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WORLD MARITIME UNIVERSITY

Shanghai, China

**The Research of the Constructing the Port of
Xiamen to Become a Container Pivot Port**

By

Weng Zui Fei

China

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

MASTER OF SCIENCE

(INTERNATIONAL TRANSPORT AND LOGISTICS)

2006

DECLARATION

I certify that all the material in this dissertation 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 dissertation reflect my own personal views, and are not necessarily endorsed by the University.

.....

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.....

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ABSTRACT

Title of Dissertation: **The Research of the Constructing the Port of Xiamen to Become a Container Pivot Port**

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

China's economy will still maintain its fast growth rate in the present time and the near future. The need of energy and raw material will be amplified significantly which will definitely stimulate the construction and development of our domestic ports.

So, since the port of Xiamen serves as the leading head in developing the west coast of the Taiwan Strait economic zone in the 11th 5-year plan period and due to its unique geographic position, it's extremely necessary and appropriate to construct Xiamen port to become a container pivot port.

This dissertation will fully analyze its advantages and disadvantages through certain systematic researches and then I will study some key issues in Xiamen container pivot port construction process and predict a rational container throughput target from 2007 to 2010 based on some information such as its throughput and developing trend in the past few years to guide its market business operation and competition in the constructing process.

Finally, I will give some specific implementing measures to achieve the container throughput target that I predict in constructing Xiamen port to become a container pivot port process.

KEY WORDS: Pivot port, Strategic Port Development, Transshipment, Taiwan, Forecast

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LIST OF ABBREVIATIONS

WCEZ	West Coast Economic Zone
YRD	Yangtze River Delta
PRD	Pearl River Delta
IT	Information Technology
IMF	International Monetary Fund
TI	Taiwan's Investment
WTO	World Trade Organization
TS	the Taiwan Strait
XB	Xiamen Bay
DT	Domestic Trade
CM	the Communication Ministry
TEU	Twenty-foot Equivalent Unit
EDI	Electronic Database Interchange

CHAPTER 1

INTRODUCTION

1.1 The background of topic selection

As we enter the 21st century, Xiamen is now facing new construction and development situation. First, since the reform and opening up, with the rapid development of China's economy and trade and the rise of modern ports clusters marked with container transport, the pattern of China's coastal regions of large ports is being changed. Like other port, Xiamen port has encountered new development opportunity and also has felt the pressure of port's new competition. Secondly, with China's accession to the WTO, the export-oriented economy has characterized Xiamen which will make Xiamen obtain some new development opportunities and so Xiamen port is needed to become a door to connect the international market with Xiamen's hinterland which made Xiamen port feel the urgency to accelerate its development. Third, the construction of Fujian coast economic strategy plan has been proposed by the government of Fujian province and at the same time the government puts forward higher requirement of Fuzhou, Quanzhou and Xiamen gulf port development centered in Xiamen, the accelerating of the construction and development of Xiamen port is an important component of Xiamen's "The 11th 5-year plan" of construction program of the west coastal economic zone of the Strait. Fourth, the integration of Xiamen port and Zhangzhou port will make the development of Xiamen port become a new economic growth point of Xiamen economy and also create the conditions of the great target for constructing Xiamen port to become an international hub port.

But in the development process of Xiamen port becoming a container hub port, there are a number of difficulties. First, the comparatively small hinterland of Xiamen constrains the increase of the sea routes and the densification of regular ships so that the capital, the human and the logistics flow accumulation effect will not happen. Second, Xiamen port is facing competition from the Kaohsiung port from the east coast of the Strait. Third, cross-strait trade is fluctuating as a result of a not fully politically opened relationship between the two sides. Overcome these negative factors is the key to of Xiamen port becoming an international hub port.

1.2 The significance of the topic selection

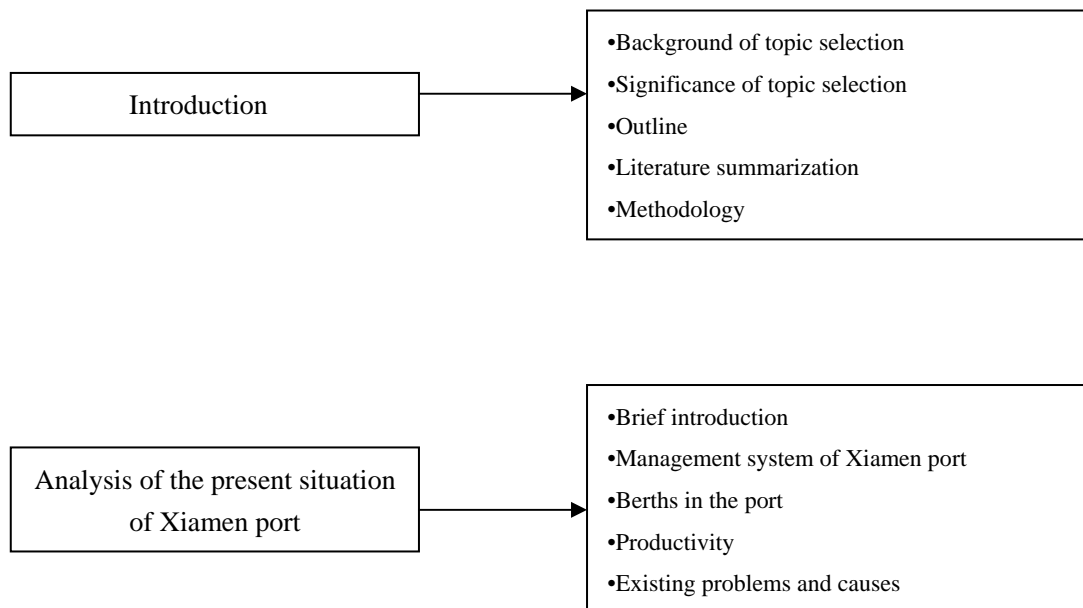
Port is the gathering point of the logistics, financial flow and the flow of information. It has some resource advantage of becoming integrating platform and serves as a filter which means keep the good and leave the inferior products to develop some competitive industries. Xiamen port is in the west center of the TS and serves as a bridge for contacting with Taiwan. It plays a special role in the development of trade with Taiwan and the promotion of Taiwan's return. Therefore, port development strategy should be studied and also port function should be precisely positioned. That is to say, constructing Xiamen port to be a container hub port is of great strategic importance.

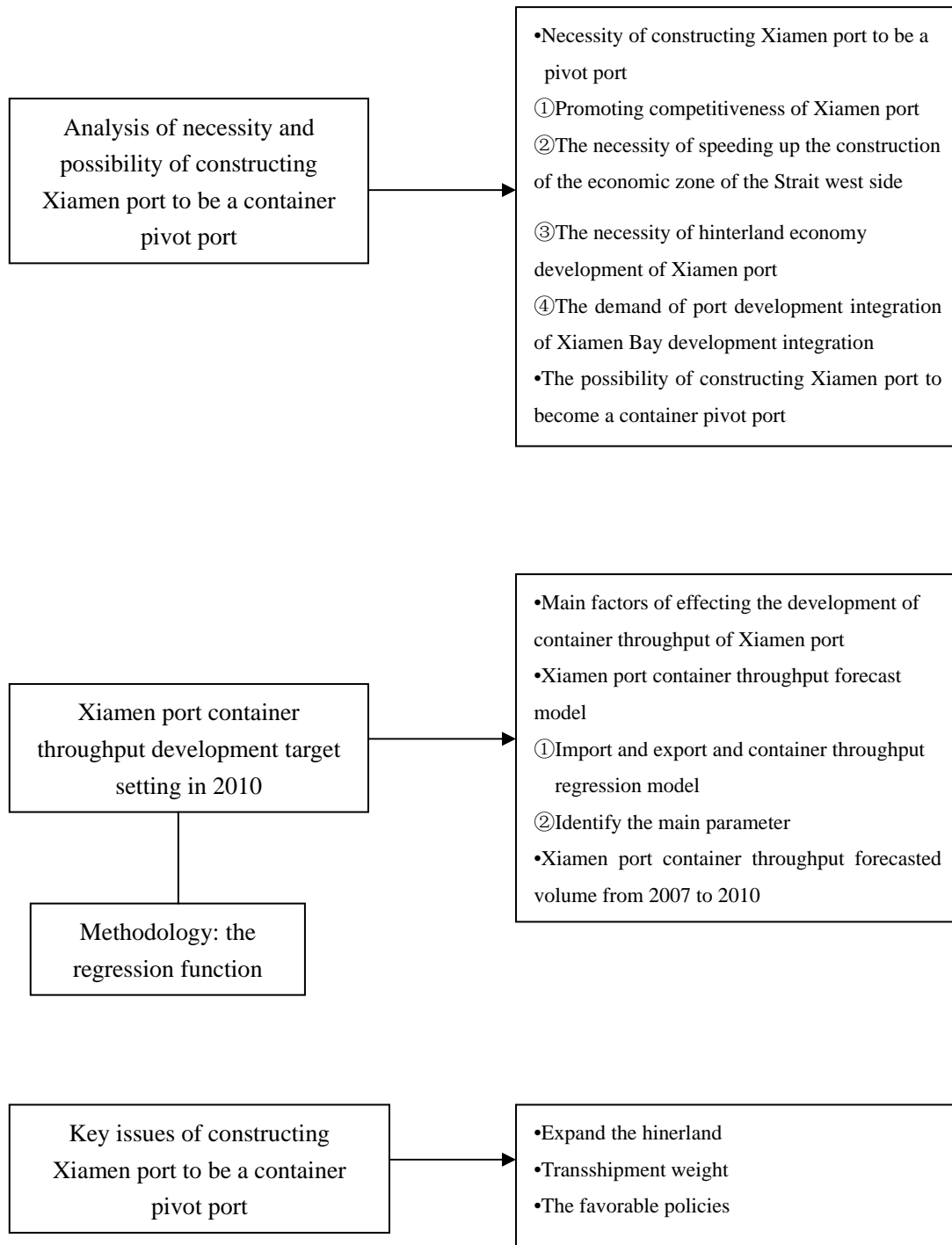
So, since the port of XiaMen serves as the dragon head in developing the WCEZ of the TS in the 11th 5-year plan period and due to its unique geographic position and in order to take advantage of the historic opportunity in the new round of the reform and opening-up and promote its competitive power, I think it's extremely necessary to set its future goal and make some measures through certain systematic researches to guide its market business operation and competition and finally construct Xiamen

