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## The development strategy of Tianjin port integrated logistics environment

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**SHANGHAI MARITIME UNIVERSITY**  
**WORLD MARITIME UNIVERSITY**

Shanghai, China

**Development Strategies of Container Business in Tianjin Port in  
Integrated Logistics Environment**

By  
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**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**  
**In**  
**INTERNATIONAL TRANSPORT AND LOGISTICS**

**2013**

## 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 endorsed by the University.

.....

.....

Supervised by  
Professor Shi Xin  
Shanghai Maritime University

## ACKNOWLEDGMENT

How time flies! During my two years study here, I really appreciate the help from Professor Xin Shi—my tutor who not only gave me a lot of guidance on my study but also care on my life. With the assistance from him, I have achieved a lot during these times. So I'd like to show my great respect and sincere thankfulness to him again.

What's more, I'd like to express my gratitude to all the professors and staff both from World Maritime University and Shanghai Maritime University who used to provide me all these marvelous and meaningful courses as well as all the resources I need in writing this dissertation. I'd like to mention some names here: Professor Shuo Ma, Ms. Fangfang Hu and Ms. Zhengfei Jiang. Without your help, I guess I can not finish the dissertation as quickly as I can.

Finally, it is all my classmates and my friends that I want to say thanks to. During these years, they not only share all the happiness and sadness with me, but also help me a lot in my study and life. Though we may go to different countries or cities after graduation, I still hope our friendship can last as long as it could.

Meanwhile, I want to show my greatest thankfulness and deepest love to my family who always gives me the most important help, support and love to finish my master course. All my successes are dedicated to them.

## ABSTRACT

**Title of research paper: Development Strategies of Container Business in Tianjin Port in Integrated Logistics Environment**

**Degree: Master of Science in International Transport and Logistics**

With the development of China's entry into WTO and the globalization of the world economy, the logistics industry has become an important symbol reflecting the level of economic development and attracted the concern and attention of countries all over the world. As the hub of combined transport by rail and sea and also the center of international trade, goods collection and distribution, ports play an increasingly important role as the logistics node. Therefore port logistics become the important task in port strategic development.

In this dissertation, SWOT matrix analysis is applied to raise all the strengths and weaknesses in container development in Tianjin port. On the basis of the prediction of container throughput trends in Tianjin port, the functional orientation and strategic aims of the port logistics are confirmed to overall improve the port function, realize the great-leap-forward development of container transportation, develop the multi-functional and comprehensive logistic business and participate in the one-on-one full service in modern logistics. Combined with the logistics development level both home and abroad, the difference between Tianjin port and advanced ports home and abroad should be found out. Meanwhile, we need to put forward the planning system (including the infrastructure, talent cultivation, information platform, political suggestions, etc) of strategic aims of container development in Tianjin port according to these problems.

**KEYWORDS:** Tianjin port; SWOT model; Container business; Port prediction

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## Chapter one Generals

### 1.1 Research background

(1) Port logistic becomes a new business department and the strong force of national economy

Since 1980s, logistics has become a new industry, which is considered as the third profit source after raw materials and processing. Modern logistics is gradually separated from production and circulation and becomes the professional and independent economic organization undertaking new economic activities and a new specialized labor division. Logistics is growing up to be a new industry sector and the important pillar of national economy. As the window of opening to the outside world and economic and trade activities, ports<sup>1</sup> are usually the center of combined transport of road, rail and sea, which is the hinge of transportation. It can be said that ports are one of important components in logistics. The logistics<sup>2</sup> development is closely connected with the port service, while the emerging of logistics provided new chance for the further development of ports which promotes economic activities inside and outside the area and becomes the important environmental conditions of regional economic development with convenience, low cost and high efficiency and adjustment of industrial structure. Modern logistics and port development complement and promote each other.

(2) Tianjin port has already possessed the basis to develop comprehensive logistics

Binhai New Area is incorporated into the national development strategy and it is clearly put forward that Binhai New Area will be built into the important logistics center of our country. Based on its own development and industrial transfer and trading development of back land, regional bulk commodity trading market community is to be built which will become the international

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1. MaoBaiké - Explore the Port Logistics – China port 121, 2002, (3): 21-23

2. Liu Zhixue. Modern logistic manual. Beijing: China Material Press, 2002: 36. 38

trading gathering center and circulation and transfer hub; material capital settlement and financial services community is to be built which will become the financial business core of regional trade capital settlement, credit, financing, etc.; the regional logistics information service gathering commodity is to be built to realize the overall information of logistics operation process design, tracking and processing, evaluation which will become the main center of regional supply chain management; logistics new technology research and development transformation gathering area is to be built to form logistics new technology transformation and application mechanism and become the base leading the logistics technology development; relative logistics industries and talent gathering area is to be built to form the talent center of starting the business, management and operating personnel of logistics, and information processing, financial services, management consulting, logistics exhibition and so on.

The logistics value added is more than 34 billion Yuan, accounting for GDP6.96% of the new area in 2012. In the new area, there are over 7000 logistics enterprises, including domestic enterprises, such as COSCO, etc., and some international logistics giants also invest in the new area, such as UPS, MAERSK of Denmark, YCH of Singapore, Prologis and so on. Eight logistics parks have been built in the area, including harbor bonded area, container logistics center of Tianjin port, air port international logistics park, etc., covering more than 79 square kilometers. 19 bulk trading markets have been put into operation, including engineer mechanism, ships, cotton, and coal and so on. Tianjin International Trade and Shipping Service Center have been built and put into operation. Electronic port and logistics information platform are passed officially and the customs of 21 inland dry ports and back lands has been cleared.

Tianjin port<sup>3</sup> is one of costal ports with fullest functions in our country, owning various professional terminals, such as container terminal, iron ore terminals, coal terminals, oil chemicals terminal, cargo terminal, rolling-loading terminal and bulk grain terminal and bulk chemical fertilizer wharf, international passenger terminal, etc. The built Tianjin international trade and shipping services center is presently the largest "one-stop" shipping service center and electronic port with integration of customs clearance, inspection, port service, settlement and information services, consulting services, etc. Tianjin international trade and shipping services region which is being built is the integration of trade service and market operation, information gathering and distribution, talent exchange and business leisure forming shipping CBD<sup>4</sup> zone.

The logistics industry is developing rapidly in China. As port enterprises of logistics platform, they will play an important role in modern logistics system. So new development modes and directions must be explored. In this thesis, development strategies of some port with comprehensive logistics environment will be discussed.

### (3) Current state of container development in Tianjin Port

Tianjin port is a comprehensive and international port with full kinds of cargoes, forming the cargo structure with container, crude oil and its product, ore and coal as main cargo and steel and grain as supplemental cargo. Tianjin port is the largest comprehensive port in northern China with a water area of 336km<sup>2</sup> and land area of 131km<sup>2</sup> and 159 berths among which there are 102 berths with 10 thousand tons. In 2012, the cargo throughput achieved 477 million tons with the fourth rank in the world and the container throughput achieved 12.3 million TEU with the eleventh rank in the world.

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3. <http://baike.baidu.com/view/76205.htm>

4. <http://baike.baidu.com/view/139069.htm?fromId=1039&redirected=searchword>

## **1.2 Research significance**

With the continuous high-speed growth of China's foreign trade, coastal ports, esp. large pivotal ports<sup>5</sup> play a more and more important role in promoting and leading global and regional economy. Container transportation overcomes such weaknesses as poor systematicness and low intensification during traditional transport. The development of marine container even becomes the mainstream of transportation industry in 21<sup>st</sup> century. The shipping industry in China started later and the container transportation fell behind that in developed countries. However, the economical trade has become the second in the world and plays an important part in circulation of international trade. The development of container business in each port has become marketization and internationalization. Meanwhile, the container logistic based on container transportation has become an important part in logistic in Tianjin port.

## **1.3 Research summary home and abroad**

It is quite necessary to learn from the advanced experience both home and abroad to develop the comprehensive logistic industry in Tianjin port. Although there is big difference between Tianjin port and the foreign ownership system, inner-land resources, industrial characteristics, economical developing state and the personnel quality and efficiency, we can still learn a lot from its logistic developing conditions, logistic concepts and management technology.

### **1.3.1 Home study**

Zhang Meili makes a research on the feasibility of Dalian port turning from traditional loading and unloading business into comprehensive logistic service according to the comprehensive analysis on important interior and exterior factors in Dalian port Group.<sup>[1]</sup>

Jia Hongxin introduced the current state and the developing orientation of Cao Feidian Area. He combines the quantitative analysis and qualitative analysis,

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5. Chenjiayuan – management of port enterprise Dalian: Dalian Maritime University Press 1999: 46-55

empirical analysis and normative analysis together to find out the strength, weakness, opportunity and threat for developing modern port logistic in Cao Feidian Area. He used SWOT model to work out the SO、WO、ST、WT strategic combination.[2]

Chen Qihong and Chen Yun make research on the strategic methods for accelerating the development of modern comprehensive logistic from two aspects such as transportation platform and information platform which construct the port. [3]

Li Guang carries out an empirical analysis on port logistic assessment system according to the available material for construction and operation of port logistic system both home and abroad. He structures an assessment index system and verifies its effectiveness and meanwhile he puts forward the countermeasures and advice on accelerating construction development of our national port logistic system.[4]

An Xiaopeng and Han Zengling make a research on the construction of our national logistic system and the development of the port with a background of comprehensive logistic. At the same time, he comes up with the creativity of port operation mechanism.[5]

Xie Zhongtao introduces the basic theory of port logistic and applies the game theory to analyze the relation between port logistic and economical increase. He also provides methods and design for port logistic planning. Aiming at the current state of development in Rizhao port, on the basis of logistic planning method, he adopts the planning thoughts and mathematical means for the design of modern comprehensive logistic development in Rizhao port and meanwhile he puts forward the relevant supporting measures and advice.[6]

Chen Yun introduces the approaches for developing comprehensive port

logistics from the following aspects: storage, loading and unloading, distribution and information processing.<sup>[7]</sup>

Ren Zhipeng explains and analyzes the port function and the required developing conditions of comprehensive logistics after entering WTO. In the meantime, he also raises the strategy for developing comprehensive port logistics.<sup>[8]</sup>

