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WORLD MARITIME UNIVERSITY

Shanghai, China

**RESEARCH ON STRATEGIC
COUNTERMEASURES OF NANJING PORT
BASED ON THE ANALYSIS OF ITS MAJOR
CARGOES**

By

YANG SISI

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 research paper that is not my own work has been identified, and that no material is concluded 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.

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ABSTRACT

Title of research paper: **Research on Strategic Countermeasures of Nanjing Port Based on The Analysis of Its Major Cargoes**

Degree: **MSc**

This research paper is a study of major cargoes of Nanjing Port, focusing on the petrochemical cargoes and containers due to length restriction. The former is the most important supporting cargoes of port, occupying almost half of the throughput; whereas the latter is the kind of cargo which develops fastest and faces most development opportunities. The objective of the paper is to find out practical strategic countermeasures in terms of different cargoes and provide reference for Nanjing Port (Group) Co. Ltd. and other similar port enterprises concerning operational development tactics in fierce competition.

The macro and industry environments of Nanjing Port are examined to identify the external conditions for its development as well as the competition it should face up. Based on my survey in Group Cooperation, the current situation, strengths and weaknesses of Nanjing Port are detailedly analyzed.

The situations and development trends of two major cargoes are investigated, taking into account many external and internal factors that have big effect. Moreover, simple forecast about container throughput is also made .

Revolving around the strategic development positioning and overall goal of Nanjing Port, many adopted competitive measures of Group Cooperation are evaluated, and a

number of strategic countermeasures of two major cargoes and other auxiliary operations are brought forward to realize further development.

The concluding chapter sums up the results of this paper and reveals its significance.

KEYWORDS: Petrochemical cargo, Container, Affecting factor, Development trend, Strategic countermeasure

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LIST OF ABBREVIATIONS

CO	Crude Oil
FO	Finished Oil
LCP	Liquid Chemical Oil
MOC	Ministry of Communication
NP	Nanjing Port
NPC	Nanjing Port Co. Ltd.
NPGC	Nanjing Port (Group) Co. Ltd.
SISC	Shanghai International Shipping Center
YCFC	Yizheng Chemical Fiber Corporation
YCIZ	Yizheng Chemical Industry Zone
YR	Yangtze River
YRD	Yangtze River Delta

Chapter 1 Introduction

1.1 The background and significance of this study

1.1.1 The background of this study

1. Co-prosperity of cities and ports

Cities, are the centers of social polity, economy, science, education and transportation, are the centralized places of modern industry and technology. Ports, are important infrastructure of national economy and have decisive effect on the foreign and domestic trade development. Nowadays, port cities act as the bridges in the communication of economy and technology with foreign countries, such function is more and more significant as the cities rely on ports to a greater extent. It is a important way to realize city development and modernization by making use of the advantages of ports and bringing the bridge function into full play.

The development of cities and ports is obviously integrative. On the one hand, ports have strong effect on the economy structure and functions of cities. In the process of industry modernization, many port cities develop multifarious processing bases and has the possibility to become newly emerged industrial cities. Meanwhile, as the development of foreign trade, those cities gradually turn into trade, finance and shipping centers. By virtue of good transportation conditions of ports, the cities

increase the export-oriented degree of economy which drives the city development. On the other hand, with the development of cities, ports have powerful support, thus promoting their development. In short, ports drive city development, cities support port development, they depend on each other and complement with each other.¹

2. Severe port competition along YR

At present, the ports all around the world compete very fiercely to scramble for direct and transshipment cargoes, so does the situation of the ports along YR. Those ports mostly take the southwest, northwest, north and east of China as the basic hinterland, and engage in the coastal transportation as well as foreign trade transportation. As the land transportation develops a lot, the original monopolized hinterland becomes mutually owned, the information and resources are all shared with each other. Therefore, they adopt various measures to attract cargoes, the competition to be the pivot port along YR is even fierce than before.

1.1.2 The significance of this study

It can be seen that along with the aggravation of port competition, port enterprises along YR should not respond passively, but they should formulate effective strategies and corresponding countermeasures to achieve success in such competition.

The operations of major cargoes are the main support of any port. Nowadays, two major cargoes of NP are both confronted with great changes. Through the elaborate analysis of their current situations and influencing factors, it is easy to find out their

¹ Feng Baochun. (1997). Analyzing Nanjing Port development from the view of "Co-prosperity of Ports and Cities". *The research papers volume of port economy in Nanjing 1997* (pp. 66-72).

development directions, which are significant for NPGC to formulate corresponding strategies. As for port enterprises, strategies are the development direction and action guidance chosen to realize its long-term goals and also the general principles for optimal collocation and allocation of resources. However, the strategic countermeasures are the things ultimately implemented to realize the goals. So the countermeasures based on analysis of major cargoes' change are more practical, particular and have more significance to facilitate the fulfillment of strategic goals.

1.2 Structure of this paper

Chapter one is introduction, including the background, significance of this study and the literature review. In chapter two, the external and internal environment of NP are examined. Chapter three and four are analysis of two major cargoes' change of NP. I analyze the current situations, influencing factors and development trends of petrochemical cargoes and containers successively. In chapter five, based on overall strategic positioning and goals of NP, I provide the development ideas of major cargoes from the whole point of view. Then I bring forward corresponding strategic countermeasures in term of different cargo types and also sum up the countermeasures of other aspects of NP to realize further development. In the last chapter, I come up with the conclusion of this research paper.

1.3 Literature review

1.3.1 Review concerning the literature of ports

1. The general introduction of NP

NP is situated in the lower reaches of YR and at the west end of YRD. Its scale ranks No.3 in this area, following Port of Shanghai and Ningbo. It is open to navigation for 35,000-ton ships all the year. As the largest inland port in China with hundreds years of history, NP is one of the national pivot ports and the first class opening port, it became the member of the International Association of Ports & Harbors in 1992. Because of the clearance height restriction of Yangtze River Great Bridge, NP is the last deepwater port for ships over 10 thousand tons to enter the river from East Sea.²

At present, NP mainly consists of NPGC, shipper ports and ports of Nanjing Port Administration Department. As the main body and the biggest public wharfs operator, NPGC has 7 stevedoring companies, a passenger station and a joint venture container co. ltd., owning both public berths and exclusive berths for shippers.

It is reported that imported CO needed by big enterprises in the middle and upper reaches of YR is almost entirely transshipped via Nanjing, half of the iron ore throughput of NP is for those companies and 35% of their containers are transported via this port. The transshipment throughput of NP accounts for 40% of the total transshipment volume of ports along the river in Jiangsu Province.

The functions of port expands constantly, ranging from agent of ships and cargoes, tally for foreign ships, port equipments manufacturing, port engineering, repair of vehicles and ships to port area processing. The style of diversification has already formed. After many years' mold of enterprise culture, "For all shippers, For shipper's all, All for shippers" has firmly become the service tenet of NP.