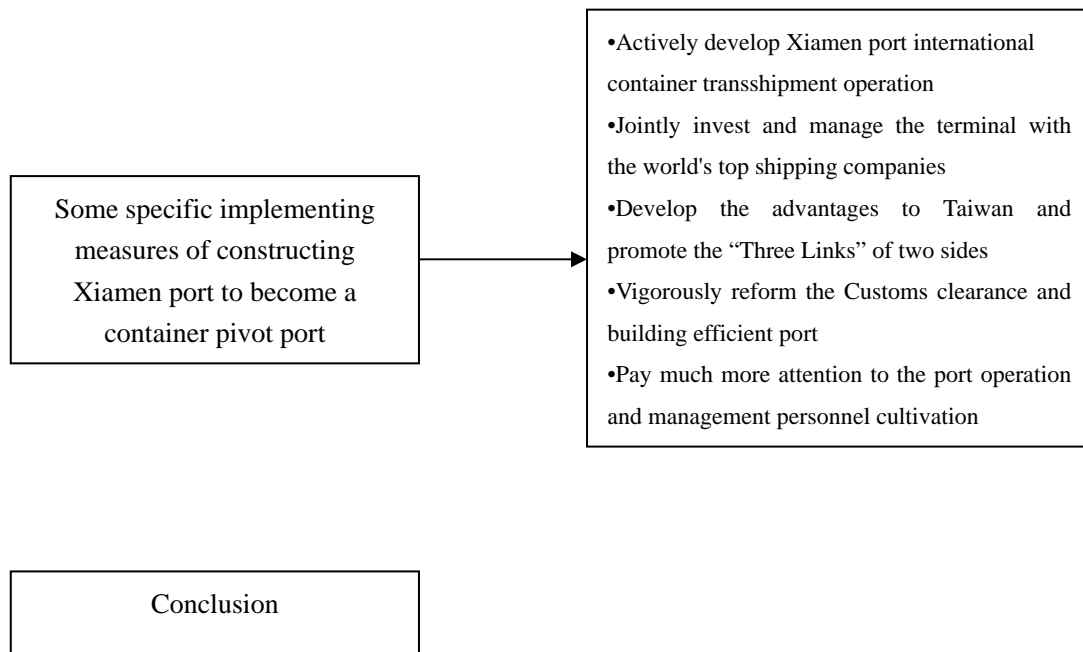
port to be an international container hub port in the near future.

According to throughput and other information of Xiamen port in the past few years and its need development, I will conduct the target set research of Xiamen port development and put forward the goal of constructing Xiamen port to be a container hub port and predict the reasonable container throughput target figure and make some implementation measures as well. The dissertation can be referred with some realistic significance in promoting cargo transport development of Xiamen port and accelerating the construction of west coastal cluster of the TS and driving Fujian and Taiwan regional economy and the foreign trade development.

1.3 Outline of the dissertation







1.4 Literature summarization

1.4.1 The port strategic positioning

In order to get used to the new economic pattern and changes and developments of the international and domestic shipping market, experts and scholars from home and abroad have conducted a series of researches of port strategic positioning and function expansion in many respects. Many countries have changed their main target from solely pursuing port throughput and enterprise benefit maximization from realizing port value for long term.

Doctor Jia Da Shan put his viewpoint forward in his article named <<The strategic exploration of China Sea transport>> so as to adapt the world shipping developing trend ^①. He said that those ports which can meet the need of national strategic material and become internationally standard, forming reasonable structure, clear layer, complete function, fluency in communication and safe, highly efficient modern

^① Edited by Jia Da Shan : Strategic exploration for China sea transport development
Dalian maritime publication company 2003.10

ports, container pivot port is comparative highly competitive can become the important nodes.

Zhang Chun Xian, the director of Chinese transportation department, wrote an essay in the <<China Sea transport>>^② magazine in talking about 5 relationships and 6 problems in January 1, 2003. He pointed out that the overall strategic goal of our domestic ports development is: ①adapt the economic globalization. ②meet the needs of building our modernized country. ③guided by the international and national shipping market, we should build modern port system with reasonable structure, clear relation, complete function, fluent information communication, safety, convenient and efficient and civilized environment protection.

Many experts and scholars such as Tu De Ming have conducted a lot of researches in the development of ports and analyzed the environment for national ports development and all kinds of existing problems. Those researches and analyses have greatly and positively instructive significance to the port strategic development. But through analyzing those materials and information we can easily find those researches are all marco-field researches. The research result can only be regarded as reference since each specific port has its own geographic position and market and current situation. We should still make profound analysis in the situation of the specific port to present the practical and suitable blueprint and feasible strategy.

The National Congress of the People's Republic of China has made a instruction in the <<11th 5-year plan of Fujian province>>^③:

①we should develop economic industrial cluster.

^② Edited by zhang Chun Xian. China sea transport 2003(1)

^③ Edited by National Congress: the 11th 5-year plan of Fujian province

②we should further better the developing strategy and plan of Xia Men port cluster.

③suggestion to promote the development of the Xia Men port cluster.

i The layout of the combination of Xia Men port should have some breakthrough and innovation in its system.

ii Further strengthen the import policies and regulations researches and its publishing which should be earlier when properly.

iii The container throughput capacity should reach the target of 10,000,000TEU a year.

iv The project of Xia Men port deep-waterization should be speeded up which can accommodate the 6th generation container ship.

v The logistics center in the back of the port should be left with larger space which will become the center platform for the port logistics cluster.

vi The hinterland of Xia Men port and others in the province should coordinate with comprehensive transport network and modern logistics network. It's extremely necessary to interact all the layouts in the region.

vii The comprehensive informationized service platform should be built with high efficiency, integrity and safety based on the custom clearance to provide the most convenience for all industrial clusters.

1.4.2 The existing infrastructure

Lu Tian Jiao pointed out in the paper named <<The target of Xia Men—international pivot port>>^④ that though presently Xia Men port's throughput capacity can basically meet the requirements of increase, the dock still has its shortcomings such as outstanding structural contradiction, the berth level is generally low, lacking of the specialized berth which is suitable for 5th and 6th generation container ships and

^④ Edited by Lu Tian Jiao: The target of Xia Men—international pivot port
Xia Men Daily 2005.12.3

difficult to adapt the developing trend of becoming larger of container ships.

1.4.3 The integration of XB(Xiamen Bay)

Xu Mo considered that it is necessary to put emphasis on the reasonable use and protection of the port resources in order to realize consistent development. The strategy implemented by the provincial government can make full use of the port resources in Xia Men harbor which is very favorable for Xia Men port to enlarge its scale.

Zhuang Zong Ming thought that Xia Men port and Zhang Zhou port consist the new Xia Men Port, which means the integration and exploration of Xia Men port has entered into a substantial and meaningful phase^⑤.

1.4.4 The connection between the port and free trade zone

Gong Ren Zhi thinks that setting free trade logistics zone in Dongdu port area and implement the “in the border and out the custom” policy can realize the policy of turning to Gao Xiong free trade zone in Taiwan in his paper named <<The target of the 3rd generation Xia Men port is container transport>>^⑥. Enhancing the transshipping function is a win-win strategy. Xia Men port has already set up its status in the international pivot port field.

1.5 Methodology

Prediction is a method which uses all kinds of knowledge and scientific approaches to analyze and study the historical information to speculate and evaluate the

^⑤ Edited by Xu Mo, Zhuang Zong Ming: Xia Men port walks to the world from west coast
Xia Men Daily 2005.12.31

^⑥ Edited by Gong Ren Zhi : The target of the 3rd generation Xia Men port is container transport
China sea transport literature information 2004(6)

developing trends and possible results in advance. In short, prediction is to speculate the future according to the past and present information. In another word, it's to speculate the unknown from the known. By the nature of forecasting methods, they can be divided broadly into three categories. There are the qualitative forecast method, the regression forecast method and time series forecast method. In this dissertation, I will use the regression forecast method.

Regression forecast: It is to study the interrelationship between variables and variables for a number of statistical methods. The application of regression analysis from the value of one or several independent variables to predict the value of variables can be achieved. The variables and independent variables are hand-in-hand in the regression forecast. Dependent variables will be predicted according to the hand-in-hand independent variables. This method not only considered the time factor, but the causality between the variables. There are unitary linear regression forecast, multivariate linear regression forecast, nonlinear regression forecast method. According to some information I referred, unitary linear regression forecast is comparatively suitable in throughput prediction for the short and medium period.

Regression forecast is a highly theoretically quantitative predicting method which has been already broadly used for a long time. It has three major advantages: First, it can study the interrelationship between the predicted objects and the relevant factors, catching the real reason for the predicted targets. So the results can be more credible. Second, the results can be given for the confidence interval and confidence, thus enabling the forecast more complete and objective. Third, it can consider the interrelationships and apply some relevant statistical methods for statistically testing the regression equation, and thus to predict a turning point in the predicted target with identification capabilities. However, the regression forecast also has its

drawbacks: all the data has the same impact to the predicted target regardless of time of the data, which often did not correspond to reality. And if the new data show up, generally the regression equation will be reestimated and reanalyze the correlation.^⑦

^⑦ Edited by Xu GuoXiang: Statistics and prediction and decision-making
Shanghai finance and economic publication company 1998

CHAPTER 2

ANALYSIS OF THE PRESENT SITUATION OF XIA MEN PORT

2.1 Brief introduction of Xiamen port

2.1.1 The geographical location and natural conditions of Xiamen port

The port of Xiamen is located at 118 longitude meridian east 04 '15 ", latitude 24 meridian east 29' 20", in the south-eastern coast of China's Fujian Province. It is also located in the south part of the Jiu long river sea entrance and backed the Zhangzhou and Quanzhou plains. It faces Chin-men, while beside TS and not much far from the Taiwan Island and Penghu islands. Xiamen is in the center of Hong Kong and Shanghai (287 nautical miles away from Hong Kong and 560 nautical miles from Shanghai) and Taiwan, Penghu islands are only a TS apart.(156 nautical miles away from Kaohsiung and Penghu 102 nautical miles). It is near Zhangzhou, Quanzhou city, not very far from Japan (816 nautical miles from Nagasaki), and the Philippines (Manila, 677 nautical miles away) and Nanyang archipelago, which make the city of Xiamen enjoy exceptional advantages in developing overseas traffic.

