 to 2005:

TABLE 5-5 THE ANNUAL CARGO THROUGHOUT IN DALIAN PORT

(unit: thousand teu)

YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Throughput	374	421	453	526	736	1,010	1,217	1352	1,669	2,211	2,687

Source: <http://www.chinaports.com.cn/>

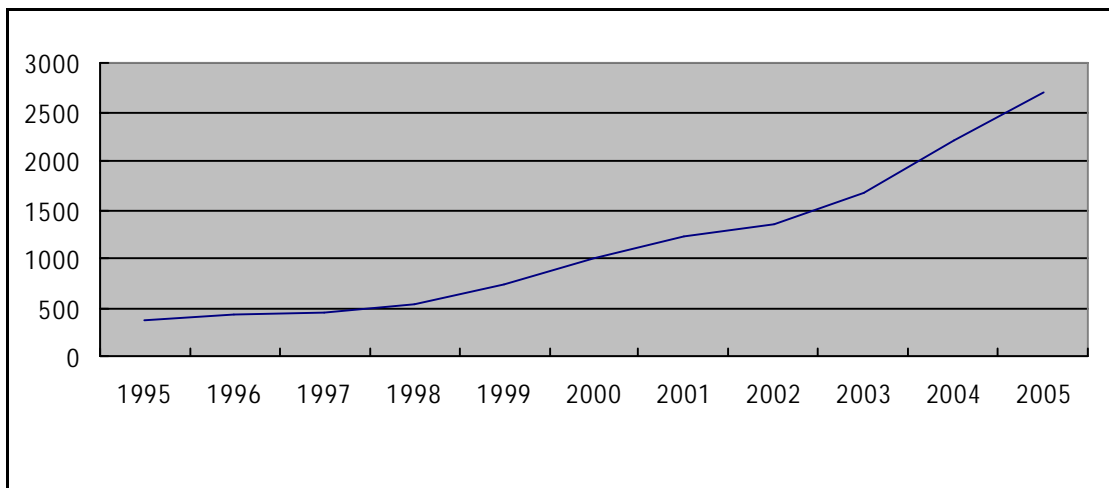


FIGURE 5-6 THE ANNUAL CARGO THROUGHOUT IN DALIAN PORT

(UNIT: THOUSAND TEU)

5.3.1 The analysis of the contribution of container throughput to the Northeast region economic and trade development

Analyzing the relationship between Dalian port container throughput and the Northeast region GDP:

$$\text{LOG}(Y_2) = 1.992, 935,866\text{LOG}(X_1) - 13.787,669,75$$

Analyzing the relationship between Dalian port container throughput and the North three province import and export value of export trade:

$$\text{LOG}(Y_2) = 2.216, 591,23\text{LOG}(X_2) - 28.325,434,34$$

From above model, it is known that the elasticity of Dalian port container throughput to the northeast region GDP and import and export value of export trade respectively are 1.992 and 2.216. So, Dalian port container throughput has high relationship with economy and export trade development in the North region.

Calculating the liner program model of the Northeast GDP (billion RMB) and import and export value of export trade (million USD) to the Dalian port container throughput:

$$Y_2 = 0.1064X_1 + 3.278, 027,878e - 50X_2 - 93.285,317,34$$

The model illustrates that 1 thousand USD import and export value of export trade can product 0.0328 TEU containers throughout.

5.3.2 The forecast of the total volume of Dalian port container throughput

The Dalian port container throughput is consisted by the export trade, import trade and export trade transfer container. So the analysis and forecast is from these three aspects as follow.

I The forecast of export trade container throughput

The high speed increasing of export trade will stimulate the great development of port container throughput. From worldwide economic trend, below the background of international economic globalization and regional economic integration, the countries as China, Japan, South Korea, Russia and other Northeast Asia countries have more economic complementary with amplitude cooperation and development foreground, and will become a new Northeast Asia economic group. With the favorable principle of government, the northeast region and circled Bohai sea economic group with high development speed, is possible become the new national economic development area, following Zhujiang River delta and Yangzi River delta by analysis of local economic environment. Dalian as the window and pioneer in northeast region is the important channel and hinge of interior zone cargo transferred to southeast coastal area and international market, and is the main point connecting the two markets and the two resources. These favorable factors will accumulate the development of northeast region export trade and the increasing of Dalian port container throughput.