² Ministry of communications of the People's Republic of China. (2005, October 15). *Port of Nanjing: a port that connect Yangtze River and sea*. Retrieved from the World Wide Web: http://www.moc.gov.cn/05news/0510/t20051017_27153.htm

In recent years, the development of NP began to accelerate, it became the tenth domestic port with throughput over 100 million tons last year.

2. The development history and current situation of domestic and foreign inland ports

(1) Domestic inland ports

YR can be divided into three parts. The first part is the upper reaches from Chongqing to Yichang, which is the least developed area in the river. The second part is the middle reaches, ranging from Wuhan to Wuhu. The navigation conditions of this part are relatively good and manufacturing industry is especially prosperous. The lower reaches from Nanjing to Shanghai constitute the third part, the economy there is the most vigorous and developed. In the first half of 2005, the GDP of YRD accounted for 24% of the whole nation.

In recent years, the ports in YRD all develop very quickly, especially Port of Ningpo, Port of Suzhou and Port of Shanghai. Let's take Suzhou Port as an example. Suzhou Port is located in the estuary of YR and closely near to Shanghai Port, its geographical advantage is obvious. The waterfront is 139.9 kilometers, within which amount to 83.5 kilometers are deep enough to construct wharfs.

At present, the three port areas of Suzhou Port have already formed their own distinct characteristics. Taicang port area actively develops distinctive operations while accelerating the construction of container terminals, it has become the biggest production base of high-quality lubricating oil in our country and the biggest LPG production base in East China. By making use of its own port and industrial

advantages, Changshu port area has developed to be one of the biggest domestic steel import bases. Meanwhile, Zhangjiagang port area brings the policy of “linkage of port and bonded zone” into full play, and has become the national biggest lumber import base from the waterway.³

(2) *Foreign inland ports*

① Inland ports in Europe

The European inland river network is densely covered, there are so many river mouths which can enter sea. Therefore, the embouchure and inland ports which are near the sea ports can make full use of the superior water resources and geographical superiority to attract cargoes from hinterland of Europe.

Take the Port of Antwerp as a typical example. The Antwerp port is located along the Schelde River in Belgium and approximately 75 kilometers away from the North Sea. The port area extends 20 kilometers with the water depth of 12 meters, the restriction of depth has seriously constrained the development of Antwerp to maintain its status as a pivot port. Therefore, it places the key point of port construction on the excavation of deep water route. In the 1980's, Antwerp port invested hundreds of millions to construct artificial canals, namely Schelde River and Rhine River. Then the emphasis is put on the efficiency enhancement. At present, Antwerp connects with the inland water network of Belgium and Europe, and there are more than 52,000 barges to arrive every year. There are also direct container lines between port and hinterland, such convenient network of railway, road, inland water and short-sea

³ The port institute of Jiangsu Province. (2003, May). The discussion of problems of inland ports development in Jiangsu Province. *The technology forum of shipping market in Yangtze Delta*, (5), 9-13.

transport provides the clients with efficient transfer service. So, Antwerp has become one of the important gateways in the world trade.

② Inland ports in USA

The region of USA where develops inland water transport mainly concentrates in the Mississippi River. The USA inland river spans approximately 30,000 kilometers, in which nearly 20,000 kilometers belongs to the Mississippi River. In 1830, the federal government carried out large-scale dredging project in the upper reaches of this river for the first time. Afterwards the government authorized the dredging projects of 4.5 feet depth and 6 feet depth of water in 1878 and 1907 respectively. Through further dredging in last century, the present maintenance water depth is 9 feet and the route width is 300 feet.

Reviewing the development history of inland ports in West Europe and USA, we find a common point that their development usually starts with dredging of routes. They construct and open inland distributive channels. Simultaneously, they attach much importance to bringing inland river into the comprehensive transportation network effectively, reconstruct wharfs and necessary port facilities, and also open up barge lines from inland ports directly to sea ports, therefore dramatically increasing the transfer efficiency which facilitates the logistics activities development of hinterland.

3. The existing problems of domestic port development

Along with the development of our social economy, the national government attaches increasingly more importance to port development. Port development facilitates the

development of marine industry and foreign trade, it also has positive effect on the international communication and cooperation. However, there still exist some problems as follows.

First, there are insufficient strategies involved in port development. At present some domestic ports only develop for their own short-term interest, seek quick success and instant benefits. There are no long-term goals, lacking in scientific guidance and integrated planning, such development is not strategic and sustainable.

Second, there are insufficient large-scale container terminals of deep water. Nowadays, the container terminals in our country are scattered, they have not formed the centralism superiority.

Third, the port distribution has not formed a network. The distribution of modern ports will develop towards to form a network., including the central ports, the regional pivot ports and the regional feeder ports. At present, there lacks a powerful organization to establish respective functions and statuses of each port, the ports all take competitive strategies for their own economic interest. The combination ports can't complement with each other either in the hardware (e.g. opening up new lines, the port construction, etc.) or in the software (e.g. the sharing of information and drawing on the related experience), they haven't formed the situation of reasonable division, which affect the overall development of port groups of our countries.

Fourth, the cooperation between relevant departments are not smooth. Because of the disunity of enterprise management systems, scale and standardization as well as lack of specialized operations, the relevant organizations in the port industry chain can't cooperate efficiently with each other. With no team-spirit, the logistics operation

between those enterprises is seriously affected and not effective.

Fifth, the integration of ports and cities has not fully realized yet. As the rapid development of container transport, the relationship between ports and cities is more and more close. It is particularly important for them to facilitate each other and develop together. At present, the integration of ports and cities of our country is still at the early stage, which needs further development towards maturity.

Sixth, the information technology is insufficiently applied in the port management. There is a big gap between domestic ports and international modern ports concerning the software, such as information sharing between Customs, port enterprises and clients, the efficiency of port equipment and port bureau. Moreover, the information circulate in the shipping exchange market is comparative less complete and timely.

Seventh, the degree of privately owned is relatively low. Although the government requests the ports to separate government administration from enterprise management, many ports still combine them together in fact, it is very difficult for them to completely get rid of the effect of government on the port construction in the system of planned economy. At present, with regard to raising fund, the majority of ports mainly depend upon the investment of government or the preferential loan, the implementation of privately owned proposal only becomes reality in few ports.

It can be found out that within all existing problems, the most essential and crucial one is lack of strategic management, which makes the port enterprises difficult to carry out management system which is suitable with national port development from a strategic and long-term view. Therefore, the critical approach to solve these problems is to solve the problem of lacking strategic management.

4. The development trend of modern ports

In accordance with fast development of economy and port industry, all the ports develop towards the direction of strategic management, network of port distribution, deepening of apron construction, diversification of port operations, integration of ports and cities, informationization of management and privately owning.

1.3.2 Review concerning the literatures of methods applied

1. PEST Analysis

PEST (sometimes rearranged as STEP) analysis is a strategic analysis tool that helps people explore external influences on the organization or department from several perspectives. PEST analysis is an acronym of the following: Political factors, Economic influences, Sociological trends and Technological innovations.