The natural conditions of Xiamen port are quite favorable and it's a strait port of lowhill rock district. It is surrounded by some islands such as Chin-men(big and small), which formed a natural shield. The bay is inside the mainland. There are several mountains in the port area which provide good wind-proof performance, broad water area, deep water, and small wave, non-frozen and less silted water. It is an important foreign trade port along the southeast coast in our history.

The Xiamen port is divided into two parts: the inner and the outer. The outer part of

the port is located between the Gulang Island and the mainland, which is approximate 3.63 square kilometers. The general water depth of the port wharves is 9 meters. The inner part of the port is about 1.28 square kilometers, whose water depth is from 7m to 25m. Those near the wharves are from 9m to 12m in average. The water depth of the port main channel is more than 12 meters while many places is as deep as from 25m to 30m, the deepest spot is more than 40 meters which is not silted. Port water area is 300 square kilometers and its land area is 11 square kilometers. It has 234 kilometers of coastline, including 15.64 km favorable for the port construction. The anchorage ground is planned to be over 38 square kilometers. The whole incoming channel of the port is about 42 km. The good geographical conditions make Xiamen become a natural deep-water harbor.

Xiamen port is a multi-functional, comprehensive and modernized port of many large, medium and small berths, which is consisted of some port area (Dongdu, Haicang, Songyu, Dongbu, tourism and passenger transport, Zhaoyin, Houshi and Shima. Presently, there are 79 productive berths, more that 18 10,000-ton deep-water berths. The maximum berthing capacity is 100,000 tons. Specialized container, oil and coal wharf facilities are all available to the customers. By 2007, eight new deep-water container berths will be built and a large international tanker terminal will be finished to accommodate maximum 140,000 metric tons. At that time, Xiamen port is capable of taking in the sixth generation container ships with 24-hour around the clock.

Xiamen port has convenient transport road network of connecting the road to the provincial road network and can be linked with State Road network through number 319, 324 National Highway; direct rail lines through the terminal front line connected with the national rail network through Eagle-Xia line. Xiamen's Gaoqi International Airport is only a half hour's drive away from Dongdu and Haicang port

area. The major ports in the world are connected through more than 70 shipping lines.

Xiamen has a long history and is the China's main port to Taiwan; the port is also one of China's fastest growing ports, which has now been established for the main coastal pivot port and one of the eight container trunk line ports. In 2004, Xiamen port container throughput is about 2.87 million TEU in containers, the 7th place among Chinese coastal ports, and the 26th place among the 100 strongest world container ports. In 2005 Xiamen port cargo throughput reached 66 million tons, the container handling capacity is more than 3.5 million TEU.

2.2 Management system of Xiamen port

The reform work project of Xiamen port management system has been passed on December 28, 2005 and the new port management system has begun to operate officially on January 1, 2006 as well. Former Houshi, Shima and Zhaoyin port area of Zhangzhou and former Dongdu, Haicang, Songyu, Liuwudian, Passenger transport port area of Xiamen are all combined together to become a new port authority. Former Xiamen port authorities and Zhangzhou Port Authority agency have been dismissed to establish the new Xiamen Port Authority. From now on, the 8 port area in Xiamen harbor will all be called XX port area of Xiamen port. These 8 port resources in XB will be effectively integrated. The Xiamen municipal government points out that it's necessary to effectively integrate resources in XB and rationalize the Xiamen port management system in order to construct Xiamen port to be a pivot port of the west coast and solve many sporadic problems through breaking the administrative boundaries. This reform project aims to achieve Harbor resources unified planning, unified management and rational use, solving the problem such as a bay of multi port, and irrational system, creating conditions for speeding up the

development of Xiamen port as an international shipping pivot. After the integration of the new deep-water coastline of Xiamen port will increase 14 km, with an overall length of 40 km, the number of those deep-water berths that can accommodate more than 10,000-ton is about 114. By 2010, Xiamen port plan to build 35 berths which are all more than 10,000-ton level, increase 71 million tons integrated cargo handling capacity, of which the new container handling capacity is more than 4.3 million TEU.

The resources of the 8 port areas (see Figure 2-2) are integrated and repositioned functions, which is detailed in Table 2-1

Table 2-1 Brief introduction of the port areas

Name of the port area	Brief function introduction
Dongdu	Developing container transport, taking advantage of being adjacent to the free trade zone, actively promoting port and free trade zone working together, developing the modern logistics
Haicang	Mainly focus on the development of medium and far ocean container shipping, constitute the main port area of whole port container trunk line transport together with the Songyu port area
Songyu	Mainly focus on the development of container trunk line transport on the basis of the existing coal and oil terminal to become the main container trunk line port area of the whole Xiamen port
Zhaoyin	Mainly focus on the development of container and general cargo transport as well as bay and strait passenger transport.

Houshi	Mainly focus on the development of large bulk cargo terminal relying on the rear large industrial chemical port area
Liuwudian	It's the important port area of the future Xiamen port development, which will emphasize on developing container transport and port industry as well as serve the economic connect and trade with Taiwan (“three links”)
Shima	Mainly serves the city of Zhangzhou and Longhai to do cargo and material transport and also serves two sides of Jiulongjiang to do some passenger service between Xiamen
Passenger transport	Mainly developing international passenger and bay roll-roll transport as well as coastal and regional short-distance passenger transport

厦门港港区布局示意图

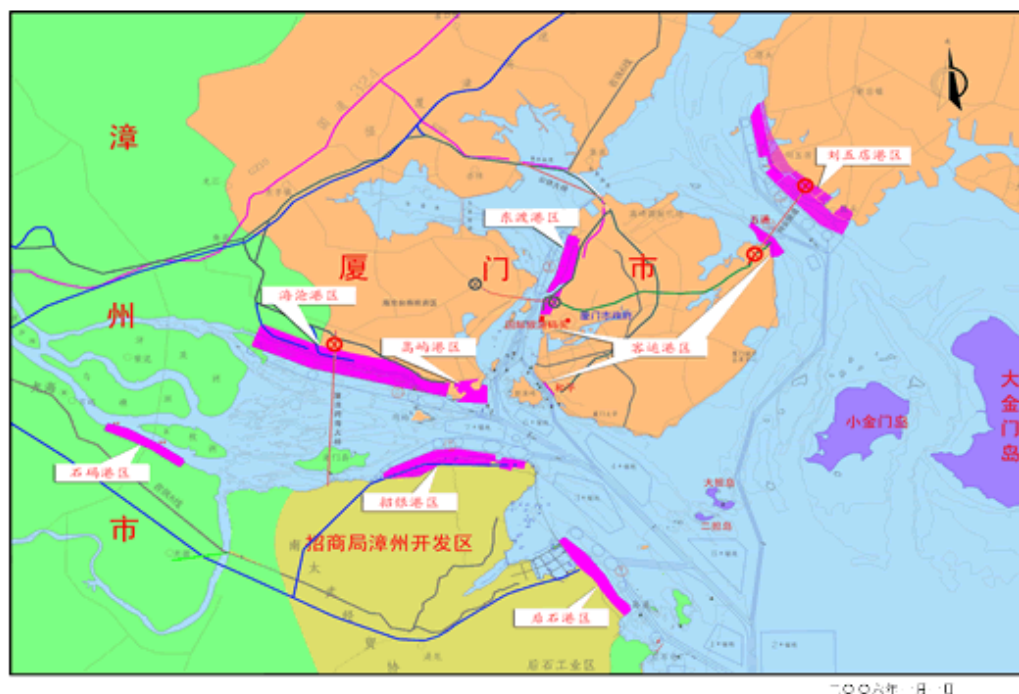


Figure2-1 Xiamen port layout

2.3 Berths in the port

Dongdu port area is now having 30 productive berths, 15 deep-water berths, terminals length is 4442 meters, and the integrated designed capacity of 24.716 million tons, of which 2.02 million TEU. In 2003 its cargo throughput is about 25.1833 million tons, of which 1.751 million TEU, respectively 74% and 75% of the total number of Xiamen port.

Haicang port area is now having 8 productive berths, 1.9 km terminal wharf length , cargo handling capacity is 14.87 million tons, of which is 600,000 container handling capacity. In 2003 its cargo throughput is about 605.95 million tons, of which container handling capacity is 579,900 TEU, respectively 18% and 25% of the total number of the whole Xiamen port. A berth which can accommodate 100,000-ton level fully loaded container ship will be put into construction in the near future. It is expected that three years later, the terminal berths will be put into use. By then, Xiamen Haicang port area will be the 1st berth whose forward water depth can reach 17.5 meters deep. 100,000-ton level fully loaded container ship can berth in the modern large berth all day long. By 2010, the length of the coastline in this port area berths will reach 3.9 km, the number of more than 10,000-ton deep-water berths will be over 13, the integrated cargo handling capacity will be 35.4 million tons, the total container handling capacity will be 2.2 million TEU.

Songyu port area is the important container port area in the future development of Xiamen port. It will be constructed to be the large specialized container working zone which can accommodate the 5th and 6th container ships. The planned length of coastline is 3.8 km, which will build more than 10 million-ton level deep-water

berths and the comprehensive cargo handling capacity will reach 31.8 million tons, while container handling capacity will reach three million containers.

There are 2 500-ton level general cargo berths which can also accommodate thousand-ton level ship in Liuwudian port area of Xiamen port.