The following is the forecast of Dalian port export trade container throughput

**TABLE 5-7 THE FORECAST OF DALIAN PORT export trade
CONTAINER THROUGHPUT**

YEAR	2006	2010	2015	2020
export trade value (billion RMB)	62.749	136.383	191.284	268.286
export trade container throughput (thousand TEU)	2,934	6,312	8,961	10,801

Source: *A study on strategy of building up Dalian Port into the international shipping center in northern Asia*

The chart illustrates that in 2010 the export trade container throughput is about 6.312 million TEU and in 2020 is up to 10.801 million TEU.

I The forecast of import trade container throughput

From analysis of current development situation, as the geographic limitation, Dalian port container throughput increases relatively slowly, and the competition with Yingkou port and Jinzhou port is more fierce. On the other way, not like export trade, import trade transportation in Dalian has less local cargo and more depend on cargo to far interior zone, which is cross-area with Yingkou and Jinzhou. That main these interior zone cargos can be transferred through three ports, and the ports such as Yingkou, Dandong, and Jinzhou which have the same interior zone with Dalian, have more regional predominance than Dalian port. Because in the aspect of geographic position, the distance from Yingkou port to the interior zone of three northeast provinces and east region of Inner Mongolia is 180 kilometers shorter than Dalian port; this predominance of Jinzhou port is more obvious.

Since witness this disadvantage, Dalian port has taken more action to expend the radiation of import trade transfer power and improve import trade container throughput with the goal that increasing from 15% to 30%.

The following is the forecast of Dalian port import trade container throughput.

**TABLE 5-8 THE FORECAST OF DALIAN PORT IMPORT TRADE
CONTAINER THROUGHPUT (THOUSAND TEU)**

YEAR	2006	2010	2015	2020
Import trade container throughput	506	740.9	1,034.5	1,328.2

Source: *A study on strategy of building up Dalian Port into the international shipping center in northern Asia*

The chart illustrates that in 2010 the export trade container throughput is about 740.9 thousand TEU and in 2020 is up to 1,328.2 thousand TEU.

I The forecast of import trade transfer container throughput

In the north port of China, the handing efficiency of Dalian port is always the top and with the construction of Dalian international shipping center, integration of port and city and development of Free Trade Zone, Dalian port will have more priority to enhance the international transfer serve predominance. So, in the future, the increase point of Dalian maritime transfer service is the development of international transfer service.

In Chinese coastal port, Dalian formed completed internal transport network, becoming the export trade transfer base in circled Bohai sea area. With the transfer service development in circled Bohai sea area, Dalian opened new export trade transfer line to Shanghai and Qingdao, opening the transfer channel connected local big ports and stimulating the achievement of cooperation of international ports. Meanwhile, Dalian also seize the opportunity of North Korea opening to be transfer center of China-North Korea trade and try to as an sample of development of international transfer service center. With the radiation expand of circled Bohai sea area, the transfer container throughput in Dalian port will increase more and more.

It is planed that before 2010, Dalian port will add 5 to 10 main shipping lines; to 2020, the number hope to about 30 lines, forming the worldwide transportation main shipping lines network and attracting more transfer containerized cargo to Dalian

port.

The following is the forecast of Dalian port export trade transfer container throughput:

TABLE 5-9 THE FORECAST OF DALIAN PORT INTERNAL SHIPPING LINE CONTAINER THROUGHPUT(thousand TEU)

Year	2006	2010	2015	2020
Internal shipping line container throughput	164.225	236.915	319.605	402.295

Source: *A study on strategy of building up Dalian Port into the international shipping center in northern Asia*

It is illustrated that in 2010 the export trade transfer container throughput is about 236.915 thousand TEU and in 2020 is up to 402.295 thousand TEU.