Yu Honghai conducts an overall analysis on the exterior and interior environment of container transportation in Ningbo port and discusses the current developing state of container transportation in Ningbo port. On this basis, he makes use of SWOT analysis methods to carry out strategic analysis and orientation. Meanwhile, he puts forward the developing thoughts and strategic aims of container transportation in Ningbo Port.<sup>[9]</sup>

Wang Dajun puts forward the measures to develop the ports into a comprehensive logistic center from the following seven aspects: raising the modern logistic awareness, strengthening the infrastructure construction, improving the port logistic information level, providing logistic integration services, conducting the logistic value-added services, supporting the port agencies and cultivating the modern logistic talents.<sup>[10]</sup>

### **1.3.2 Oversea study**

With regards to the research on port comprehensive logistic informatizaion: Mats • Abrahamson explains the definition of logistic information platform and points out that it is one important part of logistic information system.<sup>[11]</sup>

As to the research on relations between port logistic and economical development: research from Slack indicates that the relation between port and inner-land become more complicated and dynamic.<sup>[12]</sup>

Theo • E.Notteboom and Willy • Winkelmans analyzes the structural changes of

port management in international trade, transportation and marine strategy.<sup>[13]</sup>

Khalid •Bichou and Richard •Gray think that port logistic and supply chain are closely related and they should provide services for enterprises and even the entire logistic system so as to reduce the costs effectively and provide customer services.<sup>[14]</sup>

Valentina •Carbone and Marcella De •Martino make analysis on a detailed port by introducing SCM and mainly discuss the general development between logistic and port management.<sup>[15]</sup>

Jean-Paul • Rodrigue introduces the port partition theory in developing the port and port system. And he also points out that the port and its relevant inner-land require new port management modes and form a certain gathering function on the basis of traditional port boundary.<sup>[16]</sup>

## **1.4 Research contents and methods**

### **1.4.1 Research contents**

(1) discuss and list the exterior and interior environment factors in container logistic in Tianjin port. Set up the theoretical basis to further make out the logistic developing strategy in Tianjin port. Analyze the development strategy for container business by SOWT to find out the difference of developing logistic in Tianjin port.

(2) predict the container throughput in Tianjin port and put forward the strategy of developing container logistic in Tianjin port.

(3) aim at the results after predicting the container throughput by SWOT and statistic analysis and raise the measures for hinders in container developing strategy in Tianjin port.



#### **1.4.2 Research methods**

( 1 ) make research on the strength and weakness of container logistic development in Tianjin port by means of SWOT

(2) predict the container throughput on basis of MLR.

## Chapter two SWOT analysis of container business in Tianjin port

### 2.1 Generals of SWOT strategy analysis methods

#### 2.1.1 SWOT matrix

SWOT strategy analysis method is the one to find out advantages, disadvantages and core competitive as per existing internal conditions of the organization, among which internal strategic factors (“able to do”): S stands for strength, W stands for weakness; external factors (“may do”): O stands for opportunity, T stands for threat. Shown as table 2-1

Table 2-1: figure of SWOT analysis method

Analysis of internal and external conditions	Strong points list strong points	Weak points list weak points
Opportunities list opportunities	ST Strategy make use of advantages and opportunities	WO strategy overcome disadvantages and make use of opportunities
Threat list threats	ST Strategy make use of advantages and avoid threats	WT strategy reduce disadvantages and avoid threats

#### 2.1.2 SWOT analysis procedure

After analyzing the internal and external environment for construction of international logistics system of Tianjin Binhai new area, external opportunities and existing threats in the development of Tianjin port are found out. At the same time with its own advantages and by avoiding disadvantages, the actual

operable and reliable basis is provided to set up correct strategic decision for the construction of Binhai new area international logistics system.

Followings are analysis of integrated logistics development strategy of Tianjin port as per steps of SWOP analysis methods:

(1) Analyze factors. With various investigation and research methods, analyze environmental factors of the enterprise, i.e. external environmental factors and internal capability factors. The former includes opportunities and threats, which are favorable and unfavorable factors affecting development of the enterprise. They are objective factors. The internal environment factors include strength and weaknesses, which are positive and negative factors. They are active factors. When we are researching and analyzing these factors, not only the history and current status of the enterprise, but also its future development should be considered.

(2) Structure matrix. Sequence researched factors as per importance and emergency or effecting degrees to make SWOT matrix. Firstly list direct, major, urgent and lasting factors, and then list those indirect, secondary, few, not urgent and transient factors. SO is the strategy to develop the enterprise's internal advantage and make use of external opportunities. It is an ideal strategic mode. This strategy can be adopted when advantages of some aspects exist and the external environment provides opportunities for it. Statics of WO is the strategy to make up internal weaknesses by making use of external opportunities to make the enterprise obtain advantages. Some internal weaknesses hinder the enterprise to make use of opportunities; some measures can be taken to overcome these weaknesses firstly. ST refers to make use of the enterprise's or organization's own advantages to avoid or reduce effects caused

by external threats. WT is the defensive technology to reduce internal weaknesses, avoid external environment threats. When enterprise is facing internal and external problems, they are facing survival crisis. Cost control may be the main measure to change disadvantages.

( 3 ) Work out plans. After completing SWOT matrix and analyzing environment factors, corresponding plans may be worked out. Basic ideas are: highlight advantages, avoid weaknesses, make use of opportunities factors, solve threatening factors; consider the past, based on current and focus on the future. With the method of systematic analysis, connect and combine listed and considered factors to get a series of selective strategies for the future development of the enterprise.

## **2.2 SWOT analysis of container business in Tianjin port**

### **2.2.1 Strength analysis**

#### (1) Improvement of infrastructure in logistic services

The logistic developing Co. Ltd. in Tianjin port has already owned such facilities as container yard business, quay horizontal transportation business and ship and cargo agencies. Shown as follow:

##### 1) Business of container yard

Tianjin Port Logistics Development co., LTD owns five container yards, i.e., collection and distribution center yard, new Tonghai yard, 3rd Wujie yard, 4th logistics yard and yard for combined sea and rail transportation, covering about 830 thousand square meters (42.5 thousand square meters for warehouse and five railway lines, i.e. 3600m). Main business of container yards is container transferring business, empty container management, container opening and loading, combined sea and rail transportation, container maintenance and

washing, among which the import container transferring business is the monopolized cargo source granted by Tianjin Port Group, empty container management is mainly to provide service to CMA, APL, etc. The yard areas, warehouses and related conditions of Tianjin Port Logistics Development Co. Ltd. are shown as the following table:

Table 2-2: yard areas, warehouses and related condition

Yard name	Yard area (ten thousand/ m2)	Warehouse area (m2)	Business
Collection and distribution center yard	13	2 500	Pallet transferring, unpacking and loading of containers, special transferring, container management, cold container storage, customs declaration, etc.
New Tonghai yard, ,	10	2 000	Pallet transferring, unpacking and loading of containers, container management, customs declaration, etc.
3rd Wujie yard	15.6	—	Pallet transferring, CY unpacking and loading of containers, combined sea and rail transportation, customs declaration, sundry cargo storage, etc.
4th logistics yard	25	24 000	Import Pallet transferring, CY and CFS unpacking and loading of containers, container management,

			customs declaration, etc.
yard for combined sea and rail transportation	20	12 000	CY and CFS unpacking and loading of arrival and shipment of railway vehicle and containers, containers, customs declaration, etc.

Note: Data comes from the official website of Tianjin Port Logistics Development Co. Ltd.

Table 2-3: Completion conditions of main cargo types of Tianjin Port Logistics Development Co. Ltd. in 2009

Yard type	Main cargo types	Completion condition (ten thousand TEU)	Percentage %
Container yard	Pallet transferring of import container	35	41.2
	unpacking	7	7.9
	loading	5	5.5
	Empty container management	20	23.3
	combined sea and rail transportation	1	1.6
	Drop zone	9	10.7

	Container maintenance and washing	2	1.8
	Out storage quantity	85	/

Note: Data comes from the official website of Tianjin Port Logistics Development Co. Ltd.

### 2) Quay horizontal transportation business

The logistics company owns about 500 container vehicles, mainly to provide yard horizontal transportation service to newly built to four container yard companies, i.e. "Wuzhou international ", " Alliance international ", "Pacific international", and "Eurasia international". In 2009, horizontal transportation of 5750 TEU was completed, covering about 66.1% of container handling of the whole port (8700 thousand TEU)

### 3) Other business

By five free special railway lines, Tianjin Port Logistics Development co., LTD broadens the function of combined sea and rail transportation and actively takes part in the construction of water-free port and inland logistic network to make the logistics channel from inland backland to Tianjin port and extend port functions to backland cities.

### (2) Obvious area advantages

Tianjin port is located at the junction of Beijing and Tianjin and Bohai economic circle. It is the sea gateway for the capital Beijing. It is an important foreign trade port in north China and the hinge of connecting Northeast Asia and West Asia. Tianjin port is highest-level manual deepwater port in the world. At present the water depth of the main channel come to -21.0m and

ships of 300 thousand DWT may go through the port with tide. Tianjin port is 150 kilometers from Beijing and it is the shortest and best port from Beijing, the whole north China and northwest China to the world. It is also the best channel for foreign businessmen to central and western markets. Tianjin port is the largest comprehensive trade port in north China. It is also the beginning point with the shortest shipping distance in Eurasia land bridge. It has trade relations with over 400 ports in more than 180 countries and areas.

### (3) Advantages of land resources

The cost of developing land around Tianjin port is low and the potentiality to make use of land resource is great which is convenient to develop port logistics. Dongjiang port of Tianjin port which is being constructed is located in the northeast of Tianjin port. It is the half-island port with three sides facing the sea formed by reclaiming land around sea on the shallow area. The total area is about 30 square kilometers. The advantages of land resources in Tianjin port are obvious among all the coastal ports in China with an existing area of 22.71square kilometers (including bonded zones). The land resources are enough for constructing the warehousing facilities. Meanwhile, the continuous sea reclamation can provide adequate land resources for developing modern logistic.