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See table 2-2

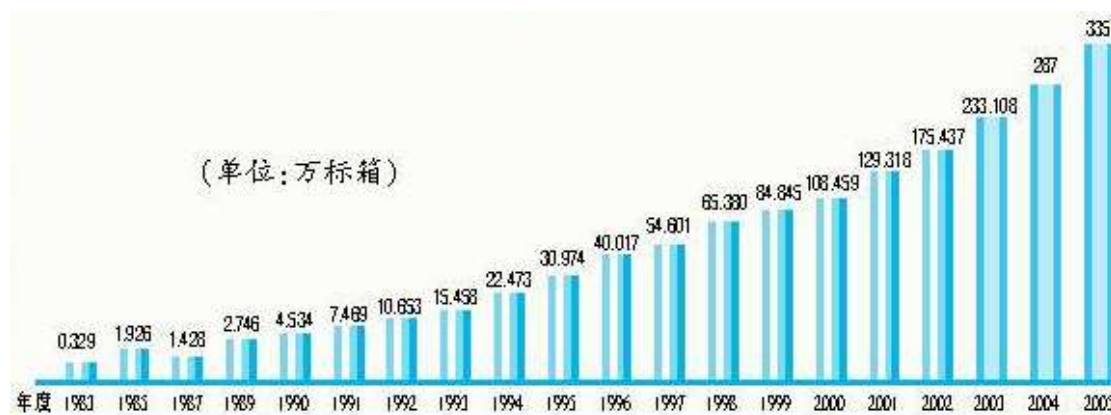
Table 2-2 Some specific berth information

Port area or the name of loading company	Name of the berth	Length (m)	Water Depth (m)	Handling Capacity (ton)	Cargo	Crane Information	Remark
Dongdu	No.1	166	-7.69	10,000	container	30.5*2	DT
Dongdu	No.2	254	-11.7	50,000	grain	4*10 ton	
Haitian loading	No.5	260	-12.2	50,000	container	2*30.5t	
Haitian loading	No.9	190	-13.3	50,000	container	2*50t	
Xiangyu	No.12	220	-12.2	50,000	container	2*40t	
Guomao group	No.20	355	-13.5	50,000	Multiple		
Xiamen international Cargo terminal LTd	Haicang No.2	278	-13.3	50,000	container	2*41t 1*35t 1*41t	

Songyu	Songyu oil terminal	110	-7	3000	Oil and chemicals		
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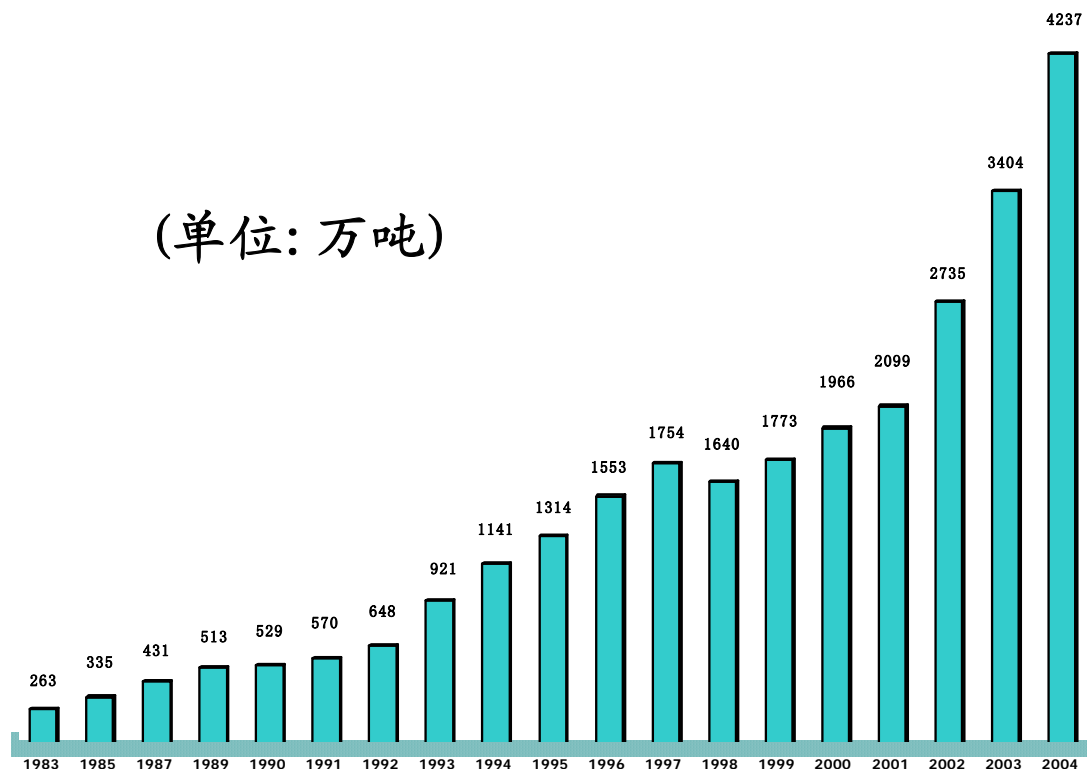
It is reported that, in the "11th 5-year" period, the new Xiamen port development will be started with the integration of resources of the eight port areas. The total investment of the port projects is about 12 billion yuan, with an annual investment equals to the annual current provincial port construction investment. The 8 port areas will complete the construction of 30 deep water berths, of which specialized container berths is 17, and 3 multi-purpose berths, 3 liquid chemical berths, 6 scattered general cargo berths and 1 general berth, at last 6 channel building projects

2.4 Productivity



Source: Xiamen Daily

Figure 2-2 Container Throughput of Xiamen Port from 1983 to 2005(unit: 10,000 TEU)



Source: Xiamen Daily

Figure2-3 Cargo Throughput of Xiamen Port from 1983 to 2005(unit: 10,000 tons)

In 1998 Xiamen port annual container throughput reached 650,000 TEU, which ranked the 67th place among the 100 strongest ports in the world.

In 2000 Xiamen port reached 1.08 million TEU. This is the first time that exceeded one million containers, which ranked the 48th place in the world.

In 2002 the container throughput of Xiamen port was more than 1.75 million TEU, ranking world NO.36.

In 2004 Xiamen port ranked 7th among the coastal ports in China with 2.87 million TEU, which also ranked 26th among the container ports in the world.

On November, 2005 the annual container throughput of Xiamen port was the first time that it was more than 3 million TEU.

The annual container throughput and cargo throughput of the port of Xiamen from 1983 to 2005 can be referred from the figure 2-3 and figure 2-3

2.5 Existing problems and causes

2.5.1 The hinterland of Xiamen port is quite small

The development of the port requires the support of its broad hinterland.

Xiamen is an island. It is mainly connected with the mainland with Xiamen bridge and Haicang bridge. The island is only more than 120 square kilometers and the space of the whole city is more than 1600 square kilometers. Moreover, the city of Xiamen is the smallest and least in the population and land area in 9 sub-provincial cities in Fujian province. This is too small for a port city which requires the support of its industry. In fact, according to Xiamen port cargo statistics, it shows that in 2004 60% of Xiamen port container throughput came from the city of Quanzhou.

At present, the hinterland of the port of Xiamen is mainly limited in Fujian province which is from some coastal cities in Fujian such as Fuzhou, Putian, Zhangzhou and Quanzhou to some inland cities such as Nanping, Sanming and Yong'an. Since these cities are all having relatively slow economic growth rate as well as the small economic volume, this is the reason why it's not possible to provide the port of Xiamen with the adequate cargo supply. Moreover, there is fairly limited hinterland outside the Fujian province, which reaches Shantou from south and Wenzhou from north. In addition, the city of Wenzhou has not opened the inner feeder line yet. So generally speaking, the hinterland of Xiamen port is relatively small.

2.5.2 Inadequate cargo supply of goods

Kaohsiung port is one of the world famous harbors, which container throughput ranked 3rd or 4th for a long time in the world. Just because "direct shipping" can not be reached cross the Strait for a long period, the Kaohsiung port can not attract container cargo supply in large scale which can be brought by the foreign trade with a fast growth rate that the Chinese motherland is enjoying, resulting slide in the ranking. In 2004, the annual container throughput of Kaohsiung port was 8 million TEU which still ranked world NO.6. It has a big advantage in depth of the port channel, port infrastructure, port through ability and port management over Xiamen port.

At present, the port of Kaohsiung is now attracting a lot of containers which are supposed to belong to Xiamen port. Kaohsiung port is relying on the mainland's fast economic development, vigorously developing the port logistics functions. In order to expand cargo supply, with the "direct three links" progress with the mainland and Taiwan, the dependence of port of Kaohsiung on the mainland's transshipment cargo will be more protruding, and at the same time continues to expand its hinterland. This will make its and those belong to the port of Xiamen overlapped. That is, from Wenzhou to Shantou. Therefore, in future development, Xiamen port will face severe challenges from the port of Kaohsiung.

2.5.3 The restriction of port land area and out-of-date equipments

The resources of coastlines of Xiamen port are limited and the depth of the port is not enough. Such as the roads and depth in Songyu port area are just 300m to 500m which directly cause the small land area which is used to do container stacking, seriously insufficient stacking ability of the container yard. The restrictions affect the circulation of the containers in the port area, which make the port container through

capacity can not be adequately realized.

The lack of the port land area depth affects the development of the port largelization as well. The port is lacking follow-up room. . Xiamen port's container handling facilities are also fairly backward, while the number of container crane is also small as well.

2.5.4 Problems of port information system

The port information system is the major infrastructure to improve the efficiency of ports and port service. The building of Xiamen port information systems started long time ago, but the operating e-commerce system of Xiamen still exists following problems:

Firstly, the logistics information platform is incomplete. As a complete logistics information platform should consider EDI system as the core, linking customs, freight forwarding, shipping agency and inspection, the Marine Bureau, the Port Authority, owners, handling, clearing firms, terminals, electronic ports, container yard and empty station association through data interfaces. Theory and practice have proved this structure is the best in information transmission, network connectivity. At present, most port logistics information platform is exactly in this way to create.

Xiamen port e-commerce center of Xiamen logistics information platform core now exists. But its subsystems except customs, shipping agency and immigration inspection, the Marine Bureau, the Port Authority, the declaration OK, docks, container and empty stations, other subsystems linking work is not yet complete. Therefore, Xiamen port logistics information platform construction is incomplete.