I The forecast of total container throughput in Dalian

In conclusion, calculate the three part container throughput to get the total container throughput as following:

TABLE 5-10 THE FORECAST OF DALIAN PORT CONTAINER THROUGHPUT (thousand TEU)

YEAR	2006	2010	2015	2020
Total throughput	3,604.2	7,290.8	10,315.1	12,532.5
export trade container throughput	2,934	6,312	8,961	10,801
Import trade container throughput	506	740.9	1,034.5	1,328.2
Internal shipping line container throughput	164.225	236.915	319.605	402.295

Source: *A study on strategy of building up Dalian Port into the international shipping center in northern Asia*

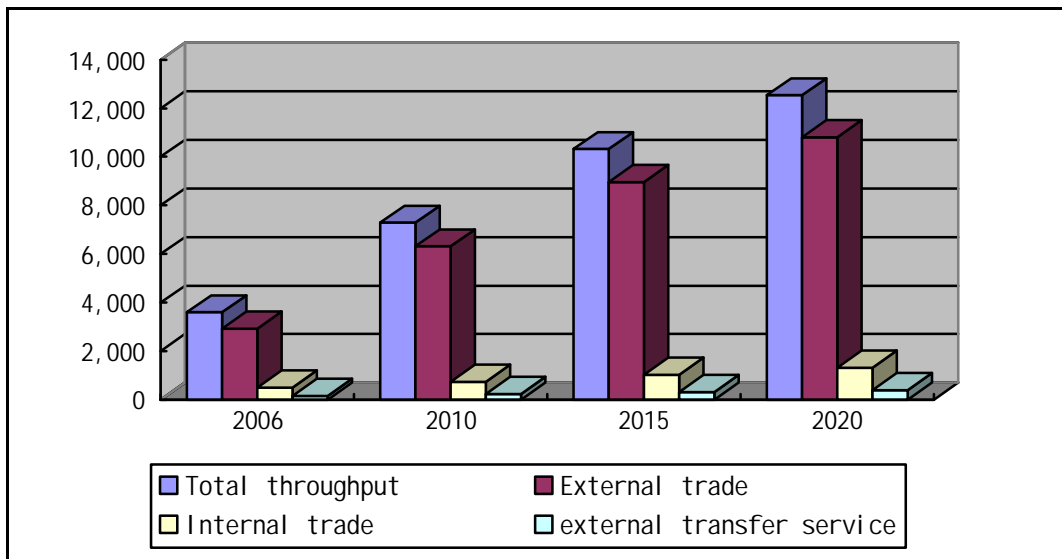


FIGURE 5-11 the forecast of Dalian port container throughput (thousand TEU)

The forecast result measures up the development plan of Dalian government, but also existing some distance to the goal of international shipping center. However, above forecast result is only base on the quantity analysis, if considerate the quality factors, there are also some favorable advantage and in 2010 it is forecast that Dalian port container throughput will be up to 9 to 10 million TEU.

5.4 The program of Dalian container shipping line

5.4.1 The rule about Dalian port container shipping line program

In the program of the Dalian shipping center, designer should subject to below rules:

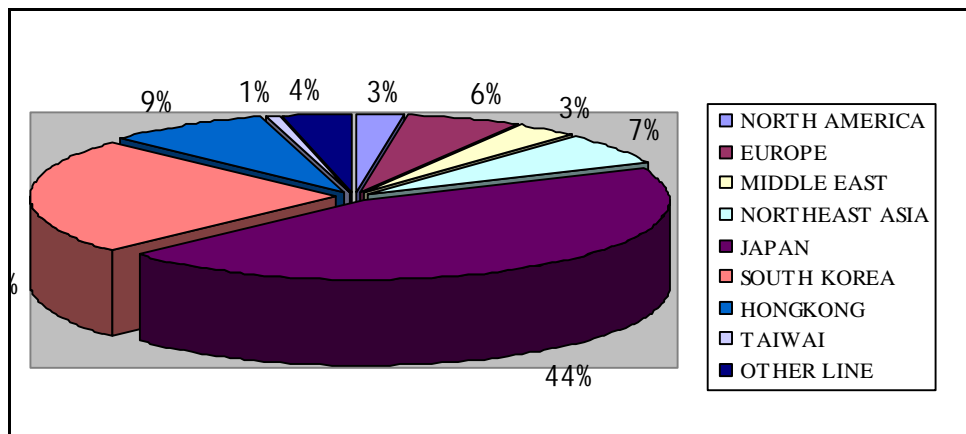
- I** Long shipping line and great volume cargo should be planned basically according to position of Dalian base port.
- I** With the analyze of Dalian's former static and demand of developing economy of interior zone, a short term and long term plan should be putted out taking both real and potential need into account.
- I** Attach great importance to the business relation between Dalian and cities

around Dalian, especially northern part of China (like Yingkou, Dandong, and Jinzhou)

- I When making the decision, areas like the Qinhuangdao, Tianjin, Qinhuangdao, and Japan, Korea should also be taken into account.