### (4) Economic advantages of inner-lands of Tianjin port

Tianjin port has great radiation inside and area of back lands comes to almost five million square kilometers, covering 52 % of the country's total area. About 70% of cargo handling quantity of the port and more than 50% of import and export cargo value comes from provinces outside Tianjin. The service function of Tianjin port is perfect with strong regional radiating and leading capability, owning three crossings of Eurasia land bridge. It is the port with the greatest traffic volume of international channel of land bridges; The built



Tianjin international trade and shipping service center is presently the largest one-stop shipping service center and electronic port; 21 water-free ports built on back land improve its logistics network system. Among ports all over the world, there are few like Tianjin port which owns such broad back land. Take 2007 as an example, GDP of direct back land was up to 493.7 billion Yuan.

(5) Improvement on collection and distribution system

The main inner collection and distribution system in Tianjin port includes road and railway. The main artery traffic consists of the following: Jintang highway, Jingjintang highway, Tianbao highway, Jinbao highway, Jinhan highway, Jinbin highway, Jinpu highway, Jinjin highway. All these artery traffic connects Tianjin ports with the economical inner-lands. The railway collection and distribution system mainly consists of three important railways: Jingjin, Jinghu and Jingha.

(6) Logistics service capability is increased

After cooperation of port departments, logistics mating is being perfected, service capability is improving and service level is improved obviously. From July 1<sup>st</sup> 2009, Tianjin port logistic development Co. Ltd. recovers the arrival and delivery business in two container yards: “zhongcai” and “third Wujie” . Railway containers in Tianjin port can achieve one-stop arrival and delivery so that the interchange between sea and rail can be accomplished seamlessly. In the future, Tianjin port logistic development Co. Ltd. will provide “port-to-door” or “door-to-port” logistic services for the consignors in inner-lands. Meanwhile, we can increase absorbing cargo sources and develop cargo capability so as to better serve the inner-land economy and promote the throughput of Tianjin port. All these measures will not only save a

lot of logistic costs for consignors but greatly improve the port logistic service as well.

### **2.2.2 Weakness analysis**

Though there are obvious advantages for developing logistics of Tianjin port, some restricted problems exist, including following aspects:

(1) Ability to know port property is not enough.

The industrial layout in many parts in the world is changing from resources type (close to the raw material location) into a coastal type (close to the port). All kinds of processing industry and heavy chemical industry which are dependent on the sea transportation begin to gather close to the ports and become a new economical increasing point. Meanwhile, this will lead the inner-land economy to develop. So the function of ports becomes more important nowadays. However, the knowledge to modern logistics industry of all sectors of society, including government and enterprises remains to be further improved. The government and port enterprises still regard the port logistics as traditional transferring and storing activities, instead of a system and an industry which has close relation with information network and combine transportation system. They don't view ports as an important hub for national comprehensive transport system, but simply consider them as area logistic system based on cities. They don't consider ports as the important rely for overall construction of well-of society and modernization, the base to form a large-scale and modern industrial chain as well as the important port for foreign contacts.

(2) Weak points of integrated environment for port logistics development still exist.

Some factors of soft and hard environment for development of modern port logistics limit the logistics development of Tianjin port. Currently, the general development of China ports is still low, the port development mainly focuses on the improvement of hardware. There is still no united standard for port logistic information system which cannot adapt to the developing needs. Overload operation exists in most quays with single container yard function. The container transportation by sea and railway is rare and the container collection and distribution conflicts in ports are common everywhere.

(3) Tianjin port is man-made port and is far from the main courses for international containers

As a man-made port, it has serious deposit which comes from three sources: the first one is the sediment carried with sea and river which is the main source. The second one is the wave stirred sand. The third one is the sediment carried with tides which flows into the course berth. Compared with Qingdao port, the geographical location of Tianjin port is far from the main courses for international containers. This will make the ships spend more operation costs to stop at Tianjin port. Under the condition of the market economy, shipping company pays more attention to the cost control of the enterprise which will cause fewer ships to stop at Tianjin port.

(4) The cooperation with international container giants is slower than the competitors

In 2003, Malaysia and Singapore started a port competitive war while Maersk -- the shipping giant signed a long term service contracts after breaking away from Singapore for four months. Under this new agreement, port of Singapore authority will continually provide a tailored service for Maersk cargo ships which call at the Singapore quay. After this lesson, port of Singapore authority centralizes the advantages and provides new value-added services for their

customers. Port of Singapore authority possesses fine quality service and perfect port facility with 250 shipping lines around the world. It also has business relationship with 123 countries and regions as well as more than 600 ports with high transit and operation efficiency. However, Tianjin port has not achieved such influence in the competition with international large-sized ports.

#### (5) Lack of technical talents and aging of talents

Participating in the competition of international container logistic system, Tianjin port must possess a certain amount of logistic talents who understand the international practice and logistic operation procedures. However, this kind of talents is really rare. Tianjin port has some experienced management personnel. Therefore, we need to introduce greatly and try to cultivate these talents by running a joint school. Meanwhile, the talent structure in Tianjin port is aging. It is low in introducing the young ports personnel.

### **2.2.3 Opportunities**

#### (1) Tianjin Binhai New Area is being included into the national overall planning

Being included into the national overall planning is the biggest opportunity of constructing national logistics center for Tianjin Binhai<sup>6</sup> new area which will be the engine of economic development for Tianjin and even Bohai areas. This area has been included into the national developing strategic layout and becomes one of the most energetic and investable areas in northern China. Such projects as airbus A320, ethane and oil refining are all settled here. All kinds of logistic, capital flows and information flows gathered here to provide Tianjin port with such rare historical chance. As a key developing area, Tianjin Dongjiang Area is an important carrier for developing the port economy and ocean economy. Meanwhile, it is a special comprehensive port. The Dongjiang Bonded Zone located here has a planning area of 10 square kilometers and it

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6. Edited by historical and geological research center in Fudan University, Ports—inner-lands and the modernization in China, Qilu Press. 2005: 31-40

has been the biggest bonded zone in China so far. It would take the international practice as references and focuses on development of international transit, distribution, purchase, enter port trade and export processing etc. meanwhile, it would actively explore the management system in special supervision areas in Customs. It is the bonded port zone that has the largest opening degree with most favorable policy in China.

(2) The economical development in circum-Bohai and its industrial structure adjustment

Circum-Bohai area includes the broad economical areas around the Bohai and Huanghai. Since the middle of 1990s, especially after the clear propose of accelerating the development and opening of circum-Bohai area on the 14<sup>th</sup> conference of the Party, this area further became a hot spot for economical development and the focus by home and abroad. The development research on circum-Bohai economical area becomes hotter than before in the theoretical fields. The industrial structure of circum-Bohai economical area gradually adjusts and optimizes according to the economical development. Changing from sources product into technological products gives increase on optimal LCL rate. The adjustment of the industrial structure stimulates the development of economy which will necessarily increase the demands for logistics. Therefore, Tianjin port has great advantages in the economical developing tides.

(3) Manufacturing industry shifting from development countries to China

Recently, affected by the increasing cost in labor, some foreign enterprises shift the manufacturing factories to Southeast of Asia. However, during the emigration of low manufacturing industry, some foreign high manufacturing industry has speeded up the process of moving into China. According to the “2012 world investment report” by trade and development conference in UN, among the most popular host country which are chosen by multi-national companies, China becomes the first one. Large quantity of skilled labor and

high technological talents as well as the perfect industrial bases are all becoming the new comprehensive advantages for China. Meanwhile, with the rapid development of Chinese economy and the domestic demand promoted as well as the practice and boost of stimulating the domestic demands, Chinese consumers have a great and increasing demand for intermediate and high products. This also attracts foreign high quality manufacturer to accelerate their investments.

#### (4) Rapid development of service industry

Improving the development of service industry is the main task in Tianjin social and economical development during the 12<sup>th</sup> five-year plan. 《The 12<sup>th</sup> five-year plan in Tianjin service industry》 is made according to the layout plan of 《The 12<sup>th</sup> five-year in national economical and social development in Tianjin》 and 《Allocation plan of modern service industry in Tianjin (2008-2020)》. It gives guidance for the development of service industry in the following five years in Tianjin. At present, in Tianjin, the number of financial and financial service organization has increased to 2,400. This forms a multilevel, diversification and open typed financial organization system which mainly focuses on bank, insurance, bond, fund, future goods, lease, trust, factoring, finance company and service outsourcing, etc. meanwhile, it forms some new financial activity such as industrial investment fund, stock equity fund, finance lease, factoring, consumer finance, small loan company, currency exchange, etc. The continual innovation of financial market and product establishes such capital and factor market as Bohai commodity exchange, Tianjin stock exchange, etc. The trade is active and the influence continuously expands. The gathering position of national private equity is consolidated and the finance lease industry keeps the leading position in whole country.

#### **2.2.4 Threat**

(1) the rapid development of container transportation business in Dalian port and Qingdao port in circum-Bohai Area

Dalian port is located in the center of Northeast Asian economic circle. It is a broad port with deep water and without sediment and freezing. It is the closest port to the world in northeaster area and eastern Inner Mongolia. 14100TEU container ships can be moored at the container quay of Dalian port Group with more than 90 container liner courses whose website covers more than 100 ports home and abroad. It is the largest container pivotal port in northeastern China with 97% foreign trade container throughput. Qingdao port owns the world largest container quay which can moor 18000TEU ships. In 2012, Qingdao port completed 14,503,000 TEU and its loading and unloading efficiency remains first in the world.

(2) the operation of international famous quay company causes great threats to the container transportation business in Tianjin port

In 2006, one of the largest global port enterprises “Heji huangpu” company formally joins the Huizhou port construction. On the afternoon of March 30<sup>th</sup>, Heji Port Co. Ltd. and Huizhou port Group held cooperation and signing ceremony to celebrate the formal operation of fifth newly-built berth. On December 4<sup>th</sup>, 2008, Shenzhen Yantian port Group and Heji Huangpu port corporation signed 《cooperation agreement on the first container quays in eastern port of Shenzhen Yantian》. They agreed to cooperate and invest to develop the Eastern Yantian port. East port area is located in the east side of Yantian port, including the first and second projects. The first project plans to cover an area of 1,385,600km<sup>2</sup> with 1442 meters shoreline of deep water berth and 4 special berths for deep water containers of 70000-100000 tons. After entering inner ports, Heji huangpu must form a competitive state against Tianjin port on container business which would cause threats to the development of container business in Tianjin port.