Secondly, the system functions imperfect. The building of Xiamen city EDI center began in 2002, which started relatively late. After almost two years of development, a major development of electronic customs clearance system, and air-express export and import systems, manifests EDI transmission systems, sea and air transport electronic declaration system. There are all four systems, which can achieve electronic booking; manifests receipt enquiries, ship situation enquiries, customs clearance, loading situation, container quarantine declaration, sea cargo enquiries and other functions. Compared with Yitong web which is famous in the industry, its functions are still not perfect. Currently, in addition to the above functions, Yitong web can allow owners, freight forwarders issue inventory information through the its web, allow inventory and transport and logistics enterprises issue vacant storage information, issue various cooperative information in the cargo trade columns in order to attract freight transactions and search for the potential partners. Customers can search the timetable and tariff according to the latest timetable and ship information and relevant tariff issued by the major carriers to select the best route and tariff through comparison; and provide online cargo tracking; issue the company bulletin and all kinds of business notices and other functions, etc. Yitong web's powerful system functions make consignors and traders, freight forwarders, shipping carriers, air carriers, clearing firms, inventory and transport and logistics enterprises and customers share the information and resources through logistics information platform.

As the functions Xiamen port information systems are not perfect and its core functions such as electronic offshoring and other functions have not established, which will directly affect the efficiency of the information processing and the resource sharing level.

Thirdly, the data flow is unbalanced. One of the main purposes of setting up "Xiamen port logistics information platform network center"—the Xiamen Electronic Commerce Center Limited which is only company designated by Xiamen city government is to implement logistics monitoring, provide technical support means, reduce pressure on the Customs system, and improve the Customs working efficiency, so currently the system the company is developing primarily serves the Customs services. Therefore, the data flow mainly goes to the Customs subsystems. The other subsystems such as port authorities, terminal correspondingly turned out to be the unilateral information resources providers in the logistics information platform. The internal information of a normal functioning system should be mutual and circulated in various subsystems, that is to say each subsystem is the user of information and information providers as well. However, the internal data flow of Xiamen port logistics information platform is unbalanced; such imbalances are bound to affect the coordination between the various subsystems which will result in the incomplete information sharing.

Fourthly, the charges are not reasonable. At present, fees are the most important issues constraining the development of EDI system. On the one hand, the center of EDI requires substantial financial support in developing new systems, although the government decreases charges through some favorable policies in the fee problem to give policy support to the construction of the information platform. However, the government support has certain time limits. Therefore, the company only has to charge the users through providing the information service to maintain day-to-day business operation. Currently, the main customers that EDI center charges are the ports, terminals, container yard, ships agency, and most of the data of the logistics information platform is from the above company. However, the main users such as freight forwarders, cargo owners, traders are unable to join the platform due to the

limitation of the information platform configuration, which ultimately can not be the important income sources of the EDI center.

On the other hand, since the imperfections of the current system functions and the failure to achieve a real sense of data sharing, it causes that the major data providers have not got the high quality service of high efficiency with the high service fees. The contradictions between them were gradually revealed, which ultimately showed on the issue of the unreasonable charges.

Fifthly, the technical personnel are scarce. As a high-tech industry, IT has very high requirements to the technical personnel. The shortage of high-tech talents is an important issue that Xiamen EDI center will encounter in its future development. First, there is no independent human resources sector in the organizational structure of Xiamen E-commerce center Ltd. So the enterprise are in the lack of effectiveness in selecting and educating people ,doing a career planning for its staff , training staff and personnel, talent reserving and other aspects. The Company currently only has about 80% staff who are of college level or above, which lacks high-tech talents. Secondly, the coordinating units lack the technical support of the higher level scientific research institutions. Now, Xiamen EDI center operational support units include Xiamen port traffic committee, port office, the Information Industry Bureau of Xiamen, Xiamen logistics office, Xiamen Customs, Xiamen State Inspection, Xiamen immigration office, Xiamen maritime bureau, Xiamen Port Authority, Xiamen Foreign Investment Control Bureau, Xiamen Financial Bureau, Xiamen Economic and Development Advisory Bureau,, the Statistics Bureau of Xiamen, Xiamen national Taxation Bureau, Xiamen Regional Taxation, and other functional departments which have relatively strong operational relevance in dealing with the transactions. Compared with Yitong web, besides its relevant government

departments, there is Shanghai Jiaotong University that is the country's leading academic institutions in its coordinating units, which provide Yitong web with a solid technical support and human resources guarantee. Therefore, the scarcity of high-tech talents will be an obstacle to the further development of enterprise.

CHAPTER 3

ANALYSIS OF NECESSITY AND POSSIBILITY OF CONSTRUCTING XIAMEN PORT TO BE A PIVOT PORT

3.1 Necessity of constructing Xiamen port to be a pivot port

3.1.1 Promoting competitiveness of Xiamen port

Modern port is no longer a hub in the traditional sense. It has become an important part of large international circulation to support the world economy, international trade development. It has become the central link to connect production, exchange, distribution and consumption of the whole world as well as the central node of the modern logistics supply chain. Optimizing the allocation of international production elements construction industry can save a lot of logistics costs, and enhance our international competitiveness.

Port is the lifeline of Xiamen development, which is the important foundation to enhance the competitiveness of the city, serve as the “dragon head”. Xiamen port is located in the west side center of the TS, playing a role in serving as a bridge to contact with Taiwan. The Xiamen port has a special influence in developing trading with Taiwan and promoting the return of Taiwan. Xiamen’s “the 11th 5-year” development planning proposed that it is expected that in the end of “the 11th 5-year ” period, the comprehensive cargo handling capacity of Xiamen port will reach 150 million tons, of which container handling capacity will be 12 million TEU. So Constructing Xiamen port into a container pivot port may enhance the competitiveness of Xiamen port of Taiwan – and take care of the cargo distribution

and gathering of Taiwan cargo. It is possible for Xiamen port to compete with Kaohsiung port in the global shipping market and finally together with Kaohsiung port become the most reasonable transshipment ports between Shanghai and Hong Kong, making Xiamen port fully make use of the exceptional resources advantages, thus completing the "the 11th 5-year" plan.

3.1.2 The necessity of speeding up the construction of the economic zone of the Strait west side

In the end of this February, at the meeting of “discussing to speed up the development of the WCEZ of the Strait transportation”, Communications Minister Zhang Chun Xian clearly indicated that the CM will identify Xiamen port as a regional hub port in the new round of the port location planning, actively promote the integration of the resources of XB, support the construction of Xiamen port’s sea route channel and transport road of the Xiamen and Quanzhou city to promote Xiamen port to be modern logistics center which mainly deals with the container transport business as soon as possible.

Building the west coastal economic zone of the Strait can not be done without the support from the port. Port economic development direction has greatly relations with the Fujian economic restructuring in recent years. Since the reform and opening up, Fujian industry has been almost textile manufacturing industry which is labor-intensive industry. But in recent years, Fujian province actively develops electronics, machinery, petrochemical three leading industries. The economic scale of the heavy industry began to succeed the light industry, and heavy industry became the main driving force for industrial growth and overall economic development gradually. In addition, export-oriented economy characterized with foreign trade and

foreign investment was showing obvious in Fujian.

Fujian province's imports and exports trade value was 25.38 billion U.S. dollars during the first half of 2005, a 13% increase. There are 1,017 newly approved foreign-invested enterprises; the growth of foreign investment which can be used at once is 31.8%. "Large inflows and outflows of" foreign trade and heavy industry development will undoubtedly need the support of the port condition, leads the port economy to further prosperity in return. Xiamen port is absolutely outstanding in the Fujian province. In 2005, the import and export trade value of Xiamen Customs area accounted for 58% of that of the total province, the leading influence is indisputable. So in order to speed up the construction of the west coastal economic zone of the Strait, it is inevitable to construct Xiamen port into an international pivot port.

3.1.3 The necessity of hinterland economy development of Xiamen port

Port development and hinterland economy is a community of interests, their development and changes are complementary and linked. Upgrading port services function would promote economic development of the hinterland; hinterland economic development level also determines the level of development of ports

Quanzhou, as a major hinterland of Xiamen port, is the container throughput source. It is the place that private economy rapidly develops. There are thousands of light industry enterprises, of which there are nearly 10,000 textile companies. Quanzhou's export-oriented economy is very active. Shishi's clothing, Jinjiang's shoes, Nanan's stones are the large import and export cargo. For example, in 2005, "Anta"'s travel shoes market share is amounted to 17.4%, "Jiumuwang"'s market share is amounted to 30.1%, "seven wolf" brand jacket shirt market share is amounted to 20.5%, and so on. The GDP of the Quanzhou is 160.25 billion yuan in 2005, which increased 16%,

which is as much as one fourth of that of the total province. Quanzhou ranked third in all of the sub-province cities in Chinese mainland; There are 8 counties in Fujian province which is one of the 100 strongest counties, of which 5 is in Quanzhou area. And the area of those 5 counties all goes to the 10 strongest in economy and development. Now most export of the export-oriented enterprises in Quanzhou region is via Xiamen port. According to statistics, at least 60%-80% cargos of Quanzhou region for exporting or importing are via Xiamen port in the form of container.

Thus on the basis of this interdependence Xiamen port and Quanzhou, notice that Xiamen port should be built to be an international container pivot port while noticing its hinterland economy development, which can better enable port and hinterland mutual interaction and be complementary inside and outside region, form an interests community, finally realize port development and promoting hinterland economy as well as mutual development both inside and outside the region.

3.1.4 The demand of port development integration of XB(Xiamen Bay)

Port coastline is a non-renewable resource. Building new port will require huge investment. It is especially important to make fully use of the potentiality of the existing port in the circumstances of the economic development gradual dependence on the port logistics.

Thus in January 1, 2006 XB port management system reform integrated the management way and port resources, involving Xiamen and Zhangzhou city and Zhaoshang bureau of Zhangzhou development zones. It is an exploration, and innovation and breakthrough for cross administrative region harbor management system. After the management system integration, Xiamen port will achieve

reunification of port administration, planned construction, main part of port pilot business, port production statistical analysis, law enforcement in the port channel, waterborne transport administration. And also to accelerate the integration of and XB port resources and comprehensive development, improve the conditions of outlet road system of Xiamen port. After the XB ports merger, Xiamen port's deep-water coastline will be increased to 14 km, the total length will be up to 40 km and it can have 114 10,000-ton level deep-water berths. Until 2010, Xiamen port plans to increase 35 new 10,000-ton level berths, of which the new increased container handling capacity will reach more than 4.3 million TEU.