5.4.2 The container volume proportion of Dalian port in different international container shipping lines

Currently, Dalian has more than 74 container shipping lines with monthly around 300 times departure to Japan, Korean, Hong Kong ,Gulf ,Red Sea, Africa, Mediterranean and so on. However, the ocean going shipping line only amounts to 11 in 74 sea shipping lines. The following chart is the proportion of Dalian port different container shipping lines.



Source: Collect data from Internet

FIGURES 5-12 THE CONTAINER VOLUME PROPORTION OF DALIAN PORT IN DIFFERENT CONTAINER SHIPPING LINE

Thus, the container volume of near-sea in Dalian occupies almost 85%, while Korean and Japan shipping line almost 68.4%. In the past several years, there is almost no direct call from Dalian to Europe and America. Dalian only serves as a feeder port for Kwan yang and Japanese base ports. Even these years some ocean going shipping line were launched, but due to the frequency and volume, Dalian do not see any improvement in the filed of base port. In addition to that, Pasha attracts

the world with its low freight rate and frequency, which makes Dalian even worse as far as base port is concerned.

5.4.3 The container shipping line program result in Dalian port

When doing the analysis on future export cargo volume of Dalian, the main line should be on first priority. Currently, most services operated by shipping lines on trades like Asia/Europe and Asia/North America are Go-around service, that means, the vessel will sail in a certain route and call each port at a determined time ,thus we could calculate easily the main line service sailing from Dalian .

If the annual growth rate maintains the same, it is estimated that main line from Dalian will be daily ,which will fundamentally change Dalian's position from a feeder port to a hub port and will be the shipping center of the world.

With the rapid development of economy of Asia, the export cargo volume of this area moves forward steadily. Currently, Asia based shipping line (Intra Asia, Asia Europe and Trans Pacific lines) occupies almost 2/3 of the total container cargo volume. According to the performance of the world three major shipping lines (Asia Europe, Trans Pacific and Europe America), Trans Pacific is almost three times of Europe America, which attracts the most focus of all eyes. Another great change is the rapid development of the base port and ever ferocious competition between these base ports.

Taking Asia/North America daily shipping line as an example, usually, this line should have 5 to 7 vessels working, calling 5 to 7ports consecutively, and choosing the 4,000 TEU container ships which utility is up to 80%. In the following chart, '+' represented load cargo in the port, '-' represented discharge cargo in the port, and loaded and discharged cargo both are inter-continent trade cargo, which all loaded in Asia port such as Long beach, Hong Kong and discharged in North American port such as Seattle or Los Angeles.