(3) Large sized vessels bring about the new requirements on ports

With globalization and integration of world economy, the container transportation nets are formed gradually. Early in the last bull market of shipbuilding, some experts predicted that the large vessel era has arrived who thought 12,000TEU container ships are the limitation that the market can accept. However, with the improvement of ship designing levels, the advancing of port facility capability, the limitation of large vessels are upgraded continuously. Large sized vessels bring about the new requirements on quay dimensions, warehouse capacity, fairway depth and the collection and distribution capability. The level of port infrastructure, loading and unloading operation, collection and distribution all become the measuring standards to see whether this port can be a center port or pivotal port.

#### (4) coalition of liner company operation

Large merging cases occurred frequently in international container Liner Company in recent years. On December 20<sup>th</sup> 2011, the members of great alliance-Japan liner, Hapag-Lloyd and OOCL and the members of new world alliance-APL, modern merchant ship and MOL announced that they would set up a new far-east-European course. This makes the entire member in great alliance and new world alliance to make new far-east-European alliance (which is also called G6 alliance). The new alliance plans to start operation in April 2012 with 7 Asia-European and 2 Asian courses. All these 9 courses deploy more than 90 vessels which provide more frequent liner services among main ports in Asia, Europe and Mediterranean Sea. The members of the alliance claim that they would have more rapid transportation speed and broader port coverage with the newest 14,000TEU container ships. In the following 30 months, the new alliance will make the most effective integration for the largest container ship.

#### (5) competition from foreign ports in Northeastern Asia

After vigorously constructing the ports by several coastal cities in China, as the fifth container port in the world, Pusan is considering an ambitious plan: before



2015, they will complete constructing a new port with 30 berths with a giant logistic area. Now there are 13 berths come into use. Pusan is located on the main course of North America and Europe. However, with more and more vessels sailing directly to China, Pusan is changing its orientation and becoming a transshipment port. Since Japan has more inner transportation costs, the above-mentioned measures can save a lot compared to transporting containers to big ports as HOK and Kobe.

### 2.3 SWOT analysis conclusion

#### 2.3.1 Crossed and combined development strategy for port logistics of Tianjin port based on SWOT analysis

To achieve strategic targets, scatter and re-integrate internal and external factors on the basis of SWOT analysis and four crossed and combined strategies<sup>7</sup> can be found out: SO is the strategy which is based on internal advantages and makes use of external opportunities to obtain quick development; ST is the strategy of making use of internal advantages to avoid external threats; WO is the strategy of making use of external opportunities to overcome internal weaknesses; WT is the strategy of preventing external threat by overcoming internal weakness.

Analysis results are shown in the matrix form and table 2-4 can be obtained:

Table 2-4: SWOT analysis matrix of container business of Tianjin port

	External	<p>opportunity</p> <p>1. International trade drives the development of shipping and port</p>	<p>Threat</p> <p>1. competitive pressure from ports abroad and some areas</p> <p>2. new requirements</p>
Internal			

<sup>7</sup> You Xuehai. The application and research of SWOT in making the port enterprises operation strategy, excellent graduation dissertation in 2002 in Dalian Maritime University, p44-45

	<p>logistics.</p> <p>2. In our country, logistics industrial are attached importance in recently years and a series of policies encouraging logistics development are provided.</p>	<p>for ports due to large scale of ships</p>
<p>Strength</p> <p>1. Completion of infrastructure 2. Broad inner-land with great potentialities 3. Policy advantage of Binhai area 4. Advantages of Dongjiang Bonded area and logistic area 5. interlink with world ports</p>	<p>SO Strategy</p> <p>Develop the modern quays of container transportation based on international transit, build more deep water berths and logistic system which can cover Jingjingyi Area</p>	<p>ST Strategy</p> <p>Upgrade and expansion of the existed quays to meet the current and future demands; build new port strategic alliance; apply the policy advantage in bonded zone; further complete the information service system; strengthen the construction of dry ports and open up the new inner-land market</p>
<p>Weakness</p> <p>1. Poor location and unobvious advantages 2. Sub-development of</p>	<p>WO Strategy</p> <p>Make full use of the policy advantages to upgrade the existing</p>	<p>WT Strategy</p> <p>Make use of the original resources, strengthen the</p>

modern logistic ports 3. Big competitive pressure 4. Short of working vessels and branch berths 5. poor geological conditions which needs irregular scattering	facilities, improve the hardware conditions, improve and strengthen the quay service awareness and improve the key competency	solicitation extent; adopt the diversification operation strategy; provide good services for near-sea shipping lines and inner branches
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### 2.3.2 Selection of key strategy

SWOT analysis method lays emphasis on three factors: strategic target, external environment and internal conditions. Find out reasonable implementation strategy by observing status of internal factors and external environment.

SWOT analysis has the characteristic of obvious structuralization and systematicness. With regard to structuralization, the form is reflected on structuring SWOT matrix and it defines different analysis meaning for each area in the matrix. And from its contents, the main theoretical basis of SWOT analysis focuses on the exterior environment and interior resources on the basis of structural analysis. Besides, in 1960s before the emerge of SWOT, there were someone who put forward such variable factors as the interior strength and weakness, exterior opportunity and threats in SWOT but they only analyzed them separately.

In terms of present logistics condition of Tianjin port, on the one hand, it comes to the golden period of trade and logistics flourishing development and government also pays great attention to development of port logistics, therefore

external disadvantages are what we should emphasize. Only by overcoming weakness and reversing unfavorable factors, strategy target of world-class port logistics can be constructed. Therefore WO is the suitable strategy for port logistics development of Tianjin port. When disadvantages are reversed to be advantages, development strategy can be upgraded to SO and higher growth rate of economic development can be obtained.

SWOT strategy combination is shown as the figure 2-1:

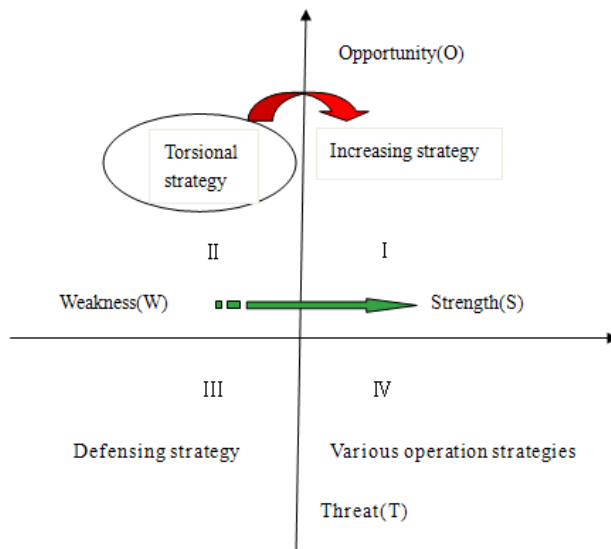


Figure 2-1: SWOT strategy combination

I quadrant, more exterior environmental opportunities and obvious interior strength in Tianjin port. More input into the key developing business is to be increased.

II quadrant, more exterior opportunity but poor interior conditions. Adjustment of main business is to be carried out to maintain the interior stability.

III quadrant, big exterior environmental threats and poor interior conditions.

Main business is to be abandoned for internal adjustment.

IV quadrant, threat in exterior environment and obvious interior strength. Main business is to be cut down to carry out more diversified operation.

## **2.4 Summary**

In this chapter, SWOT analysis method is applied to make an overall comprehensive analysis on the current developing state of container business in Tianjin port. On the basis of combination of all kinds of interior factors and exterior conditions, we can make analysis that Tianjin port has great potentials in developing the container business. Meanwhile, from SWOT analysis, we can see the required problems in developing container business in Tianjin port. The following two aspects are listed:

### **(1) how to stand out from the competition in Circum-Bohai port**

Besides such traditional ports as Dalian port and Qingdao port, the rivals in circum-Bohai area of Tianjin port also include the newly emerged Jingtang port. The most competitive field is the cargo sources of domestic trade.

### **(2) how to solve the problem of talents shortage**

One of the developing bottlenecks facing Tianjin port is the shortage of port technical talents, especially those management and technical talents with practical experience and technical knowledge.

## **Chapter Three The prediction of container throughput in Tianjin port base on MLR (Multiple Linear Regression)**

### **3.1 The introduction and selection of the models**

In the current phase, the prediction of container throughput mainly focuses on grey theoretical model which defines definite information as white system, indefinite information as black system and partly indefinite information as grey system. The characteristic of this system is we can get precise prediction value even under fewer conditions. However, with the increase of the length of the prediction, the precision will decrease. Meanwhile, this system cannot better introduce the influencing factors for dependent variables. In this thesis, MLR is introduced for relevant prediction of container throughput in Tianjin port.

### **3.2 The container throughput in Tianjin port and the relevant data influenced factors**

#### **3.2.1 The container throughput in Tianjin port**

Since reform and opening up, with the rapid development of national economy, Tianjin port has realized great-leap-forward development. In 2001, the cargo throughput surmounted a hundred million tons, in 2004 two hundred million tons, in 2007 three hundred million tons and in 2010 four hundred million tons with 10 million TEU of container throughput which makes it first-rate port in the world. In 2011, the cargo throughput achieved 453 million tons with a fourth world rank and 11.59 million TEU of container throughput with an eleventh world rank.

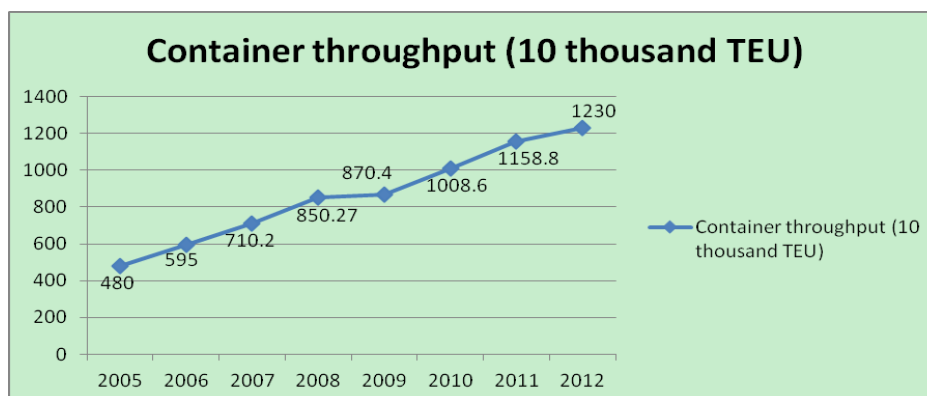


Figure 3-1: Container throughput in Tianjin port (10 thousand TEU)

We can see from Figure 3-1 that the container throughput in Tianjin port kept a steady increase from 2005 to 2008. However, from 2008 to 2009, because of the international financial crisis, it didn't show any increase. And after 2010, the container throughput surmounted 10 million TEU and a great historical leap has been achieved. So we can see its great developing potentials.