These factors refer to macro forces from the external environment acting on the organization. People always use this analysis to review a strategy or position, the direction of the organization, a marketing proposition, or future business and product development initiatives.

2. Michael E.Porter's Five Forces Model

It is a model for industry analysis. Michael Porter provided a framework that models an industry as being influenced by five forces, namely the risk of entry by potential competitors, the intensity of rivalry among established companies within an industry, the bargaining power of buyers, the bargaining power of suppliers, and the closeness

of substitutes to an industry's products. The strategic business manager seeking to develop an edge over rival firms can use this model to better understand the industry context in which the firm operates.

Porter argues that the stronger each of these forces is, the more limited is the ability of established company to raise prices and earn greater profits. Within the Porter's framework, a strong competitive force can be viewed as a threat because it depresses profits. A weak competitive force can be viewed as an opportunity because it allows a company to earn greater profits. The strength of the five forces may change through time as industry conditions change. The task facing managers is to recognize how changes in the five forces give rise to new opportunities and threats and to formulate appropriate strategic responses. In addition, it is possible for a company, through its choice of strategy, to alter the strength of one or more of the five forces to its advantage.

When analyzing a company's environment to formulate suitable strategies, Porter's Five Forces model can be used to good analytical effect alongside other models such as the SWOT analysis.

Chapter 2 Environment Analysis of NP

2.1 External environment analysis

2.1.1 *Macro-environment analysis*

I. Political factors

1. Macro-political factors

- (1) The strategy of building a well-off society in an all-round way and realizing modernization facilitates the prosperity of direct hinterland of NP

Since the new century, our country has stepped into a new phase of development. Jiangsu Province sets up a grand goal of “two leaders” that taking the lead in building a well-off society in an all-round way and in the realization of modernization. The prosperity of direct hinterland of NP brings forward higher requirements for its development.

- (2) The large-scale development strategy in western China promotes the development of indirect hinterland of NP

The west development strategy will facilitate the economy development of this area

and the industry structure adjustment will intensify the international as well as the domestic trade communication between this region and other areas. As the transportation pivot between southern and northern China, NP will play an more important role in the progress of west development.

(3) The local adjustment of industry structure emphasizes the supporting role of NP

The City of Nanjing views such adjustment important to realize the “two leaders”, development emphasis will be on five major industries, i.e. electronic information, automobile manufacture, petrochemical, metallurgy and electric power. All these industries can’t develop without the cooperation and support from NP.

(4) The provincial and local strategies of developing areas along YR drive the full-scale development of NP

Based on the strategies of developing areas along YR set up by Jiangsu Province, Nanjing City formulated its corresponding general development strategy that taking the River as the axis, jointly developing on both banks, responding to the development of Shanghai and radiating to surrounding areas. The development of port resources should be top priority, so NP must has crucial status in such development.

2. Industry political factors

(1) Implementation of Port Law of the PRC

Administration system restructuring of state-owned port enterprises is one of the

important acts confronting the ports in recent years. It brings out opportunities for the development of port enterprises. The Port Law which was officially implemented on January 1, 2004 regulates and governs the port operations as well as the administration system reform of port enterprises.

(2) The new round emphasis given by MOC to the port construction

Since 2003, our country has witnessed a new round climax of port construction. The sufficient attention paid and favorable policies given by MOC provide broader development space for NP.

(3) Inlandwater transport enters into a new stage

As China has been implementing the sustainable development strategies, inlandwater transport got sufficient attention from the country due to the advantages of low cost, large carrying volume, low energy-consuming and environment friendly. As the largest inland port, NP faces new opportunities to develop.

(4) The navigation route dredging in lower reaches of YR

With the progress of this project, the water depth conditions of this section will improve, 50,000-ton ships can call NP directly, thus reinforcing the strengths of NP and bringing many opportunities.

(5) The improvement of cross-strait relationship

With the closer relationship with Taiwan, direction navigation across the strait has

become a must for further development of trade connection. Not only the local cargoes can be directly imported from or exported to Taiwan, also part of the cargoes from upper reaches would be transshipped via Nanjing. Therefore, such new cargo resources promote the development of NP.

However, in the Eleventh-Five Year development plan of Jiangsu Province, it laid special emphasis on the Taicang Port in the aspect of coastal and riverside port construction and doesn't attach most importance to the development of NP. Such policy leaning from the government will bring negative effect to NP.

II. Economic factors

1. International environment

Economic globalization plus integration and liberalization of trade and investment enhance the economic contact and cooperation between countries. Since 2000, as international trade has began to boom, the marine industry which carries over 80% of the international transportation has revived. The global sea transport volume was up to 6.1 billion tons in 2003, it is forecasted that as the world economy and commodity trade will keep rising at a relatively high rate this year, the increase rate of this volume could be 3.6% or above, higher than the average growth rate of 3.4% in the past five years. The rapid development of marine industry in various countries promotes the flourishing of many industries such as ship-building, port, freight-forwarding and logistics. As an important port along the lower reaches of YR, NP acts as an important node in the global supply chain.

2. Domestic environment

(1) The domestic economy development

Along with entry into WTO, China's opening up extends and deepens, the socialist market economy system constantly improve, thus pushing it to be important commodity trade market and international shipping market. Last year, our country's GDP was up to RMB 18.2 trillion, with an average annual growth rate of 9.4% compared with 1978. The gross foreign trade value reached USD1.42 trillion, enjoying fast increase at 20% annually for successive 4 years. In the past 27 years, the average annual increase rate of China's economy is 6% higher than the world's, obviously pulls the rise of world economy and contributes great to its development. As one of the most developed provinces, the GDP of Jiangsu Province was about RMB 1.8 trillion in 2005, up 14.5%, among which 241 billion is for Nanjing City, up 15.2%. It is found the throughput and GDP of China's ports are closely interrelated with a high interrelated coefficient of 0.92. At present, national macro-economy will maintain stable development for a long period of time, such situation will be very favorable to the development of port industry. The volume of international and domestic cargo transportation will keep going up to a high degree, providing broader development room for the throughput increase of NP.

(2) The rising tide of investment in YRD

After entering the new century, along with the transfer of export-oriented manufacturing bases from Pearl River Delta to YRD, such cities as Shanghai, Nanjing, Suzhou and Ningbo have all witnessed an unprecedented high tide of foreign investment, thus bringing big potential of cargo resources to their ports. Until the end of 2003, there were 7849 foreign investment enterprises in City of Nanjing with the actual utilized foreign capital of more than USD 9.3 billion. Last year, this

investment tide still ascended and until then foreign merchants from 49 countries and regions have already invested in Nanjing.

III. Social factors

1. The fast development of logistics and supply chain

Along with the progress of economy globalization and development of supply chain, the overall logistics system changes from the original scattered mode to centralized one. By providing many value-added service apart from traditional functions of cargo handling, storage and transshipment, the ports will attract more cargoes.