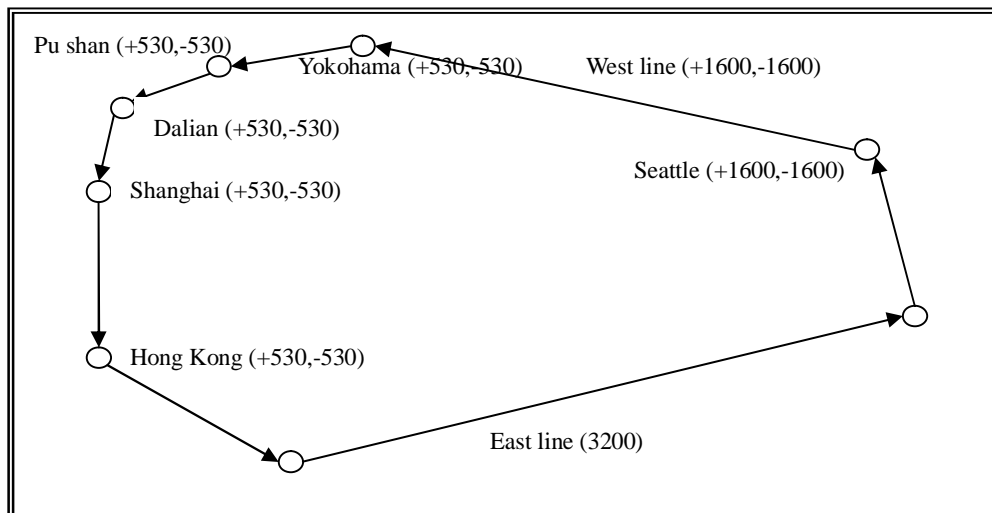


FIGURE 5-13 ASIA/NORTH AMERICA SHIPPING LINE

According to the graph, supposing every week Dalian port having export container 500 TEU, import container 250 TEU, the total number is 750 TEU, which considerate the unbalance of Asia/North America trade and export container usually is more than import container, so import discharged cargo number is a little lower. As a result, this situation can attract main shipping line calling Dalian port. The main calling ports in North America are mainly in west coast and the voyage time is about 18 days, which is operated by CMA, China Shipping and COSCO, at present. Asia/North America line is opened in 1997 by COSCO to west coast of North America and the container throughput increase speed is the highest in the three main shipping lines, nearly up to 30%.

Then we using the forecast data of future container cargo volume in chapter three which is distributed to 52 weeks a year can get three main container shipping lines number in Dalian port.

TABLE 5-14 THE FORECAST OF DALIAN CONTAINER SHIPPING LINE

Shipping line		2010	2015	2020
Europe Line	TEU/line/week	8,458	12,188	17,432
	Time/week	9-11	14-16	20-23
Middle East line	TEU/line/week	4,298	6,194	8,859
	Time/week	5-7	8-10	12-14
North America	TEU/line/week	3,466	4,995	7,144
	Time/week	4-6	6-8	9-11

Source: Calculate according to above model

The voyage time of Asia/Europe line is about 33 days, the planned calling ports such as Kwan yang, Push an, Dalian, Tianjin, Qingdao, Hong Kong, Tan Jung Pelepas, Salalah, Chittagong, Damietta, Genoa, Fos, Valenxia, and so on. At present, the operating shipping companies include Mearsk-sealand, Evergreen, CMA, APL, China Shipping, COSCO, etc. In the future, the container throughput of Asia/Europe line will still keep on predominant container throughput in Dalian port and Northeast Asia region and the container ship will be chosen to use with 4,500 to 6000 TEU carriage power.

The calling port of Middle East line includes Dalian, Qingdao, Shanghai, Ningbo, Xiamen, Shenzhen, Damman, Dubai, Kuwait, Doha, Riyadh, and voyage time is 27 days more or less. OOCL and Wanhai firstly operated Asia/Middle East line in 1999, and usually used 2,500 to 3,000 TEU container ships. Middle East line has high speed of cargo turnover and calls more Chinese ports.

Chapter VI

The Action to Develop Container Shipping Line In Dalian Port

6.1 Greatly develop Dalian local economy

Dalian is the traditional base port in northeast area, 70% sea cargo and 80% container cargo of Liaoning province, and 60% export of national foodstuff transported through Dalian port. The economic development of port city can not leave the support of economic level improvement of interior zone. As the economy rejuvenation of northeast China rust-belt industry base, Dalian will have more space in the development of port industry and city economy.

The industrial structure of Dalian port interior zone, the northeast three provinces and east region of Inner Mongolia province, mainly is heavy industry, agriculture and forestry, and primary products occupy large proportion in the cargo structure, where steel output account for 1/4, metallurgy and mine machine processing account for 1/2 to 1/3 and petroleum output account for more than 1/2. Meanwhile, the northeast region is an important national farm produce base and merchandise foodstuff base, and tumble output also occupy half of the nation. With the China economic opening, the status of northeast economic region decrease because of the development of southeast coastal city, but as an important and big economic region, and the economic scale, this region still play the important role in China.

As formed heavy industry structure, Dalian port has low increase of containerized cargo, but with the adjustment of northeast region industrial structure,

the proportion of containerized cargo will rise greatly in the future. In the future 5 to 10 years, northeast region economy must develop with high speed, and export trade will support the construction of Dalian international shipping center, stimulating the increase of container throughput. With the trend of containerization of dry cargo, Dalian port must have more container cargo resource.