Therefore, the constructing Xiamen port to be a container hub port will bring opportunity to further make Xiamen port stronger and larger and better play the leading port role of Xiamen. It will also promote the construction of the entire WCEZ of the Strait, Xiamen expand the radiation effects of Xiamen port's inner hinterland in mainland. And it will also be a positive example in the future integration reform of "one Bay two port" in the other bay in our country.

3.2 The possibility of constructing Xiamen port to become a container pivot port

Xiamen's main advantage is its geographical location which directly faces Taiwan in the Strait. The average width from east to west in TS is 102 nautical miles. It is only 8 nautical miles from Xiamen to Chin-men. See Figure 3-1. There is a special relation between Xiamen and Taiwan which is geographically near, long history, blood related and same culture, same language and business relation is broad. Since 1997, Xiamen port has carried out the experimental direct shipping transport to Taiwan. Using the economic relations connect Fujian with Taiwan. And the triangle in the south part of Fujian will become another regional economic Golden Triangle in our country. Xiamen enjoys exceptional location advantage and comprehensive

advantage and port advantage in the economic development to Taiwan in Fujian's economic development. In the "11th 5-year" period Xiamen Special Economic Zone is the leading regions in the development of west regions economy of the Strait and Xiamen port is the leading core. Currently, the completion of the trade between the Chinese mainland and Taiwan has to be via a third place such as Hongkong, greatly increased the cost. Once the "Three Links" realizes of the two sides, the transportation costs will be halfly reduced. As one of the important ports in the "Three Links", Xiamen port is a perfect play to be constructed to be hub port.

On April 19, 1997 Xiamen first opened a container transshipment sea route from Xiamen to Taiwan's Kaohsiung, which ends the history that nearly half a century there is no mutual merchant ships cross the Strait. That is the reason why in 2005, the cargo throughput reached 48 million tons; the container throughput reached 3.35 million containers, ranked the 6th place among the largest Chinese mainland ports. After the direct experimental shipping cross strait, no longer any bypass, with an average of 130 U.S. dollar of each standard container freight, which saved nearly 40% of the freight. So by the end of 2005, marine cargo throughput of Xiamen and Taiwan for the experimental direct shipping reached about 2.29 million containers, which took up nearly 70% of total container throughput of the whole experimental direct shipping from Chinese mainland to Taiwan district. It initially showed Xiamen port the special geographic advantage on the shipping to Taiwan. The trend which likes a tremendous sea wave of the economic, trade and cultural exchanges between Xiamen and Taiwan is inevitable. This exceptional advantage makes Xiamen special and outstanding.

In 2004, Xiamen port 68 opened container regular shipping routes, of which there are 55 international routes and one special area routes to China's Taiwan Kaohsiung.

And it had established business relations with more than 300 ports in the world. Including Denmark Maersk Sealand, the American President Line, the Mediterranean Shipping, P & O Nedlloyd, Cosco, the China Shipping, the world top 20 strongest shipping lines, they all had established a branch and agency in Xiamen port. In 2004 Xiamen port container throughput ranked from the 29th place in 2003 to the 26th in the world. The port scaled gathering effects began to show up, which is difficult for the other cities of Fujian Province to compete with.

Taiwan Strait Area



802566 (R01492) 8-98

Source: National Atlas

Figure 3-1 Taiwan Strait Area

CHAPTER 4

XIAMEN PORT CONTAINER THROUGHPUT DEVELOPMENT TARGET IN 2010

4.1 The main factors influencing the development of Xiamen port container throughput

4.1.1 The relation cross the Strait remains unstable

Today Xiamen port has an advantage that other ports don't have—experimental direct shipping crosses the TS. Since April 19, 1997 Xiamen port began to be opened to Taiwan, the container throughput has increased steadily. And sometimes took up 40% of the total throughput of the whole port. The container throughput of the experimental direct shipping between Xiamen and Taiwan has been more than 3 million TEU since 1997. The latest data from CM and Xiamen port show that in January 2006, the Xiamen-TS direct shipping containers were 57,754 TEU than that of the same period in 2005 (46,085 TEU) 25.32% growth, which achieved a success in the new year. So those containers related to Taiwan played a great important role in Xiamen port whole container throughput.

Of course we must pay attention to the fact that the cross-strait external political and economic environment still exist many obstacles and disadvantages that should be overcome. But former Prime Minister Zhu Rongji said that "Seeking peace, stability, and development is the current wish of the people in Taiwan and the mainland.

Unification will benefit both sides of the compatriots, while separation is detrimental, linking is win-win. Chinese on both sides should highly treasure compatriot feeling to each other, make great effects in the development of cross-strait personnel exchanges and economic and trade, cultural exchanges and cooperation and jointly inherit and carry forward the great traditions of Chinese culture, and strive to create a new situation in cross-strait economic cooperation, establish closer cross-strait economic cooperation arrangements, mutual benefit. Taiwan's economy should optimize the industrial structure and enhance the competitiveness of enterprises in the cross-strait economic exchanges and cooperation, and finally together with the mainland deal with the challenges of economic globalization and regional integration. Therefore, the Chinese of the two sides should focus on protecting the overall interests of the Chinese people; continue to speed up the "big and small Three Links" paces, which will be extremely essential in increasing Xiamen port container throughput.

4.1.2. Increase the density and coverage of regular container lines

In the first half of 2006, Xiamen port has opened in total 70 international shipping lines, covering Japan, Korea, the Southeast Asia Europe and the United States, Australia and Hong Kong, Taiwan and other places. And it has connection with nearly 100 ports in the world. Lines density also increases. There are 389 shifts average in a month. Xiamen port has become the basic port of shipping companies. And at the same time, Xiamen port container throughput was from 1.08 million TEU in 2000 to 3.35 million TEU in 2005. Therefore, the future shipping lines coverage and the gross number of the container ship density have extraordinary significance in the Xiamen container throughput development.

4.1.3 Speeding up Customs clearance

According to statistics, if the time the ship spends in Xiamen men port shortens 2.4 hours a day, there will be 10% growth in container transport volume. The increment equals a new terminal productivity in a year. So shortening the time a ship spends in the port can increase utilization of terminals and container transport growth. In order to handle the problem of many arrival in previous night and being unable to do the declaration transaction, now Xiamen port is carrying uniform inspection to the arriving and departing ships in the port all day long, which will make the ship able to do uniform quarantine and import or export declaration operation. This will make the exporting and importing ships more convenient and faster to pass the Customs, shorten time in port, ensure the time of the lines, and greatly reduce the operating hours.

4.1.4 The demand of container development of DT(domestic trade)

It is known that the container throughput of Xiamen port for DT is over 150,000 TEU in 2004. In 2005 Xiamen DT container throughput showed rapid growing trends. In the first quarter, DT container throughput is more than 50,000 TEU, a 55% growth rate over the same period last year. The main reason for the rapid development was that the enterprises of engaging in DT containers production of Xiamen city put more efforts in cultivating the DT container market, and vigorously developed in the northwest market of Fujian Province, enhanced seeking cargo supply intensity; At the same time, in order to get used to the needs of consignors, Xiamen port not only improved handling efficiency and yard utilization, but also increased the density of the existing routes, which let Xiamen port formed DT routes covering Northern and Southern coastal ports. Reportedly, the country's 7 most influential DT container transportation companies have opened sea lines in Xiamen, and that if we can continue to keep the DT container developing trends, it will do some contribution to Xiamen port container throughput development.

4.1.5 The port infrastructure

Xiamen port spent a lot of money in improving its infrastructure in 2005. A berth which can accommodate a fully loaded 100,000-ton level container ship will be constructed in Haicang Port area soon. It is expected that after three years, the terminal berth will be put into use. By then, the No.1 berth in Xiamen Haicang port area will be the first large modern berth which forward water depth will reach 17.5 meters, all-weather accommodating fully loaded 100,000-ton cargo container ships. This will make the total container throughput of Haicang district up to 2.2 million TEU. In the "11th 5-year" period, Xiamen port will completed 17 specialized container berth construction. This would make Xiamen port container loading and unloading ability more strengthened, and make it that its container throughput development will not be dragged down by its own container handling capacity.

4.2 Xiamen port container throughput forecast model

4.2.1 Import and export and container throughput regression model

The regression forecast is a statistical method to research the interrelationship between variables and variables. The application of regression analysis can predict the value of dependent variable from the value of one or several independent variables. The dependent variables and independent variables are hand-in-hand in time. That is to say the value of variables can be predicted by the value of the hand-in-hand independent variables in regression forecast. From the perspective of short and medium term forecast, the unitary regression forecast is still applicable. Therefore, this article will use unitary regression forecasting method to do Xiamen port container throughput prediction in short term.

4.2.1.1 Model building

$$Y = a + bx$$

In the equation Y ——Dependent variable, the predicting object(port container throughput)

x ——Independent variable, relevant factor(import and export value)

In the equation, parameter a and b can be obtained by least square method:

$$b = \frac{\sum x_i y_i - \bar{x} \sum y_i}{\sum x_i^2 - \bar{x} \sum x_i}$$

$$a = \bar{y} - b\bar{x}$$

In this equation: $\bar{y} = \frac{\sum y_i}{n}$

$$\bar{x} = \frac{\sum x_i}{n}$$

4.2.1.2 Model Testing

Relevance analysis is to test whether there is causal relationship between x and y . The indicator of evaluating linear relationship between the two variables strong or weak is the correlation coefficient r , its formula:

$$r = \sqrt{1 - \frac{S_{yx}^2}{S_y^2}}$$

In the equation: S_{yx}^2 ——the square of standard deviation;

$$S_y^2 \text{---total difference of the value of observation } y_i, \quad S_y^2 = \frac{\sum y_i^2}{n-1}$$

The correlation coefficient fluctuates from 0 to 1. The coefficient gets closer to 1, indicates that the relevance is stronger.