2. Enhancing of shippers' transport requirements

As the tempo of people's living speeds up, the shippers enhance their requirements to a great extent about the transport efficiency and service quality. As an important link in the transportation, port operations must meet the increasingly high demand in all-round way.

3. Strengthening of port safety and security administration

The Circular on Implementing Port Safe Production and Safety Administration released by MOC on May 31,2004 stressed that port enterprises at all levels should pay close attention to and understand the importance of port safety.

Since the "9.11event", the consciousness of anti-terrorism has been enhanced to a large degree in the world. In accordance with the SOLAS and ISPS, MOC completed

the preparatory work for convention fulfillment on port facility security, undertook China's international obligation in maintaining ocean security.

4. The sustainable development of ports

Nowadays, ports pay much attention to the sustainable development and connect own development with the city development. The concept of ecological port has been put forward, the basic meaning of which is to make the port development in harmony with the coastal environment, establish a high-quality environment-pleasant littoral zone in order to enrich people's life.

IV. Technological factors

1. Acceleration of technological advancement

The development of information and network technology has revolutionary effect on the traditional economic structure and social configuration. The advancement of technology facilitates the port development, informationization and intelligentization enhances operational efficiency and competitiveness of ports. The rapid development of computer, network and communication technology lays sound foundation for NP to become a modern port.

2. The upward of ship size

Nowadays, the upward of ship size is a necessary trend in international and domestic shipping. As the last deep water port along YR, NP has got broad space to develop.

However, the increasingly bigger of ships requires deepening of route and modernization of port facilities. Although 50,000-ton ships can call NP after dredging of YR mouth, the lag of dredging project in downstream section of Nanjing causes an unfavorable situation that only by load shedding, large ships could arrive at NP. Whereas such downstream ports as Nantong, Taicang, Zhangjiagang could enjoy the benefits from dredging of YR mouth. Therefore, NP will be in a relatively passive state in this aspect.

2.1.2 Industry environment analysis

Michael E. Porter's five forces model is a useful tool to analyze industry competition environment. According to his theory, an industry is influenced by five basic competitive forces which are shown in figure 1.

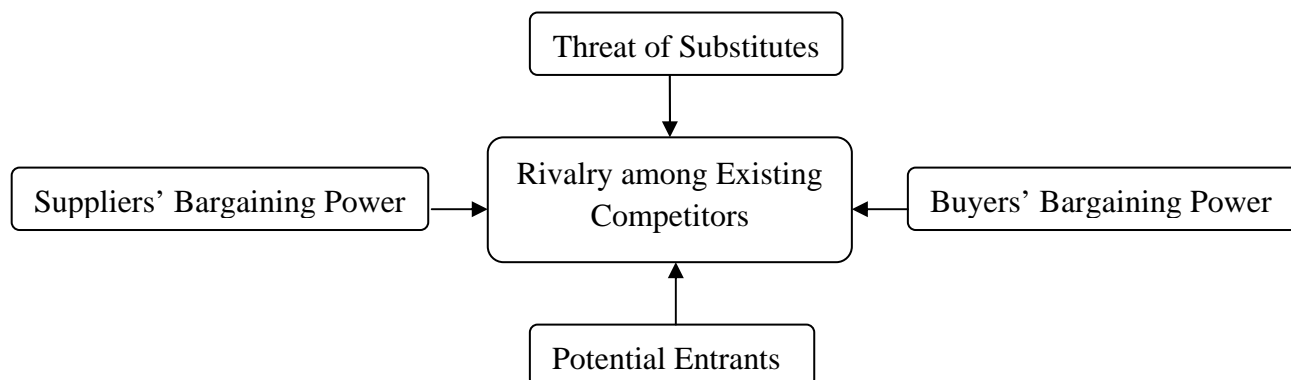


Figure 1 – Porter's Five Forces Model

The respective and integrated intensity of these five forces determine the competitive degree and the ultimate lucrative capability of the industry. Their intensity and expressive forms differ in different industries. As for port industry, suppliers and buyers are the same entity—the clients, they not only provide the cargoes but also realize the transshipment through ports. Therefore, I focus on other three forces when analyzing the industry environment of NP.

1. Potential Entrants

Ports are the pivots for the collection and distribution of cargoes and passengers. They are important links in the social logistics system and play a decisive role in the comprehensive transportation system. As the port industry belongs to service industries, the service quality, efficiency, safety and charges are the crucial factors which affect its development.

After several years' development, China's port industry has formed certain industrial foundation and structure, the entry barriers heighten gradually. Nowadays, the major obstacles to enter this industry are industry policies(national macro port plan), natural conditions(the geographical location, bank line resources, weather, hydrology, geologic conditions and so on), regional environment(the economic development level of hinterland, the clients and regional trade value) as well as the operating scale and level.

2. Threat of substitutes

Table 1 shows the advantages and disadvantages of different transportation modes and the substitute degree between them.

Table 1 – The comparison between five transportation modes

Transportation mode	Advantages	Disadvantages	Applicability	The substitute degree with water transportation
Railway	Low cost, large volume	Slow, not flexible	Long distance, cargoes with low value and low time requirement	Relatively high

Air	Fast	High cost, limited accessibility, cargo restriction	Long distance, small cargoes with high value & time requirement	Relatively low
Road	Quick, more flexible	High cost	Short or medium distance, cargoes with high value& high time requirement	Medium
Pipeline	No wastage, environment-friendly, large volume, low cost	Limited capacity and accessibility	Long distance, for only one type of liquid product	Low
Water	Low cost, no cargo restriction	Slow, more handing times	Long distance, cargoes with low value and low time requirement	—

The development of railway, road, air and pipeline transport grabs some cargo resources from the water transport, especially from the inlandwater transport, thus increasing the operational pressure of ports. However, as the waterborne cargoes especially those seawater-borne ones are mostly bulk cargoes or goods with low value, water transport has incomparable advantages in the cost and carrying capacity. Nowadays, over 90% of the foreign trade cargoes are transported by ocean shipping, which can't be actually substituted by other transportation modes. So the port operations face few substantial threat.

However, as for the petrochemical operation of NP, along with Sinopec's strategic adjustment of petroleum flow, the existing water transport will be mostly replaced by pipeline transport of CO as well as road transport of LCP and FO.

3. Rivalry among existing competitors

NP locates in the lower reaches of YR where the density of ports is high. There're many ports in its surrounding areas such as Wuhu, Yangzhou, Jiangying, Suzhou and

Nantong. Situated on both banks of the “Golden Waterway”, these ports not only serve the local hinterland directly, but also provide transshipment service for the upstream regions. Their radiant radii overlap and the flow directions of transshipment cargoes are near with each other. Along with the establishment of SISC and the implementation of riverside development strategies of Jiangsu Province, all these ports formulate grand development plans respectively, thus forming a very fierce competition environment around NP. Table 2 is the throughput comparison of China’s major inland ports and table 3 shows the hardware facilities comparison of the competitive ports around NP(until end of 2005).