On the other way, circled Bohai sea area is one of the three national container cargo bases, with annual 10 million container output. As the firstly formed complete internal network in circled Bohai sea area, Dalian will build export trade transfer base in circled Bohai sea area where main cargo resource is from Beijing-Tianjin-Tangshan region. Meanwhile, as the development of free port, Dalian port will have more advantage of international export trade transfer service, and the radiation area will reach to Japan, Korea peninsula, Russia and Far East Area. The planning of China, Japan and Korea free trade zone construction will enhance the transfer advantage. In 2010, as the foundation of China and East Union free trade zone, most East Union intertropical farm produce will transfer through Dalian port to northeast region and circled Bohai sea area, which will bring great container cargo to Dalian port.

In conclusion, with the construction of Dalian international shipping center, the efficiency of network economy and density economy will be revealed and the containerized cargo from Northeast Asia will flow to Dalian port.

6.2 Exert the great advantage of home and international container shipping enterprise

Home and international shipping enterprise can exert the function as ligament in Dalian port container shipping line business development, connecting northeast region and international market and promote Dalian port to participate the construction of logistics center, shipping center, and transfer center of Northeast Asia economic cooperation zone. Shipping enterprise has strong distribution system, information network and good relationship with many ports, which can combine

marine logistics, land logistics and air logistics together, forming solid and consolidated transport way and unification supply chain management way.

6.3 Improve the number of ocean going container shipping line

As the container shipping line plan, Dalian faces the severe competition from the port such as Qingdao, Tianjin, or Pushan. At present, there are 11 ocean going container shipping line in Dalian port, a little lower than other large container port in China. Lack of ocean going container shipping line is a main point limited the development of Dalian port. The number of ocean going shipping line decides whether the port is hub port or base port, and without deep sea shipping line, the port can not attract more cargo resource.

In 2010, the container throughput in Dalian port will be up to 10 million TEU, and the transfer container throughput need to 3 million TEU. The strategy of attracting cargo by shipping line and enhance shipping line by cargo should be implement by port authority.

So paying attention to shipping enterprise and large cargo owner, Dalian port can make use of their large volume transfer cargo and import cargo to increase the number of container shipping line. After all, container shipping company is the main body of container shipping line business. Only with assistance of shipping company and large cargo owner by integration different economic resource, Dalian container shipping line business development can be achieved.

6.4 Greatly develop the containerized cargo resource

Cargo resource is the root to port, so every port need to expend market and develop cargo resource. Unbalance of economic structure and industry structure cause the lack of containerized cargo resource in Dalian port. There also exists the problem such as, slow economic development of interior zone, lack of ocean going shipping line, high fee of port and city, policy to transfer cargo uncompleted, service

level of port authority with low quality. So cargo resource should become the most important task to Dalian port.

Firstly, the authority need to construct an effective organization to collect information, research market, and expand business. Secondly, port authority should strongly propagandize to customer, especially the advantage of container transport, enhance the communication with shipping company, freight forwarder and railway department, explore import trade and transfer service.

6.5 Exert the government's function of to improve the container shipping line business development

Support of government is the basic guarantee to the development of Dalian container shipping line business. The development of Qindao and Tianjin port both prove this point. Dalian port is the base industry of the city of Dalian, which makes great sense to the prosperity of local economy. As a result, the government should take effective action to facility the development of Dalian port.

6.5.1 Form the unification management organization of port container transportation

As the port of Shanghai and Qingdao, the management organization should be authorization and responsible for constituting the policy of container transportation and harmonize the every department of port and municipality, avoiding contradiction of policy from different governmental department.

6.5.2 Give some favorable policy to port

The important measure to achievement of port economy is attracting more ocean going container shipping line calling Dalian port. The government should cooperate

with port bureau and shipping companies and issue some favorable policy to improve the port competitive advantage.