### 3.2.2 Gross Domestic product (GDP)

Table 3-1: correlation table of GDP from 2005 to 2011

GDP		absolute volume (hundred million yuan)	Increasing percentage year-on-year (%)
2005		182 321	9.9
2006		209 407	10.7
2007		246 619	11.4
2008	first season	66 284	11.3
	first and second season	140 478	11
	first, second and third season	217 026	10.6
	first, second, third and fourth season	314 045	9.6
2009	first season	69 817	6.6
	first and second season	148 204	7.5
	first, second and third season	231 303	8.2
	first, second, third and fourth season	340 903	9.2
2010	first season	82 613.4	12.1
	first and second season	174 878.8	11.2

	first, second and third season	272 626.7	10.7
	first, second, third and fourth season	401 512.8	10.4
2011	first season	97 101.2	9.7
	first and second season	205 775.4	9.6
	first, second and third season	321 219.1	9.4
	first, second, third and fourth season	471 563.7	9.2

Note: data from China statistic yearbook

The fastest growth rate for GDP in 2008 was 11.3% and the slowest was 9.6% with an average of 10.6%. In 2009 the growth rate in the best time for GDP (first season to the fourth) was still 1.4% lower than last year. Seen from different seasons, the economical growth in 2009 was lower than that in 2008. Due to the financial crisis, the economical growth in 2009 showed a large drop with time, compared to that in last year. Therefore, it is rare that the financial crisis has such a large influence on our national economy in such a large area.

In 2010, the fastest growth rate for GDP was 12.1% and the slowest was 10.4% with an average of 11.1%. In 2011, the fastest growth rate for GDP was 9.7% and the slowest was 9.2%. Although in 2011 the growth rate for GDP was rapid than that in the previous few years, we can find that the national economical growth rate has still been slowed down till 2011.

Table 3-2: Gross domestic product in Tianjin from 2005 to 2012

	2005	2006	2007	2008	2009	2010	2011
Gross domestic product in Tianjin (hundred million yuan)	3 663.86	4 337.73	5 018.28	6 354.38	7 500.80	9 108.83	11 190.99

Note: data from websites of Tianjin Statistic Bureau



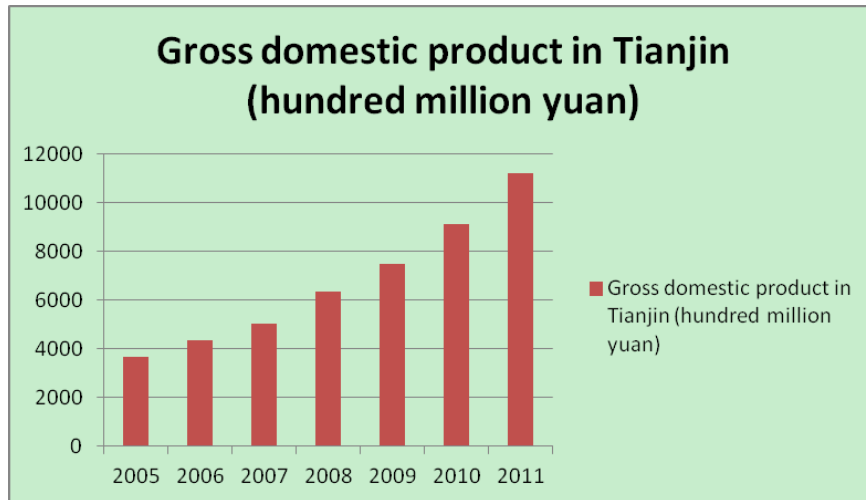


Figure 3-2: Gross domestic product in Tianjin from 2005 to 2011

We can see from Table 3-2 and Figure3-2 that gross domestic product in Tianjin keeps an increasing trends.

### 3.2.3 Export and import in foreign trade

Export and import volume in foreign trade has a close relationship with the container throughput shown in Figure 3-3. According to the statistics from Customs, in 2008 its total volume was 2561.632 billion dollars. Affected by financial crisis, it declined to 2207.266 billion dollars. In 2011, it was 3642.06 billion dollars with a year-on-year increase of 22.5%. The growth rate fell after rise with 12.3%. In 2012, it showed a persistent increase.

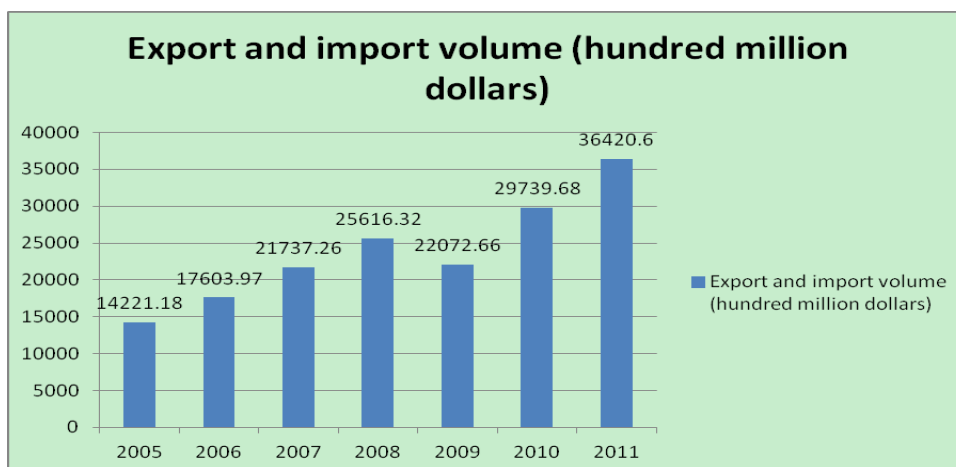


Figure 3-3: national export and import volume from 2005 to 2011



Figure 3-4: export and import volume in Tianjin from 2005 to 2011

In 2008, affected by global financial crisis, the export and import enterprises in China all met with a heavy blow so that the demands for national products by international market quickly reduced. The export and import volume in foreign trade showed an obvious decrease thus the domestic demands reduced accordingly and the demands for international products also showed a rapid shrinkage trend. Deterioration in national container transportation market took place according to the rapid decline of the export and import volume. Therefore, the container throughput showed a sharp drop accompanied by excessive transport capacity, declining freight rate and dropping vessel utilization.

### 3.2.4 Volume of freight

Volume of freight indicates the actual carrying quantity of the cargo by transportation enterprises during a certain period. As far as road and waterway are concerned, their volumes of freight are calculated according to the arrival cargo in report period, that is, during the report period, the arrival and unloaded cargo quantity is the volume of freight. Water transport volume of freight has a close relationship with the port throughput.

Table 3-3: national water transport volume of freight and that in Tianjin from 2005 to 2011

	2005	2006	2007	2008	2009	2010	2011
national water transport volume of freight (10 thousand tons)	219 648	248 703	281 199	294 510	318 996	378 949	425 968
water transport volume of freight in Tianjin (10 thousand tons)	12 367.77	13 257.45	15 671.27	15 096.0	11 656	11 911.8	12 710

Note: data from Ministry of Transport and websites of Tianjin Statistic Bureau

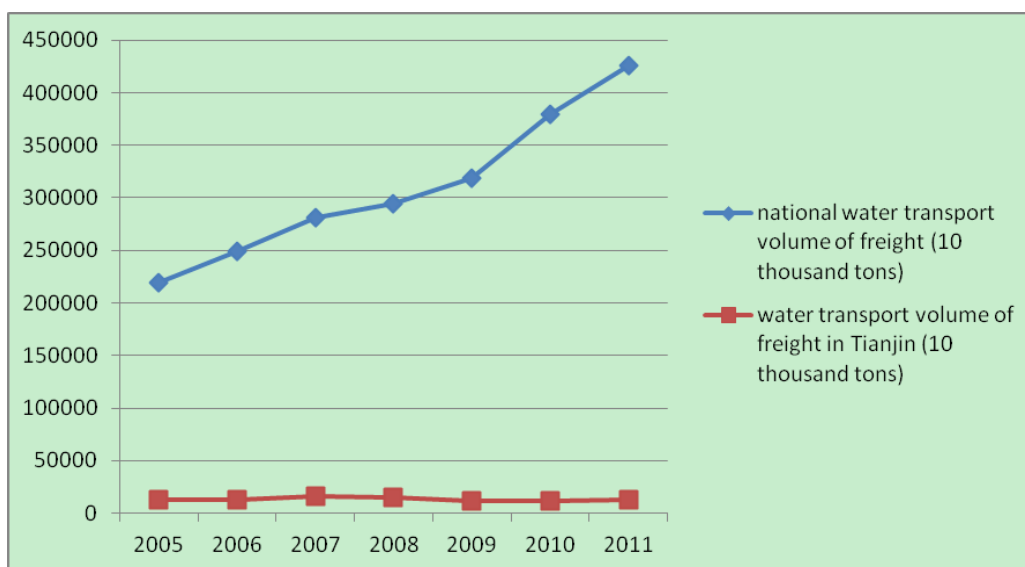


Figure 3-5: water transport volume of freight from 2005 to 2011

### 3.2.5 Quay berth number

Quay berth number is the quantity of location for ships to stop in the port, we can know from the following table:

Table 3-4: statistic of berth number in Tianjin port during the past years

Tianjin port	Total	
	berth length	berth number
	(meter)	(PC)
2005	19 682	140

2006	22 871	119
2007	25 658	130
2008	27 715	139
2009	34 018	134
2010	31 915	151
2011	32 714	154

Note: data from China port yearbook

Quay berth number will affect the container throughput in the port to some extent.