Table 2 – Throughput comparison of China’s top 10 inland ports

Units: 10,000 tons

Port \ Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	Up over 2004 (%)	Proportion in the inland ports (%)
Nanjing	5182	5494	5279	5922	6679	5789	6108	6620	9589	44.8	11.2
Suzhou								6282	9059	44.2	10.7
Nantong	1711	1910	2017	2277	2748	3511	3746	5010	7218	44.1	8.4
Hangzhou	1659	1426	1821	2174	2187	2337	2131	4662	4864	4.3	5.8
Zhenjiang	1708	1711	1680	1702	2153	2216	2630	3046	4839	58.9	5.7
Wuhan	1742	1651	1378	1547	1738	1653	1773	3124	4281	37.0	5.0
Huzhou	518	496	475	940	1085	1272	2190	2338	3321	42.0	3.9
Jiangying	434		469	598	668	1024	1357	2150	2863	33.2	3.1
Wuhu	647	734	536	602	830	902	1138	1410	1831	29.9	2.0
Ma’anshan	647	652	581	513	626	747	888	1052	1713	62.8	2.0

Source: Port annual of 2004

Table 3 – Hardware facilities comparison of the competitive ports around NP

Units: 10,000

Port	Nanjing	Zhenjiang	Nantong	Suzhou			Jiangying	Wuhu
				Zhangjiagang	Taicang	Changshu		
Berths	224	152	71	58	21	18	32	56

(>10,000tons)	(35)	(9)	(13)	(19)	(9)	(6)	(27)	
Warehouses(m ²)	60	24.1	34	70	—	—	0.36	28
Storage yard(m ²)	50	2.4	2.4		17	—	6.39	
Port railway	18km	1477m	none	none	none	none	none	1560m
Annual through capacity(tons)	11500	—	1596	2160	—	—	7500	> 2000
Annual through capacity of container(TEUs)	52	15	18	24	55	13	10	6.5
Overall throughput of 2005(tons)	10686	5800	8326.9	10066			4277.8	—
				7127	1200	1729		
Container throughput of 2005(TEUs)	60.6	—	30.1	61.7			—	—
				31.8	19.6	10.3		

Source: Summarizing from many material

Note: “—” represents no reliable figures

However, as for different cargo types, NP has different competitors.

(1) Petrochemical operation

As the dominating port along YR which is engaged in the transit of CO conveyed by pipelines and shipped to YR by ocean-going vessels, NP hasn't felt obvious competitive pressure from other ports concerning the CO operation. The sea-to-river CO must be transit via NP, so there is no competition with coastal ports but shown as complement with each other.

Whereas the FO and LCP operations of NP face competition from downstream ports such as Zhangjiagang and Jiangying. Although there is a gap between their port facilities and NP's, they have strong advantages in the operational ideas, internal

management, service quality and port charges. Moreover, these ports are usually mainstays of local economy, along with the decentralization of port administration, the local governments give strong support to port development. Their rapid development poses a big threat to the FO and LCP operations of NP.

(2) Container operation

With regard to container operation, the competitors of NP are Port of Wuhu, Suzhou, Zhenjiang and Nantong. Wuhu Port is the provincial logistics center confirmed by Anhui Province which focuses on container development. Hefei region, where it takes as part of the key development hinterland, is also important hinterland of NP. Nowadays, the reconstruction of container wharf of 50,000-TEU has completed and it is planning to build another wharf of 200,000-TEU. The competition between these two ports will be even fierce in the future.

Suzhou Port is the key port in the national construction of SISC, and also the important pivot port set up by Jiangsu Province. Its good route conditions and prosperous hinterland make it the major competitor of NP. Owning convenient road and water traffic conditions, Zhangjiagang port area has opened up many foreign trade container lines such as Zhangjiagang to Japan, America, Canada, Europe and Persian Gulf. Presently it has freight transportation intercourse with ports from over 100 countries and regions. Located on the main route of YR, Taicang port area owns the natural conditions to build deep-water berths for the third and fourth generation containership. Although the facilities of container operations of Suzhou Port are relatively scattered, as the integration of port resources and attention paid by government, its container transport will face more development opportunities. However, the closeness between Suzhou Port and Shanghai Port would restrict this

development to a certain degree.

Because of the range limitation and relatively low development of hinterland, Nantong and Zhenjiang Ports have small effect on the container development of NP.

In 2004, all ports in YR valley accomplished over 2.06 million TEUs, among which 8 major ports along YR in Jiangsu Province occupied 76.42% of the total container throughput. As the largest inland port, the throughput of NP reached 477,700 TEUs, accounting for 23.2% of the whole valley.(See table 4)

Table 4 – Container throughputs accomplished by major inland ports along lower reaches of YR in 2004

Unit: TEU

Port	Sum total			Export			Import			
	Rank	Total	Foreign trade	Domestic trade	Total	Foreign trade	Domestic trade	Total	Foreign trade	Domestic trade
Nanjing	1	477700	289700	188000	242900	193900	49000	234800	95800	139000
Zhangjiagang	2	321620	170910	150710	170910	79575	91335	150710	91335	59375
Nantong	3	250955	176622	74333	151111	100995	50116	99844	75627	24217
Yangzhou	6	132260	29780	102480	103634	18328	85306	28626	11452	17174
Taicang	7	92200	41600	50600	39400	3900	35500	52800	37700	15100
Changshu	8	88385	52778	35607	40534	20826	19708	47851	31952	15899
Zhenjiang	9	76000	45000	31000	41000	25000	16000	35000	20000	15000
Jiangying	10	70801	9419	61382	23587	3091	20496	47214	6328	40886

Source: Cai Zhengrong. (2005, May). Container transport along Yangtze booming in the ascendant.

China Ports

2.2 Internal environment analysis

2.2.1 *The current situation of NP*

As China's largest inland port, NP is a key link in the transportation network, its superior natural conditions and unique location make it a multifunctional port for the collection and distribution of cargoes, also a river-sea and water-land transshipment base along the YR and in the eastern China. It is important constituting part of SISC, and one of the national pivot port with irreplaceable leading status.⁴

1. Distribution of port areas

There are 9 port areas in NP, among which six are public and three are industry-used. NP also has 5 planning port areas, 4 of which are public and the remaining one is reserved. It owns the largest port areas of petrochemical cargo, container, coal and foreign trade general cargo.

2. The collective and distributive transport conditions

Nanjing has developed comprehensive transportation network with complete five modes. Water: It is at the end of B class route and connects with numerous branches of YR and Beijing-Hangzhou Grand Canal. Railway and road: As the important railway and road pivots in eastern China, it connects with national railway network through Beijing-Shanghai, Tianjin-Pukou, Shanghai-Nanjing, Nanjing-Wuhu and Nanjing-Qidong Railways and national road network through expressways, national highways and provincial roads. Air: It has the important international airport in eastern China. Pipeline: It is the place where Shandong-Nanjing oil transport pipeline, Ningbo-Shanghai-Nanjing sea-to-river pipeline and the pipelines along YR converge.