6.5.3 Reform the port environment

Benign port environment is important to the construction of Dalian international shipping center. The authority should pay attention to following aspects:

- | improve service quality, and build up service spirit
- | standardize the port charge, avoid unreasonable charge and low the total complex cost in Dalian port
- | harmonize the railway and highway department and
- | apply free port policy, and provide fast and rapid import and export document
- | ameliorate port handling condition and environment, and enhance port competition advantage

6.5.4 Constitute the hortative policy to shipping company and NVOCC

The hortative policy can improve the competitive advantage of shipping company and NVOCC. Meanwhile, the way of enhancing the management of freight forwarder and giving some favorable tax policy can regulate the shipping market competition.

6.5.5 Harmonized distribution network system

Cooperated with port and other relative department, container railway should be insured expedite and operate the multimodal transportation connecting inland transport and sea-rail transport, in order to construct the integrated logistics transport system with Dalian port as the core.

On the other hand, International shipping center need perfect inland distribution system, which is not only the completed marine transport system, but also includes

the system combined railway, highway, inland river and aviation. Meanwhile, the port has to provide top class service as custom inspection and quarantine, mending vessel, salvation, shipping information consultancy, and EDI exchange.

6.5.6 Make market research and investigation, and frame the relative policy

The authority need pay attention to the change of favorable policy to port, shipping company, freight forwarders in nearby ports in the process of shipping center construction, the charge of port inspection and charge, and the change of competitive measure. According to above changes, the authority can adjust the relative police properly, standardize the management function of custom and other government department, in order to provide advanced legal environment and fair, outward policy and rule platform.

Chapter Seven

Conclusion

From above analysis, the development of container shipping line business in Dalian port has great advantage and severe challenge.

On one aspect, Dalian port has favorable natural condition, wide interior zone, and economic development with high speed, developed transport network and national policy support.

On the other hands, Dalian port lacks ocean going container shipping line, mainly as a feeder port, faces threat form nearby port and furious competition in national and worldwide market.

So solving the problem of cargo resource is urgent. Meanwhile, the construction of infrastructure and improvement of authority service also should be paid more attention.

In conclusion, as current situation, Dalian port should seize the opportunity to rejuvenation of old industry base in northeast China, exert the effect as gateway of northeast region, in order to achieve the goal of Dalian port container shipping line business development and Dalian international shipping center construction.

REFERENCES

1. FAN Hou-ming, XIE Xing-lian, CHU Lian-yong, TENG Ya-hui (1999) *A study on building up Dalian Port into the container transportation hub of northern China* Dalian Maritime University
2. LvJing, WangJie (2005) *A study on strategy of building up Dalian Port into the international shipping center in northern Asia* Dalian Maritime University Publishing Company
3. Boston Brune B. (2000): *Managing Change Prentice Hall, Strategy Management: An Integrated Approach* Houghton Mifflin Company
4. Stopford M. (1997) *Maritime Economics*, Routledge, London.
5. Mukherjee P.K. (2002) *Maritime Legislation*, WMU
6. *Port Law of the People's Republic of China* (2004)
7. *Regulations of the People's Republic of China on International Ocean Shipping* (2002)
8. *Maritime Code of the People's Republic of China* (1992)
9. *Provisions on the Administration of Business Operation of Ports*, Ministry of Communications (2004)
10. *China Statistical Yearbook*, National Bureau of statistics (1993-2005)
11. *Transport Yearbook of China*, Ministry of Communications (1993-2005)
12. *Liaoning Statistical Yearbook*, Liaoning Bureau of statistics
13. *Dalian Statistical Yearbook*, Dalian Bureau of statistics
14. Handout by Dr. Gary A. Lombardo, Managing strategy and change in shipping
15. Muller G. (2005) *International Freight Transportation*, 5th Edition, Eno Transportation Foundation, Inc, Intermodal Association of North America.
16. <http://www.webcargo.com.cn/webcargocn/news/2004-9/2004913155338.htm>
17. <http://china.56en.com/Info/4349/Index.shtml>

18. <http://www.shipsmonthly.com/>
19. <http://www.chinaports.com.cn/>
20. <http://www.jctrans.com/luntan/topic.asp?topicid=239&topicitype=1>
21. http://www.portcontainer.com/b_training/wenxian/t20041101_4156.asp
22. <http://www.lawyer86.com/>
23. <http://www.Daliandaily.com>
24. <http://www.sh360.net/law/>
25. <http://www.etrans.com.cn/>
26. <http://www.guohang.org/bbs/index.asp>