4.2.1.3 Computation

Xiamen import and export trade value and container throughput data from 1991 to 2005 can be referred from the economic yearbook of Xiamen, see table 4-1

Table 4—1 trade value and container throughput data

Year	Import and export value (100 million US Dollars)	Container throughput (10,000 TEU)
1991	11.5	7.469
1992	17.13	10.653
1993	25.53	15.456
1994	38.04	22.473
1995	55.88	30.974
1996	66.45	40.017
1997	78.22	54.601
1998	75.47	65.380
1999	79.68	84.845
2000	100.49	108.459
2001	110.79	129.318
2002	151.87	175.437
2003	187.11	233.108

2004	241.10	287
2005	285.76	335

After computing:

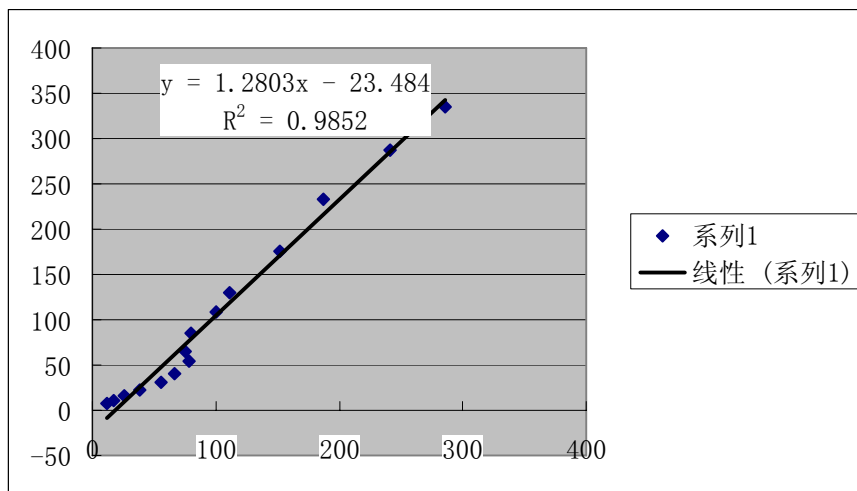


Figure 4-1 The forecasting model

We can get: The forecasting model is $Y=a+b*x=1.2803x-23.484$

The correlation coefficient $R=0.9926$

The correlation coefficient is very close to 1, that is to say The Xiamen import and export trade value is relatively highly linear correlated with Xiamen port container throughput in this forecasting case and this model is very applicable.

4.2.2 Identify the main parameter

The main parameter: The import and export value of foreign trade from 2007 to 2010

4.2.3 Xiamen port container throughput forecasted volume

According the statistics of the Fujian province and Xiamen city, the value of import

and export trade annual growth rate of Xiamen from 1991 to 2000 was 24%, the annual growth rate was 20% from 2001 to 2005, plus that at present and in the near future, the economy of Xiamen and its hinterland will maintain a sustained and rapid growth, but the growth will slow somewhat. Therefore I expect Xiamen import and export value of foreign trade annual growth rate is around 15%. I put in into the forecast model, thus I get the container throughput forecast for the following number. See table 4-2

Table 4—2 Foreign trade value and forecasted container throughput

Year	Import and export trade value (100 million US Dollars)	Container throughput (10,000 TEU)
2007	377	459
2008	434	532
2009	499	615
2010	573	710

CHAPTER 5

KEY ISSUES OF CONSTRUCTING XIAMEN PORT TO BE A CONTAINER PIVOT PORT

5.1 Expanding the hinterland

In order to achieve the goal that In 2010 Xiamen port container throughput will reach 7.1 million containers and connect with the existing obstacles, Xiamen must resolve the problem of the inadequate economic hinterland economic volume at present. That is to further develop and expand container feeder transport in some part of its eastern Guangdong, Jiangxi, Hunan province, and sea and rail intermodal container transport business. There are two specific ways to expand its hinterland:

1. Expand feeder line on the sea

Mainly to open foreign trade feeder line, through boat Custom transferred transport form, declaration in Shantou, and then transferred to Xiamen. When Xiamen Customs give information feedback to Shantou Customs, the company can work on the export tax drawback procedures in Xiamen . Shipping enterprises, such as Xiamen penavico has invested substantial sums of money to expand the to the feeder line from Xiamen to Shantou. By last year, this feeder line had already begun within the normal operation and begun making profits. This approach should be used for reference, such as the opening of the feeder line from Xiamen to Wenzhou, Wenzhou's total economic volume is amazing. If Wenzhou can be taken into Xiamen economic hinterland area, Xiamen's hinterland will be greatly enriched.

2. Expand sea and railway intermodal container transport operations on the land

Through the sea and railway intermodal operation, the port hinterland can be extended to the inland as the cargo supply sourcing channel. Xiamen port should first focus on Jiangxi province which adjoins Fujian. Jiangxi hasn't any harbor, airport facilities are relatively backward, but its natural resources, especially the mineral and raw materials are very abundant. In a sense, Jiangxi must actively search for the best access to the sea in order to build an export-oriented economy. Compared with Shenzhen and Shanghai two ports, Xiamen is the closest to Jiangxi. This means that as long as Xiamen resolves the cargo transport bottleneck from Jiangxi, its economic space can be taken into Xiamen economic hinterland area.

The law of economic development is that the economic volume should be average in the economic space through continuous economic exchanges to balanced develop between different regions. This process is always very slow, but can be artificially accelerated. And the most effective way to accelerate the process of averaging the economy in different areas is to reduce these areas economic connection and exchanges obstacles, which is to shorten the physical distance and time distance between the economic zones. On June 10, 2005, the Xiamen - Nanchang international container sea and rail intermodal direct train was formally opened. The goods transporting from Ganzhou to Xiamen would only spend 24 hours. The export time and transportation costs were reduced at some extent than that of Shenzhen, Shanghai and other ports. At the same time, Xiamen has opened containers port rail transport corridors to Sanming Yonggan Meizhou direction. Taking this as a first step, Xiamen expanded coverage to its inland economic hinterland.

5.2 Transshipment weight

An important symbol of international pivot is the international transshipment

container volume. Usually the proportion is at least 20%. Some internationally recognized transshipment ports such as Hong Kong, Singapore, Pusan, Kaohsiung, and their container transshipment proportions are all more than 40%. Xiamen has completed the changes from feeder port to become a trunk line port. Whether Xiamen port can achieve from trunk line port to the international pivot for the second change, it all depends on oversea hinterland expansion and the international container transshipment operations expansion. For Xiamen's international transshipment container business has just launched, there is much room for Xiamen's international container transshipment business compared with the major domestic and international transshipment ports. It is hard and tough, but the prospect is extremely bright.

5.3 The favorable policies

Favorable policies are the indispensable conditions for a port to become an international hub port. Because the development of international container business must involve the establishment of a free trade area and Customs clearance environment improvement and other policy issues. From the entire East Asian region container port development state, there are more policy factors which involved in the container port development than any other region. Xiamen has to take the policy factors into account in the development process.

The Xiamen Daily reported that in the "Two session", the Fujian delegation 30 representatives-led by Deputy Representative, had submitted a proposal of "request national support for Fujian to expand to absorb TI", the city who has the closest relationship with Taiwan, who has the most investment is Xiamen. The Fifth Plenary Session of the party's sixteenth clearly support the economic development program of west coast of the Strait, embodies that the government status attaches great

importance to Fujian in the great unification process. Currently, Xiamen is actively making use of the "five geographical advantages" to develop "six for" so as to speed up construction of western economic zone, and strive for the unification of the motherland and make greater contributions to the overall situation. In order to fully make use of Xiamen's unique advantages to Taiwan, The representatives request some favorable policies to support Xiamen to expand to absorb Taiwanese investment, to promote cross-strait exchanges, to speed up the process of unifying the motherland. Proposed preferential policies such as : Taking Fujian and Taiwan industries cooperation into national industrial layout plan, being "equal priority, appropriate leniency" to the economic and trade cooperation projects between Fujian and Taiwan; Loosening permission restrictions on the industry that Taiwanese merchants will invest, allowing Taiwanese to be sole proprietor; Expanding support to Taiwan businesses men who invest in high-tech industries, supporting Xiamen port to become an important international hub port in the west coast area, recommending that the port and free trade zone combining together special policy Xiamen Dongdu port area enjoys extends to the entire Xiamen port. At the present stage, the YRD and the PRD hub port development has been far ahead of Xiamen port, so if they wish to build Xiamen into a hub, learning from several other "Big Brothers" is not enough. It also needs more favorable policies to support so as to attract more container volume from the YRD and the PRD economic hinterland.

CHAPTER 6

SOME SPECIFIC IMPLEMENTING MEASURES OF CONSTRUCTING XIAMEN PORT TO BE A CONTAINER PIVOT PORT

6.1 Actively develop Xiamen port international container transshipment operation

An important symbol of international pivot is the international transshipment container volume. Usually the proportion is at least 20%. Some internationally recognized transshipment ports such as Hong Kong, Singapore, Pusan, Kaohsiung, and their container transshipment proportions are all more than 40%. Xiamen has completed the changes from feeder port to become a trunk line port. Whether Xiamen port can achieve from trunk line port to the international pivot for the second change, it all depends on oversea hinterland expansion and the international container transshipment operations expansion. That is sea-sea, sea-rail, sea-land, sea-air intermodal container transshipment transport functions. If we take effective measures to improve the soft and hard environment, develop favorable policies, strongly enhance cargo Custom clearance rate, improve port facilities service system to make port transshipment costs less than the regional average cost of shipping market, plus that the efficiency of container handling and port services is higher than other ports, thus it will attract the container from regional ports including Taiwan Kaohsiung to transship at Xiamen port, which will make the container flow, its direction and the structure of empty, loaded container reversed or changed. This can further

consolidate and enhance the status of Xiamen port, be a cosmopolitan regional pivot container port. Lots of containers from Hong Kong are now transshipping in Shenzhen, which can be used for reference.

6.2 Jointly invest and manage the terminal with the world's top shipping companies

This is a diversified financing project. We should face the fact that the internationally renowned shipping companies are leading and dominant in the container transport. And we should properly deal with the present interests and long-term interests in container handling business, temporarily exempt the port construction tax; exempt the terminal companies from removal costs. In some special circumstances of opening container for inspection, exempt the dismantle and install fee; extend international transshipment container free stacking period, attract world-renowned shipping companies (such as Maersk, P & O Nedlloyd, Evergreen, Cosco, the China Shipping, etc.) to establish an international transshipment base in Xiamen. Assisting shipping companies involved in Xiamen berths building, which can sell the shares of the terminal, on the other hand allow international shipping companies to self-manage the appropriative terminal to achieve Xiamen international container transshipment leaps-and-bounds growth. Through terminal equity investment, 2 or 3 world-renowned shipping companies may take root in Xiamen. After considering XB as the hub port for cross-strait economic zone, and improve port hard soft environment, help feeder line transport enterprises through policy support, , vigorously develop transshipment operation in feeder lines, more cargoes from the economic zone even the neighboring province can be imported or exported through Xiamen port, which, to some extent, to consolidate and even attract more shipping routes link it. Consolidating and improving the status of XB as a container hub port in the cross-strait economic zone can let Xiamen port be positive in the international

transshipment container competition with Kaohsiung port.