⁴ The introduction of Port of Nanjing. (2003, December 2). Retrieved from the World Wide Web: <http://www.itcn.net.cn/oem/page/index.asp?id=2578>

3. The infrastructure situation

Until the end of 2005, there are 224 productive berths in NP, among which 35 are over 10,000-dwt, as well as 8 public and 1 enterprise-used anchor grounds. The Longtan Port Project Phase 1 has passed the check and approval, the project of dangerous cargo yard has been completed and the Phase 2 & 3 of Longtan Port Project formally start constructing. 18 storage tanks of NPC are also put into production. As one of the top 10 projects of Nanjing City to develop modern service industry, Longtan Logistics Base has begun to take shape after two years' construction.

4. The production operational state

For the purpose of Nanjing to accelerate the build of five centers such as International Shipping Logistics Center along YR and Modern Logistics Service Center, NP insists on developing in advance moderately to facilitate the progress in various aspects of construction planning, operations and management. Last year, Cargo throughput of NP exceeded 100 million tons for the first time, amounted to 106.86 million, up 11.4% over 2004.

The throughput composition of major cargoes maintained relatively stable in 2005. As is shown in figure 2, the throughputs of six major cargoes of NP, i.e. petroleum and its products, metallic ores, coals, steels, industrial chemicals and containers accounted for 41%, 16%, 10%, 7%, 6% and 5% of the total throughput respectively, they together occupied about 85% of the whole, decreased by 9% over the previous year. The composition of petroleum and its products lowered by 8% whereas that of metallic ores, coals and steels was up 3%. Container throughput continued to grow

relatively fast, exceeded the goal of 600,000 TEUs, among which domestic trade container transport developed particularly rapid.

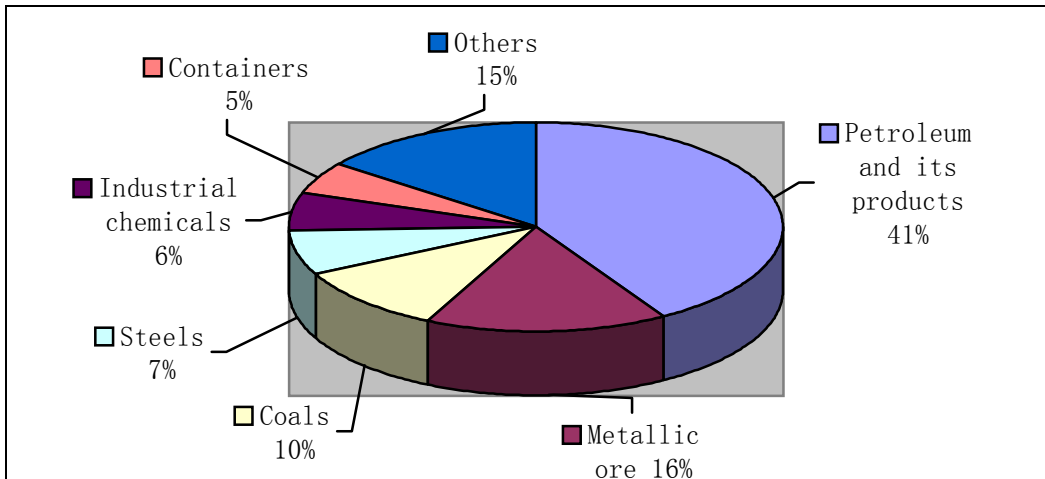


Figure 2 – The throughput composition of major cargoes of NP

Source: Nanjing Communication and Transportation Annual (2005)

The throughputs of public and shipper wharfs rose simultaneously and the increase rate of the latter was 4.8% higher. As the main body of the public wharfs, NPGC accomplished the throughput of 67.98 million tons last year, up 6.9% compared with 2004, occupying 63.5% of the whole port. The shipper wharfs, among which the petrochemical, steel and electric power enterprises constitute the major part, accomplished 38.88 million tons, up 20.51%. Such increase is caused by expand of production capacity of existing petrochemical and steel enterprises as well as the newly operated projects of Suyuan Group and BASF-YPC Company Limited.

Along with the size upward of ships which are engaged in international trade transport, 50,000-ton ships can't call NP fully loaded due to the water depth of downstream section, thus making the downtrend of foreign trade throughput of NP in recent years. Last year, this figure is 7.86 million tons, lowered by 13.9%.

5. The breakthroughs of port reform

NPC entered the market on March 25th, 2005. NPGC, Shanghai Port Container Co. Ltd. and COSCO Ports(Nanjing) Ltd. jointly establish Longtan Container Terminals Ltd. to realize power-and-power union. Longtan Logistics Base has also absorbed external investment to increase its usable capital. Meanwhile, four auxiliary entities of NPGC have successfully completed their administration system reform.

2.2.2 The analysis of overall strengths and weaknesses of NP

In order to find out the comparable advantages and existing problems of NP more realistically and detailedly, I went to NPGC to carry out a relatively comprehensive survey. By communicating with the persons in charge of the management and operation departments of NPGC and its major subordinate companies, I had an approximate understanding of NP's current situation and the opportunities as well as the threats it faces. Apart from the interview, I also use questionnaires to flesh out my survey. I sent 100 questionnaires to the operation, development departments and office of NPGC and corresponding departments of gross-roots companies, at last 83 are retrieved. Although every subordinate company engages in different operations, there are still many similarities among them. I hope the participants will appraise NP as a whole and could add some unique advantages or problems possessed by their own companies which are not included in the questionnaires or of more importance in order to ensure the integrity and pertinence of this survey.

The questionnaires consists of two parts. The first one is the investigation of the comparable advantages of NP. It is designed mostly according to the indices which are used to judge the port competitiveness and comprises 12 elements. The second

part is the investigation of weaknesses of NP, that is to find out its existing problems. According to material consulted previously, I list 11 elements. (More details in appendix 1).

By gathering statistics and analyzing the retrieved questionnaires, I get the results shown in figure 3 and 4. The concrete analysis is as below.