### 3.2.6 Cargo turnover

Cargo turnover is the cumulative number of the cargo weight actually transported by its distance for each transport tool during report period.

Table 3-5: national turnover of freight from 2001 to 2011

turnover of freight (a hundred million tons/ km)			
year	water transport turnover of freight	Turnover of ocean-going freight	Turnover of freight in Tianjin
2001	25 988.9	20 873	/
2002	27 510.6	21 733	/
2003	28 715.8	22 305	/
2004	41 428.7	32 255	/
2005	49 672.3	38 552	11 068.98
2006	55 485.7	42 577	12 149.29
2007	64 284.8	48 686	15 221.40
2008	50 262.7	32 851	14 479.07
2009	57 556.7	39 524	10 102.32
2010	68 427.5	45 999	9 858.66
2011	71 302.6	47 370	10 121.44

Note: data from China statistic yearbook

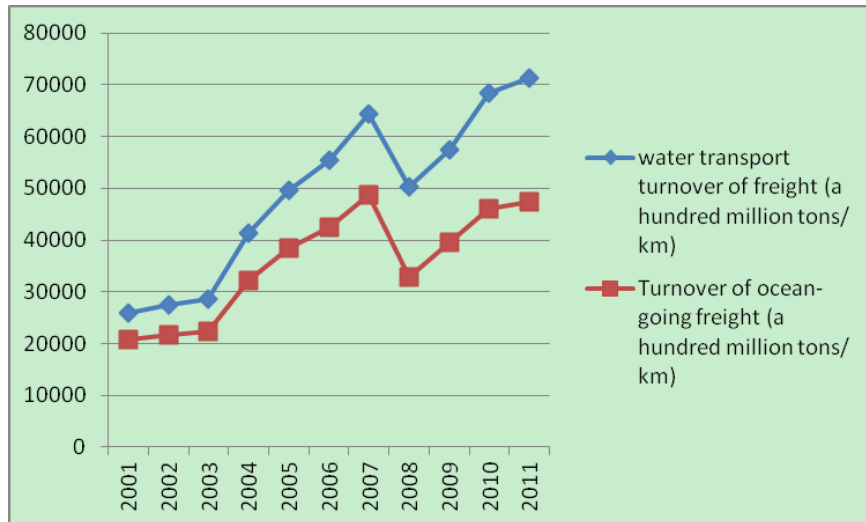


Figure 3-6: national water transport turnover of freight and turnover of ocean-going freight from 2001 to 2011

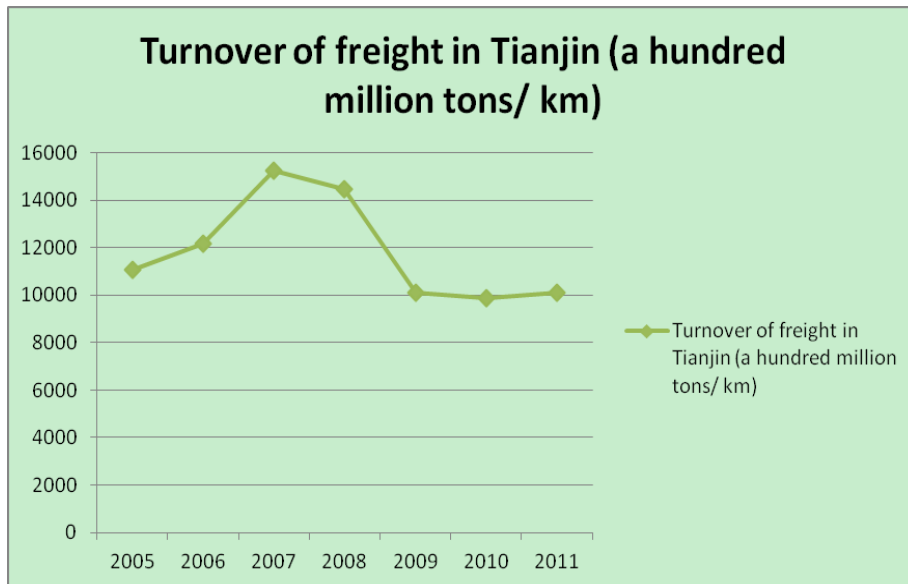


Figure 3-7: Turnover of freight in Tianjin from 2005 to 2011

Shown from Table 3-5 and Figure 3-6, from 2003 to 2007, our national water transport turnover of freight kept a stable increase. And in 2008, influenced by financial crisis, it showed a large drop in the second half and began to climb back slowly till the second half in 2009. From Figure 3-7, we can see that turnover of freight in Tianjin also showed a slump state and from 2009 to 2011, it kept in a steady position.

### 3.3 The prediction of MLR in SPSS software

SPSS stands for Statistical Product and Service Solutions. Among those frequently used international software such as BMDP、SAS、Mini Tab、GENSTAT and GLIM, SPSS has got the highest mark for its functions and assessment by customers. It combines data analysis and data processing together with clear analysis results. It can directly read data from EXCEL and DBF without any repetitive data logging.

#### 3.3.1 Theoretical models

MLR (the explained variable has more than two explaining variables) mainly researches on the relations between one dependent variable and several independent variables. The formula of it is as follows:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p + \varepsilon$$

$x_1, x_2, \dots, x_p$  are independent variables,  $p$  stands for the number of independent variable,  $\beta_0$  is the constant,  $\beta_1, \beta_2, \dots, \beta_p$ , are regressive coefficient. If there are  $n$  sets of samples, it can combine a matrix and the form of which is as follows:

Suppose  $n$  sets of samples are  $(x_{i1}, x_{i2}, \dots, x_{ip}, y_i), (i = 1, 2, \dots, n)$ ,

$$Y = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{pmatrix}, \quad X = \begin{pmatrix} 1 & x_{11} & x_{12} & \cdots & \cdots & x_{1p} \\ 1 & x_{21} & x_{22} & \cdots & \cdots & x_{2p} \\ \vdots & \vdots & \vdots & \cdots & \cdots & \vdots \\ \vdots & \vdots & \vdots & \cdots & \cdots & \vdots \\ 1 & x_{n1} & x_{n2} & \cdots & \cdots & x_{np} \end{pmatrix}, \quad \beta = \begin{pmatrix} \beta_0 \\ \beta_1 \\ \vdots \\ \beta_p \end{pmatrix}, \quad \varepsilon = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_n \end{pmatrix}$$

Then the matrix formula of linear regression is:  $Y = X\beta + \varepsilon$ , among this,  $\varepsilon$  stands for random error which includes explainable error and unexplainable error. Random error must meet the following requirements: obey the normal distribution, no biased hypothesis, independent hypothesis, variance hypothesis. It means all the random variables must be independent of each other and we can explain them with covariance.

When the error sums of squares and  $\sum e^2$  are the smallest, we can use least square method to work out the parameters. (Because of the complexity of MLR, its data processing is finished with the aid of SPSS software). The obtained parameter and the influence of each independent variable on dependent variable, that is, when such independent variables as  $x_2, x_3, \dots, x_p$  are not changed,  $\beta_1$  is the effect on  $y$  while each time  $x_1$  is added. Then  $\beta_1$  is the biased regression coefficient for  $x_1$ .

After the parameters are obtained, we need to check and assess them just like unary linear regression to confirm whether the model can be used or not. If there exist problems like multicollinearity, we need to adjust the model till the confirmation of final one.

### **3.3.2 Data analysis**

In this chapter we mainly analyze the relation between the container throughput in Tianjin port and its relevant influencing factors. According to the detailed definition of influencing factors, we can suppose  $y$  as the container throughput in Tianjin port,  $x_1$  as the berth number,  $x_2$  as the cargo turnover in Tianjin,  $x_3$  as gross domestic product in Tianjin,  $x_4$  as export and import volume,  $x_5$  as water transport volume of freight.

SPSS software is applied for the analysis of collinearity, the results of which are shown in Figure 3-8:

Correlations												
		National water transport turnover of freight	turnover of ocean-going freight	Berth number	National water transport volume of freight (10 thousand tons)	Water transport volume of freight in Tianjin (10 thousand tons)	Gross domestic product in Tianjin ( hundred million yuan)	GDP	national export and import volume ( hundred million dollars )	export and import volume in Tianjin ( hundred million dollars )	berth length ( meter )	Turnover of freight in Tianjin
National water transport turnover of freight	Pearson Correlation	1	0.865	0.518	0.834	-0.149	0.766	0.737	0.772	0.723	0.621	-0.322
	Sig. (2-tailed)		0.012	0.234	0.020	0.749	0.045	0.059	0.042	0.067	0.137	0.482
N		7	7	7	7	7	7	7	7	7	7	7
National turnover of ocean-going freight	Pearson Correlation	0.865	1	0.164	0.451	-0.037	0.355	0.304	0.374	0.371	0.214	-0.155
	Sig. (2-tailed)	0.012		0.725	0.310	0.938	0.434	0.507	0.409	0.413	0.645	0.739
N		7	7	7	7	7	7	7	7	7	7	7
Berth number	Pearson Correlation	0.518	0.164	1	0.750	-0.346	0.773	0.768	0.746	0.663	0.517	-0.492
	Sig. (2-tailed)	0.234	0.725		0.052	0.448	0.042	0.044	0.054	0.105	0.234	0.262
N		7	7	7	7	7	7	7	7	7	7	7
National water transport volume of freight (10 thousand tons)	Pearson Correlation	0.834	0.451	0.750	1	-0.278	0.991	0.987	0.968	0.891	0.860	-0.461
	Sig. (2-tailed)	0.020	0.310	0.052		0.546	0.000	0.000	0.000	0.007	0.013	0.298
N		7	7	7	7	7	7	7	7	7	7	7
Water transport volume of freight in Tianjin (10 thousand tons)	Pearson Correlation	-0.149	-0.037	-0.346	-0.278	1	-0.352	-0.298	-0.075	0.086	-0.322	0.974
	Sig. (2-tailed)	0.749	0.938	0.448	0.546		0.439	0.516	0.874	0.881	0.481	0.000
N		7	7	7	7	7	7	7	7	7	7	7
Gross domestic product in Tianjin ( hundred million yuan)	Pearson Correlation	0.766	0.355	0.773	0.991	-0.352	1	0.995	0.953	0.866	0.874	-0.526
	Sig. (2-tailed)	0.045	0.434	0.042	0.000	0.439		0.000	0.001	0.012	0.010	0.225
N		7	7	7	7	7	7	7	7	7	7	7
GDP	Pearson Correlation	0.737	0.304	0.765	0.987	-0.298	0.995	1	0.961	0.873	0.894	-0.470
	Sig. (2-tailed)	0.059	0.507	0.044	0.000	0.516	0.000		0.001	0.010	0.007	0.298
N		7	7	7	7	7	7	7	7	7	7	7
national export and import volume ( hundred million dollars )	Pearson Correlation	0.772	0.374	0.746	0.968	-0.075	0.953	0.961	1	0.971	0.779	-0.276
	Sig. (2-tailed)	0.042	0.409	0.054	0.000	0.874	0.001	0.001		0.000	0.039	0.549
N		7	7	7	7	7	7	7	7	7	7	7
export and import volume in Tianjin ( hundred million dollars )	Pearson Correlation	0.723	0.371	0.663	0.891	0.088	0.866	0.873	0.971	1	0.633	-0.127
	Sig. (2-tailed)	0.067	0.413	0.105	0.007	0.851	0.012	0.010	0.000		0.127	0.786
N		7	7	7	7	7	7	7	7	7	7	7
berth length ( meter )	Pearson Correlation	0.621	0.214	0.517	0.860	-0.322	0.874	0.884	0.779	0.633	1	-0.424
	Sig. (2-tailed)	0.137	0.645	0.234	0.013	0.481	0.010	0.007	0.039	0.127		0.344
N		7	7	7	7	7	7	7	7	7	7	7
Turnover of freight in Tianjin	Pearson Correlation	-0.322	-0.155	-0.492	-0.461	0.974	-0.526	-0.470	-0.276	-0.127	-0.424	1
	Sig. (2-tailed)	0.482	0.739	0.262	0.298	0.000	0.225	0.288	0.549	0.786	0.344	
N		7	7	7	7	7	7	7	7	7	7	7