6.3 Develop the advantages to Taiwan and promote the “Three links” of two sides

Xiamen's main advantage is its geographical location which directly faces Taiwan in the Strait. The average width from east to west in TS is 102 nautical miles. It is only 8 nautical miles from Xiamen to Chin-men. There is a special relation between Xiamen and Taiwan which is geographically near, long history, blood related and same culture, same language and business relation is broad. Since 1997, Xiamen port has carried out the experimental direct shipping transport to Taiwan. Using the economic relations connect Fujian with Taiwan. And the triangle in the south part of Fujian will become another regional economic Golden Triangle in our country. Xiamen enjoys exceptional location advantage and comprehensive advantage and port advantage in the economic development to Taiwan in Fujian's economic development. According to the latest statistics of Xiamen port sector, in 2004 the volume of container transport from Xiamen to Taiwan was more than 450,000 containers, 16% of the total Xiamen container throughput in 2004. Moreover, trade and investment increment from Taiwan produced strong market demand for the shipping from Xiamen to Taiwan; there is great potential for Xiamen port comprehensive competitiveness. According to statistics, by the end of 2004, the mainland had approved more than 64.626 Taiwan-funded projects, used 79.935 billion U.S. dollars in the contracts, actually used Taiwanese fund 39.623 billion U.S. dollars. The accumulated total of cross-strait trade value was almost 404.575 billion U.S. dollars. Therefore, if Xiamen can attract Taiwan's cargo supply by y lower freight, and strengthen Taiwan and the mainland shipping and trade connection, and promote cross-strait "Three Links" which is "link of mail, trade, trade and shipping services" and provide the development of cross-strait relation with the new favorable

variables also it will play a vital role in increasing Xiamen container throughput.

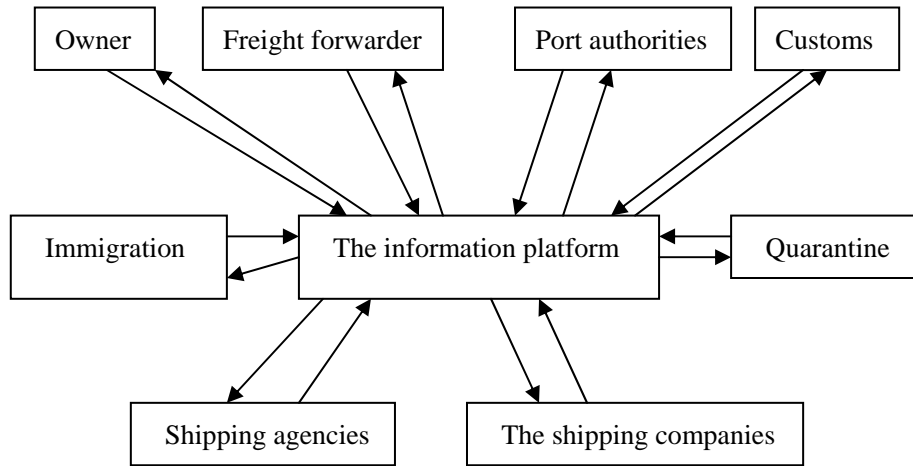
6.4 Vigorously reform the Customs clearance and building efficient port

Today the IT is ever-changing; the old Customs clearance model can not fully meet the current monitoring requirements and economic development speed. Shanghai port recently formally implemented EDI clearance, it changes the traditional practice of relying on enterprises submit written declarations and documents attach relevant papers to work on the Customs procedures, direct process the standard electronic data and information of the import and export goods , while the traditional written documents circulation practices has been got rid of.

While promoting EDI clearance process, it is necessary to correctly deal with the "clearance" and "control." It is only by succeeding in the "good control" that can "be faster clearance." Many ports have good experiences. The common point is to use high-tech means to manage port. In short, they are logistics "eye tracking" (GPS satellite positioning system), "eye identifying" (automated door clearance system), "electronic eyes" (video control system), "X-ray eyes" (large container inspection system -- H986) and computer network management systems. These "four eyes one network" constitutes a perfect network. In the context of good control, the international transshipment cargo should be treated with more convenient and faster management approaches; Internal feeder transshipment exported cargo can be declared in advance transshipment imported cargo can be firstly transshipped and then declared. The Xiamen municipal government should pay more attention to the Customs clearance reform which can save administrative cost. If it is unable to develop the software, we can learn from our brother ports in China, absorb some useful software to accelerate EDI Customs clearance.

Xiamen port should continue to improve port logistics information platform. It is not likely to develop international container pivot port just rely on paper-based documents to pass information. While ports from home and abroad are committed to speeding up the Customs clearance speed, Xiamen port must be at the leading edge of the development of the modern logistics industry in the world, building a collection transport, distribution, information services, integrated services, the inspection five systems, fully accelerating international logistics center construction. The port should let the logistics information platform connected with the every step in the transmission of the cargo information flow; make the information fluently pass through business, government and customer. See table 6-1. Vertically speaking, it should make owners, freight forwarders, Customs, yard, transport enterprises, inspection and quarantine, port authorities and other relevant units all use this information platform. Canceling the paper documents will really facilitate enterprises to speed up clearance; horizontally speaking, Xiamen logistics information platform will be introduced to Longyan, Sanming, Meizhou, Ganzhou, Fuzhou, and other places, and building the branches of Xiamen logistics information platform, extend the hinterland of Xiamen.

Table 6-1 The information flow among those units



6.5 Pay more attention to the port operation and management personnel cultivation

Port professional operation and management talent shortage is the important restricting factor of the development of Xiamen Container throughput. It is imperative to train port high class personnel in order to construct Xiamen into a container pivot port.

Currently, Xiamen port professional operating talent is scarce, and generally lack modern logistics awareness, which led to a limited port services. This situation is very detrimental to Xiamen future container throughput development. Therefore, Xiamen port authorities should increase the investment in port management personnel training to provide different levels of port professionals for Xiamen port through various channels to train its staff to start relearning and retraining of the professional knowledge and scientific and technical knowledge aiming at the container development features, and expand the container business knowledge and

technology knowledge, and continuously improve container service quality and management level. We should also enhance the cooperation between government, colleges, and enterprises, strengthening internal relevant personnel training, introducing national vocational qualifications of port personnel certification system, which will form producing, learning, researching good circle. Xiamen port should create some container port management operations elites on the basis of improving overall personnel qualities, which will match with the port container development and let Xiamen port make great strides toward a new container pivot port while making full and rational use of its superior geographical and policy resources.

CONCLUSION

This dissertation mainly deals with the research of constructing Xiamen port to become a container pivot port. Xiamen port is now encountering a historical opportunity for developing with the tremendous growth of Chinese economy and the growing up of the container transport. Based on our government's order and its own extraordinary geographical position, which is the closest to Taiwan and the most potential port in the west coast of the Taiwan Strait. Xiamen is now being constructed as a container pivot port. But during its developing period, there are still some obstacles such as small hinterland and unstable political relationship between the mainland and Taiwan and so on. I analyze those effecting factors and then present its future container throughput in 2010 by means of the linear regression forecasting, which the throughput is 7.1 million TEU. Base on the information like GDP, foreign trade value, developing trends, annual growth rate of several indicators, I think the forecasted throughput is reasonable and Xiamen port can achieve it by implementing those specific measures that I recommended in the last.

Reference

- [1] Xu Guo Xiang; Statistics and prediction and decision-making
Shanghai finance and economic publication company 1998
- [2] Ma Zong WU: Port economics
China city and economic society publication company 1989
- [3] Zhen Hong : Port management
China textile publication company 2000
- [4] XU Jian Hua : Competition and cooperation in the comprehensive logistics age
Port economy 2001(4)
- [5] Xiao Zhong Xi : Improving China's ports competition position.
China's port 2003(2)
- [6] Port law of the people's republic of China China's port 2003(7)
- [7] China's ports and container website <http://www.portcontainer.com/>
- [8] Zhang Guo Chuan: Quantitative compared research of comprehensive
competitive position of Xia Men and Gao Xiong port Research of Taiwan
2005(2)
- [9] Jia Da Shan : Strategic exploration for China sea transport development
Dalian maritime publication company 2003.10
- [10] National Congress: the 11th 5-year plan of Fujian province
- [11] Zhang Chun Xian. China sea transport 2003(1)
- [12] Gong Ren Zhi :The target of the 3rd generation Xia Men port is container
transport China sea transport literature information 2004(6)
- [13] Wang Xiao Hui; Analysis of investment policies of world main ports
China Sea transport 2005(1)

- [14] Zong Bei Hua : Port strategic management
People's communication publication company 1994
- [15] Pankaj Ghemawat : Game businesses play
Posts&telecommunications press 2005
- [16] China port yearbook (2005)
- [17] Xu GuoXiang: Statistics and prediction and decision-making
Shanghai finance and economic publication company1998
- [18] Malcolm McDonald and Ian Dunbar: Market segmentation
- [19] Ma Shuo: Maritime Economics
Shanghai maritime university 2005
- [20] Edited by D.Teece: Organizational Arrangements for Regimes of Rapid
Technological Progress, Journal of Economic Behavior and Organization,
1992(18)
- [21] Chen Jia Yuan: Port enterprise management
Dalian maritime publication company 1999
- [22] Lu Tian Jiao: The target of Xia Men—international pivot port
Xia Men Daily 2005.12.3
- [23] Xu Mo, Zhuang Zong Ming: Xia Men port walks to the world from west coast
Xia Men Daily 2005.12.31
- [24] Zhou Jun Shan: Modern port economics
People's communication publication company 1997