I. The major advantages of NP

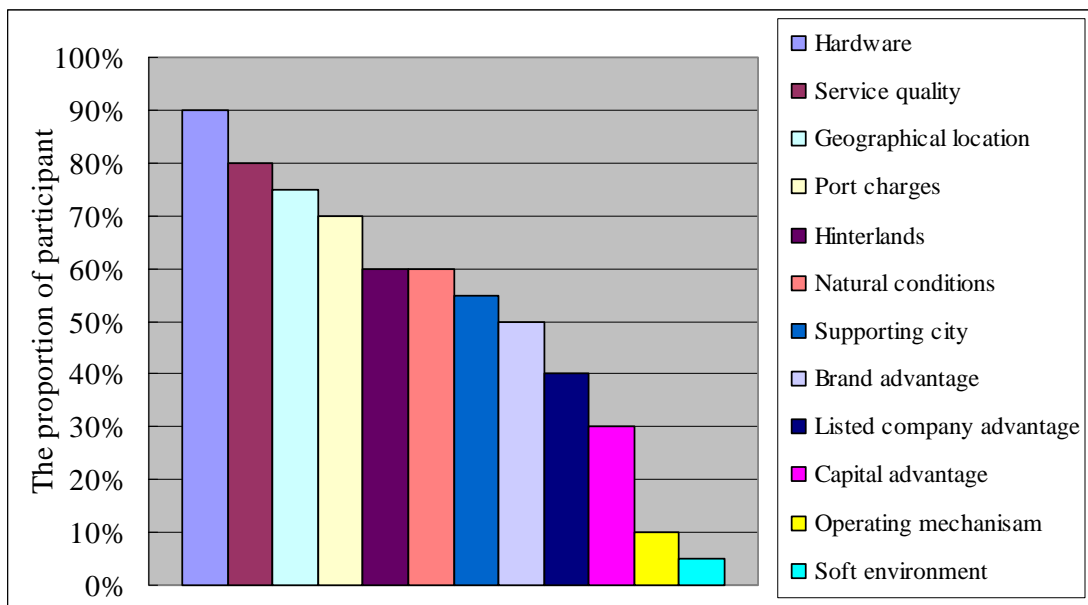


Figure 3 – The research result of comparable advantages of NP

Source: Survey in NPGC

Compared with other ports along YR, NP has distinctive advantages in two major aspects. One is position predominance, mostly comprises the following aspects:

1. Advantage of geographical location: Located at the most western end where ships over 10,000-ton enter YR, NP is a relatively good transshipment port for cargoes from middle and upper reaches of YR.

2. Advantage of transport conditions: Located on the middle node of national south-north traffic artery, NP possesses superior collective and distributive transport conditions.
3. Advantage of economy development of hinterland: YRD is at the front of China's reform and opening up and is developing to be the center of world manufacture industry. As the direct hinterland of NP, City of Nanjing is an important metropolitan and Jiangsu Province is one of the developed provinces in China, they both has irreplaceable status in the national economy system. Moreover, its indirect hinterland is also regions with strong economy.
4. Advantage of industry layout of hinterland: Nanjing is China's important chemical, electronic and automobile manufacturing bases and its surrounding areas are bases of foreign trade processing industry. The electric power and metallurgy industries of its hinterland also develop very rapidly.

The other one is brand and scale predominance, comprising three aspects:

1. Advantage of infrastructure: Owning the first Chinese-foreign joint adventure port enterprise——Nanjing International Container Terminal Services Co. Ltd., NP has relatively superior advantages in facilities, equipments and management level of container terminal. The official production of Longtan container port consolidates its predominant status of container development. With long history, coal port area in Pukou is the largest mechanized port along YR which specialized in coal transport. The distribution range of its clients is extensive. NPC is the largest port enterprise for petroleum, LCP transit and storage in river transport with the widest operational range. It possesses incomparable status for

its scale. Moreover, NP has the only specialized ro-ro wharf and the largest transfer base for foreign trade vehicles along YR, it will bring such superiority into full play in the domestic vehicle trade, especially vehicle batch transport along YR and the establishment of vehicle logistics market in eastern China.

2. Advantage of brand: As China's largest inland port, NP has long history and excellent brand.
3. Advantage of management personnel: After many years' refinement, NP has assembled and fostered a group of high-quality management personnel and a group of specialized staff with clear division.

Compared with other ports along lower reaches of YR, NP is the only port with facilities on both banks of YR in Jiangsu Province and operates across cities. It is the port with most complete transportation modes and most types of handling cargoes. Of more importance, it is a national pivot port with the functions of both sea ports and river ports. Restricted by the clearance of Nanjing Yangtze Bridge, NP is the terminus of first carriers which engage in international sea transport and the departure port of second carriers which undertake the river-sea transshipment. It is the main passage of middle and upper regions of YR to develop foreign trade.

NP also creates the method of "Efficient Stripping of Oil Tanker" and sets up many characteristic brands such as "Nanjing Port Equipment", "Yugui Brand", "Copper Concentrates Brand" and "Rice Brand" to gain some service advantage.

II. The existing problems of NP

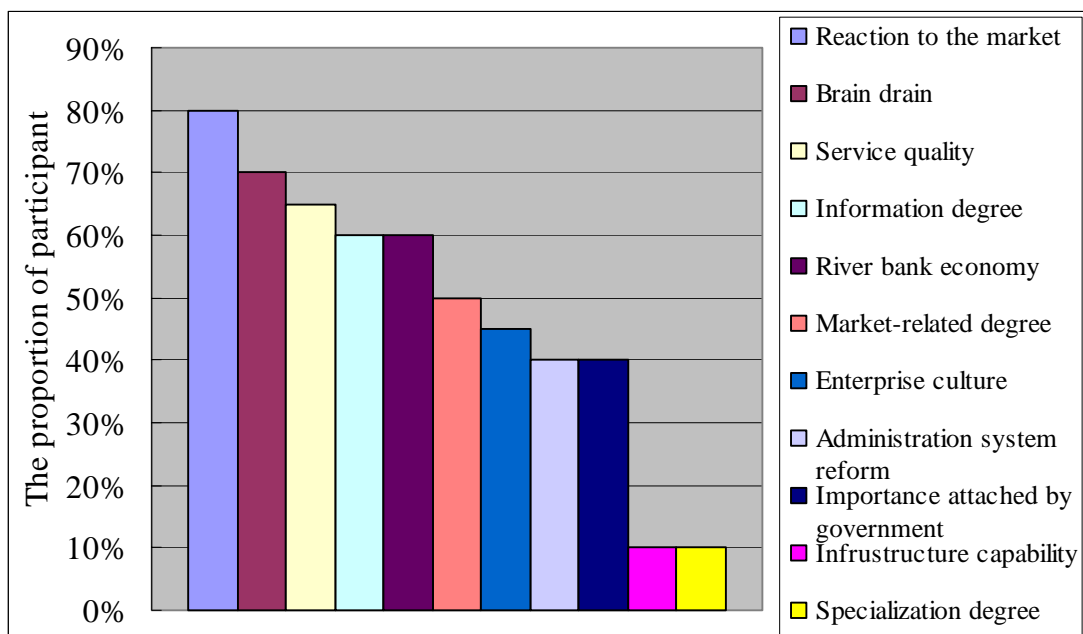


Figure 4 – The research result of comparable weaknesses of NP

Source: Survey in NPGC

1. Insufficient market investigation and opening up

NP doesn't do market research very deep, can't grasp the general trends very accurately, lacks practical and feasible emergency means and countermeasures when confronted with the market changes. As for the opening up of some overall-related and strategic cargo markets, NP usually lacks foresight and innovative thought, the systematic development ideas are not formed.