+. Correlation is significant at the 0.05 level (2-tailed).  
 \*\*. Correlation is significant at the 0.01 level (2-tailed).

Figure 3-8: variable collinearity analysis

After relevant check, four most effective variable units are as follows:

Variable unit 001 : use national water transport volume of freight and berth length as variables shown in Figure 3-9:

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	-54.988	78.058		-0.704	0.513
	National water transport volume of freight (10 thousand tons)	0.003	0.000	0.985	12.747	0.000
	(Constant)	-155.024	50.165		-3.090	0.037
	National water transport volume of freight (10 thousand tons)	0.002	0.000	0.730	8.978	0.001
	berth length ( meter )	0.013	0.003	0.296	3.644	0.022

a. Dependent Variable: Container throughput in Tianjin port (10 thousand TEU)

Figure 3-9: variable unit -001

Variable unit 002: use berth length, water transport volume of freight and cargo turnover in Tianjin as variables shown in Figure 3-10:

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	-1,007.463	325.920		-3.091	0.054
	berth length ( meter )	0.030	0.005	0.709	6.262	0.008
	Water transport volume of freight in Tianjin (10 thousand tons)	0.251	0.067	1.704	3.737	0.033
	Turnover of freight in Tianjin	-0.189	0.050	-1.801	-3.779	0.032

a. Dependent Variable: Container throughput in Tianjin port (10 thousand TEU)

Figure 3-10: variable unit -002



Variable unit 003: use national turnover of ocean-going freight, water transport volume of freight in Tianjin, cargo turnover in Tianjin and national export and import volume as variables shown in Figure 3-11:

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,750.944	343.983		5.090	0.036
	National turnover of ocean-going freight	0.010	0.003	0.255	3.294	0.081
	Water transport volume of freight in Tianjin (10 thousand tons)	-0.467	0.106	-3.171	-4.402	0.048
	Turnover of freight in Tianjin national export and import volume ( hundred million dollars )	0.323	0.078	3.088	4.126	0.054
		0.045	0.005	1.454	9.436	0.011

a. Dependent Variable: Container throughput in Tianjin port (10 thousand TEU)

Figure 3-11: variable unit -003

Variable unit 004: use national turnover of ocean-going freight, water transport volume of freight in Tianjin, cargo turnover in Tianjin and national water transport volume of freight as variables shown in Figure 3-12:

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	480.186	45.573		10.537	0.009
	National turnover of ocean-going freight	0.002	0.001	0.051	3.887	0.060
	Water transport volume of freight in Tianjin (10 thousand tons)	-0.229	0.015	-1.558	-15.319	0.004
	Turnover of freight in Tianjin	0.177	0.011	1.686	15.370	0.004
	National water transport volume of freight (10 thousand tons)	0.004	0.000	1.307	53.345	0.000

a. Dependent Variable: Container throughput in Tianjin port (10 thousand TEU)

Figure 3-12: variable unit -004

According to the above variables, we can find out the variable data in 2012 and input them into SPSS software and then output prediction result by excel.

In 2012, national water transport volume of freight was 4.56 billion tons

In 2012, the berth length of Tianjin port was 32.7 thousand meters

In 2012, water transport volume of freight in Tianjin was 103.317 million tons

In 2012, cargo turnover in Tianjin was 763.494 billion tons/ km

In 2012, national turnover of ocean-going freight was 4823 billion tons/km

In 2012, the national export and import volume was 3866.8 billion dollars

The prediction result of variable unit 001 is shown in Figure 3-13:

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-54.988	78.058		-0.704	0.513
	National water transport volume of freight (10 thousand tons)	0.003	0.000	0.985	12.747	0.000
	(Constant)	-155.024	50.165		-3.090	0.037
	National water transport volume of freight (10 thousand tons)	0.002	0.000	0.730	8.978	0.001
	berth length ( meter )	0.013	0.003	0.296	3.644	0.022
a. Dependent Variable: Container throughput in Tianjin port (10 thousand TEU)						
		456,000				
			32700			
	Prediction value 1	1,377.00974374621				
	Prediction value 2	1,320.21872637557				

Figure 3-13: prediction results of variable unit -001

Variable unit 001 gets two prediction values of container throughput in Tianjin port in 2013: 13.2 million TEU and 13.77 million TEU.

The prediction result of variable unit 002 is shown in Figure 3-14:

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1,007.463	325.920		-3.091	0.054
	berth length ( meter )	0.030	0.005	0.709	6.262	0.008
	Water transport volume of freight in Tianjin (10 thousand tons)	0.251	0.067	1.704	3.737	0.033
	Turnover of freight in Tianjin	-0.189	0.050	-1.801	-3.779	0.032
a. Dependent Variable: Container throughput in Tianjin port (10 thousand TEU)						
		32,700.000				
		10,331.700				
		7,634.940				
		2140.926486				
	Prediction value	1,133.46381256055				

Figure 3-14: prediction results of variable unit -002

Variable unit 002 gets one prediction value of container throughput in Tianjin port in 2013: 11,334,638 TEU.

The prediction result of variable unit 003 is shown in Figure 3-15:

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,750.944	343.983		5.090	0.036
	National turnover of ocean-going freight	0.010	0.003	0.255	3.294	0.081
	Water transport volume of freight in Tianjin (10 thousand tons)	-0.467	0.106	-3.171	-4.402	0.048
	Turnover of freight in Tianjin national export and import volume ( hundred million dollars )	0.323	0.078	3.088	4.126	0.054
		0.045	0.005	1.454	9.436	0.011
a. Dependent Variable: Container throughput in Tianjin port (10 thousand TEU)						
		48230				
		10331.7				
		7634.94				
		38668				
			-119.1255086			
	Prediction value		1,631.81874903371			

Figure 3-15 prediction results of variable unit -003

Variable unit 003 gets one prediction value of container throughput in Tianjin port in 2013: 16,318,180 TEU.

The prediction result of variable unit 004 is shown in Figure 3-16:

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	480.186	45.573		10.537	0.009
	National turnover of ocean-going freight	0.002	0.001	0.051	3.887	0.060
	Water transport volume of freight in Tianjin (10 thousand tons)	-0.229	0.015	-1.558	-15.319	0.004
	Turnover of freight in Tianjin National water transport volume of freight (10 thousand tons)	0.177	0.011	1.686	15.370	0.004
		0.004	0.000	1.307	53.345	0.000
a. Dependent Variable: Container throughput in Tianjin port (10 thousand TEU)						
		48230				
		10331.7				
		7634.94				
		456000				
		980.1169292				
	Prediction value		1,460.30327962445			

Figure 3-16 prediction results of variable unit -004

Variable unit 004 gets one prediction value of container throughput in Tianjin port in 2013: 14,603,030 TEU.

### 3.4 Summary

In this chapter, SPSS software is applied to work out the prediction of container throughput in Tianjin port. Direct - vision method is used to choose variables and their effectiveness is analyzed. The prediction values from 4

variable units are: 13,200,000TEU, 13,770,000 TEU 、 11,334,638 TEU 、 16,318,180 TEU 、 14,603,030TEU. From the prediction results, we can know that the container throughput in Tianjin port in 2013 remained a steady increase position. Under this premise, how to make sure the stable development of container throughput in Tianjin port in 2013 and achieve the predicted value, we have to pay attention to the following aspects during the port development:

(1) construction of infrastructure facility in the port

At present, the container ship with the largest container capacity in the world can carry 16000 TEU. The maiden voyage of ship “CMA- Marco-polo” was held in Ningbo port on November 7<sup>th</sup> 2012. The container quay in the port needs to gradually adapt to the development of large scale ships.

(2) service level and information level in the port

The development of computer technology makes the port operation and coordination tend to be networking. Tianjin port needs to strength the construction level of network informationization.

(3) construction of comprehensive port logistic environment

Under the comprehensive logistic environment, the development of container business in the port will face more opportunities.

## **Chapter Four The strategic development and key fields of container business in Tianjin port**

### **4.1 The strategic development of container business in Tianjin port**

#### **4.1.1 Accelerate the container infrastructure construction**

The trend of the large-sized global container ships has already affected many ports, and Tianjin port will continually improve the container berth and the construction of the supported shipping ranks and deep-water channels. The port can hold 300,000 tons. Meanwhile, in order to improve the comprehensive supporting ability of Tianjin port, we will accelerate the construction of sea-rail change center, build up the modern comprehensive transportation system such as roads and railways which are based on the port as well as further enhance the collecting and distributing abilities of Tianjin port.

#### **4.1.2 Increase the development in the market**

Under the market economy, the integration trends begin to appear so Tianjin port should have the competition awareness and crisis awareness. To open up, it needs to strengthen the cooperation and alliance with the shipping enterprises. It needs to be in the forefront to attract the foreign investment. Meanwhile, we should strengthen the development of information technology and internet networking technology and introduce the advanced international management experience. Try to enlarge the influence range, and actively give assistance to the shipping lines for the shortage problems of inland container sources by which we can bring along the cargo sources.

#### **4.1.3 Provide service quality and level**

There is the need for Tianjin port to speed up the changing of economic developing methods and actively adjust and optimize the industrial structure. And then further improve the diverse industrial developing pattern which is

focused on the four industries like the port loading and unloading, international logistics, port estate and port services. We need to keep up the pace with the world first-rate enterprise and provide effective, convenient and satisfactory service to all the customers home and abroad.

#### **4.1.4 Accelerate the construction of the logistic environment in port**

In order to adapt to the increasing of international transit and expansion of opening up to the outside world, we should actively strive for the preferential policy from our government on the basis of the unique geographical environment and regional advantages of Dongjiang harbor. The Dongjiang port under construction is located in the northwestern of Tianjin port and it is a peninsula area which is surrounded by sea for three sides and formed by manual reclamation of shallow sea and intertidal zone with a total area of 30 km<sup>2</sup>. Meanwhile, we should integrate with the international general rules and combine together such functions as port, export and processing, import and bonded as well as export and rebates so that we can enhance the international transit ability in Tianjin port especially the transit function for the central and western Asia.

#### **4.1.5 Reinforce the information construction for logistics**

On the basis of the current logistic information, we are going to quicken the integration of the operation system in each quay working site and advance the informatizaion of the rear stocking area. We will continually perfect the information system inquiry for comprehensive business especially the information system construction for container logistic center, newly-built and specialized berth for containers as well as the stocking areas. What's more, we will accelerate the construction for electronic ports to provide more convenient services for port customs clearance, commerce and shipping trades and further simplify the procedures by establishing a public port information platform

which includes electronic government affairs, electronic commerce and electronic logistic that is trans-departmental, trans-industrial and trans-area.

#### **4.1.6 Realize the international strategy**

Tianjin port developed quickly. The most important key is that it introduces strategic cooperating partners and investors with an open attitude. For its long term sight and strategic consideration, it aims at the world Top 500 enterprises and such famous quay operators and shipping giants as Maersk, Dubai world, COSCO and CSCL. It attracts their investments and participates in port construction. They construct the container quays, share the construction costs and share the developing profits by joint venture, cooperation and joint stock with the aid of such advantages as capital, cargo sources and flight course. While broadening the financing channels, Tianjin port pays more attention to introduce advanced quay operation and management experience, open up the cargo sources and courses, innovate the operation mechanism and rapidly improve the level of container quay.

As for the financing channel, Tianjin port created the first port finance company in China which uses capital as a link, combines strategic alliance and injects the main business assets into the listed company. Meanwhile, a stock in Tianjin port and HK red chip are integrated to open up the financing platform home and abroad, making Tianjin port into a new blue chip which is chased after by capital market.

#### **4.1.7 Accelerate the professional talents cultivation**

Talents are the power and source of development. During the development strategy of container business in Tianjin port, we need to pay special attention to the cultivation of talents. Thus during the competition with other ports, we can bring talents advantages into full play.

## **4.2 The key fields of strategic development of container business in Tianjin port**

### **4.2.1 Develop the feeder service in circum-Bohai Sea**

This means to attract cargo sources in inner-land. The inner feeder vessels can gather together all the cargo sources from small ports near the pivotal ports so that “water-water” transfer can be carried out to develop the container quantity. At present, most coastal ports are actively developing the feeder branches and attracting the exporting container quantity. The water-water transferring container quantity has been greatly increased especially in circum-Bohai branch of Tianjin port. This branch has developed quickly with more than 20 thousand TEU for feeder container quantity already.

### **4.2.2 Build the inland dry port**

“Dry port” indicates ports without water but with harbor function. It is different from the traditional inland container freight station. It is a logistic center which is set up in the inland areas with such functions as customs clearance, cargo space booking, equipment control, warehousing and transportation. In dry ports, such supervision organizations as customs and inspection and quarantine are established to gather all the shipping factors like shipping agency, cargo agency, bank and insurance. Thus seamless joint with ports can be realized through road transportation, making it become the port of loading and port of destination when the shipping company signs the billing of lading. It is also an extension of port function into inner-land. In short, inland dry port possesses all the port functions apart from ship loading and unloading function. Construction of inland dry port is an important measure for Tianjin port Group to build up complete inner-land logistic network, further give play to regional economy services, radiation and leading functions by Tianjin port.

As for coastal ports, it needs to extend its business into inner-land for cargo sources so as to realize much bigger turnover.



In northeastern China, the direct container train has already been started in dry ports from Dalian to Shenyang, Changchun, Haerbin and Yanji so as to provide conditions for construction of more dry ports. Dalian port plans to set up container dry port with cities like Changchun in order to extend the policy of Dalian bonded zone into northeastern cities.

#### **4.2.3 International transfer station**

International transfer means to transfer the cargo from the third country through the quay in the second country. This business has been actively developed in many ports home and abroad, especially the international transfer business on behalf of Singapore and HK. This becomes an effective means for developing the port container quantity. Pusan port in Korea, Taiwan port in China, main coastal port in China such as Shanghai and Shenzhen are all actively developing the international container transferring business which has a great potential for increasing the turnover. Tianjin port is slower in carrying out this business and thus falls behind Qingdao port located in the same circum-Bohai area. Meanwhile, the increase of container quantity is totally affected by the developing condition of the economical inner-land and other factors. Besides, the regional geographical conditions restrict the development scale of Tianjin port.

#### **4.2.4 Actively promote the realization of free port**

According to the trade control, the free ports can be divided into fully free ports and limited free ports. The former mainly deals with transit trades. The state council issued “official reply about setting up the Dongjiang Bonded Zone in Tianjin” and formally approved the establishment of Dongjiang Bonded Zone with an area of 10km<sup>2</sup>. It would be the largest Bonded Port Zone in China. Tianjin port needs to make full use of the government support to speed up the construction of free ports.

#### **4.2.5 Construct the large-sized logistic enterprises (logistic area)**

The developing mode of container logistic in Tianjin port is to create an international logistic center. This requires large sized or super large sized logistic company (logistic area) to support its operation. This is the urgent problem to be solved for Tianjin port. In September 2012, the large scaled logistic base was open formally in Zhangjiakou Hebei. This will be helpful for Tianjin port to extend the business into northeaster inland area. Zhangjiakou logistic base of Tianjin port is located in Huaian Zhangjiankou Hebei and has a planning area of 4 km<sup>2</sup>. In this base, logistic warehousing, public service and production area, office area, commercial and trade area and life service area are all established. Among them, the starting area of this project covers an area of 323, 000m<sup>2</sup> and it was started planning in June 2010. Now an area of 73,300m<sup>2</sup> has been finished construction.

Relied on the Zhangjiakou logistic base, Tianjin port Group gives full play to the linkage effects of inland container yard and leading quay so as to provide such whole range logistic services as “door to port, port to door”. Thus the direct distribution of cargo can be realized and the logistic costs can be reduced. Tianjin port copies the mature operation and management modes to the inner-land. Based on the traditional logistic business like warehousing, transportation, loading and unloading and processing, it mixes the financial function to supply customers from inlands of northern China with such supply chain services as future trading and impawning supervision.

## Chapter Five Conclusion and Prospect

### 5.1 Conclusion

Tianjin Port logistic is the preface for our national logistic development. The rapid development of global trade and logistics not only brings about the challenge but also fierce competition. The logistics in Tianjin port started earlier so the relevant experience to be referred is few; therefore, it is vitally important to research the logistic development strategy which is suitable for Tianjin port so that we can further promote the competitiveness of the port logistics.

This dissertation starts from the general introduction of port logistics. Then list in detail the developing state of port logistics, analysis for logistic development environment in Tianjin port, analysis for logistic business as well as the advantages and existing problems for port logistics. According to the introduced development analysis for port logistic strategy, we can carry out a comprehensive analysis for the logistic developing state of Tianjin port by using the SWOT analysis method. On the basis of combination of each internal factors and external conditions, four cross-combined development strategies have been found which include increasing strategy, diversified operation strategy, torsional strategy and defense strategy.

Currently, the trends of integration of world economy and the industry orientation for our national modern logistic are all the strong pushing forces for the logistic development in Tianjin port. However, the logistic in Tianjin port is still in the initial stage, the self conditions and the development degree still have great gaps compared with the foreign advanced levels. These interior defects are the biggest blocks for promoting the competitiveness. This phenomenon with good external conditions and insufficient interiors makes the torsional strategy the most key strategy for the logistic development in Tianjin port currently. The strategic aims of “creating a first-rate port logistic system in the world” can only be achieved by taking full advantages of such good opportunity as “the third developing tides” in global logistics, improving the

existing disadvantages, catching up, turning the disadvantages into advantages and improving the comprehensive competitiveness.

## **5.2 Prospects**

Because of limitation of my academic level and time, though our topic research has been achieved something, some relevant contents are to be further discussed which mainly consists of the following aspects:

1. As for the quantitative analysis on Tianjin port, the chosen variables haven't adequate diversification and the chosen year only ranges from 2005 to 2011. Thus the analysis may have one-sidedness. In the following research, we need to deal more with infrastructure and the external factors related with port logistics.

2. The state-owned enterprises have its own specialty therefore when we are researching the state-owned enterprises; we also need to consider the influence on them by central government and local policy. In the following research on strategic methods for Tianjin port logistics, we need to refer to and research more on the government policy.

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