2. Brain drain

The port sustainable development can't go without the support of talented people from every echelon. Presently, professionals are insufficient with serious brain strain.

3. Disparity in service quality

Although NP has brought forward the service tenet of “all for shippers, for shippers all and for all shippers”, there exist some problems in the practical production that employees’ ability and specialization level is not high. In the opinions of clients, sometimes the service quality is not good enough.

4. Information degree is not high

Nowadays, the management information system of NPGC is not complete, the marketing network and EDI system hasn’t developed entirely. In particular, the information service of bulk cargoes is not considerate and timely, which results in the inconvenience, slowness and low efficiency of bulk transport.

5. Underdevelopment of river bank economy

Although Nanjing established some river bank industry zones, the guidance ideas of their development are indefinite. Large part of river beach hasn’t been exploited and utilized. Some heavy industries develop far away from the river, which goes against the goal to lower production costs and form efficient port economy.

6. Inadequate mold and consolidation of enterprise culture

Due to such inadequacy, the employees haven’t much confidence in the prospect of enterprise.

Chapter 3 The analysis of petrochemical cargoes of NP

3.1 The current situation of petrochemical operation

The petrochemical operation of NP began in 1970's. As the most important type of cargo of NP for many years, the throughput, actual tons of handling, operational earnings and profit contribution rate of petrochemical cargoes all account for 40% or even higher of the total.

Table 5 – Throughput and proportion of petroleum and its products of NP

Cargo \ Year		Unit: tons				
		2000	2001	2002	2003	2004
Throughput of petroleum and its products	Total	43223271	34986907	34485012	38131787	42107805
	Public	33467669	25863132	26690858	26627836	33646000
	Shipper	9755602	9123775	7794154	11503951	8461805
Among which: throughput of crude oil	Total	41081236	31363829	32410159	33069615	39767879
	Public	32693180	24363519	25613263	25596774	32282972
	Shipper	8388056	7000310	6796896	7472841	7484907
Total throughput of NP	Total	66785990	57892380	61079934	66198307	75240937
	Public	52254173	45223526	49088318	52514012	63597821
	Shipper	14531817	12668854	11991616	13684295	11643116
The proportion of petroleum and its products	Total	64.72%	60.43%	56.46%	57.60%	55.96%
	Public	64.05%	57.19%	54.37%	50.71%	52.90%
	Shipper	67.13%	72.02%	65.00%	84.07%	72.68%
The proportion of crude oil	Total	61.51%	54.18%	53.06%	49.96%	52.85%
	Public	62.57%	53.87%	52.18%	48.74%	50.76%
	Shipper	57.72%	55.26%	56.68%	54.61%	64.29%

Note: Here “NP” refers to NPGC plus major shipper wharfs

Source: Internal material of NPGC

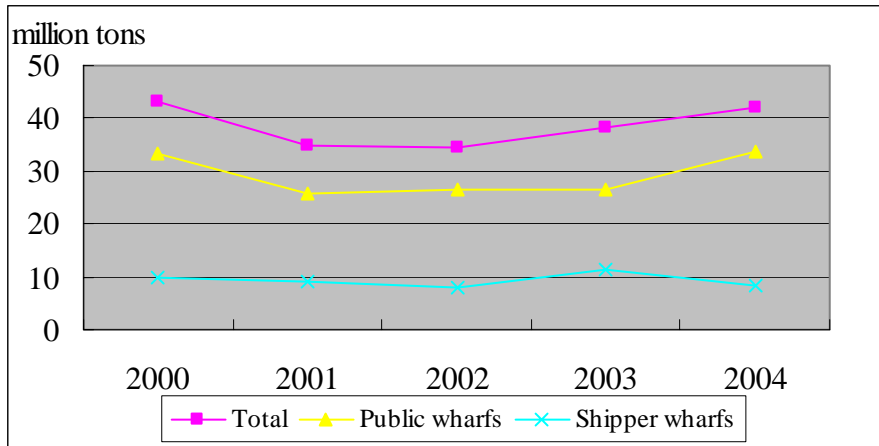


Figure 5 – Throughput of petroleum and its products

Source: Internal material of NPGC

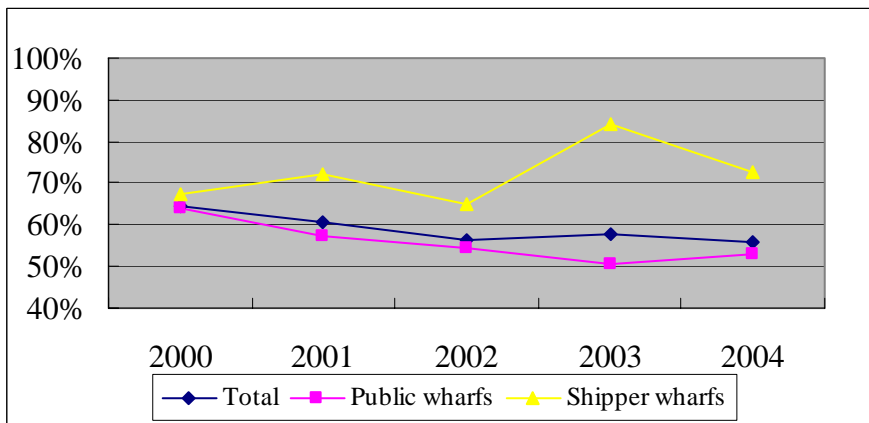


Figure 6 – Proportion of petroleum and its products in the total throughput

Source: Internal material of NPGC

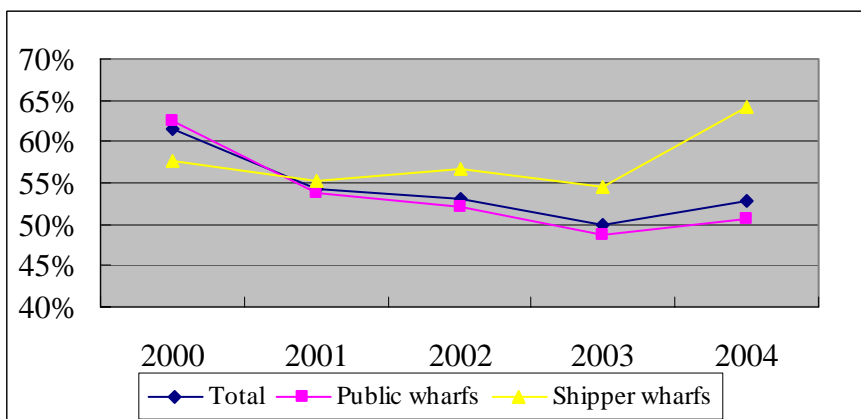


Figure 7 – Proportion of CO in the total throughput

Source: Internal material of NPGC

As is shown in table 5 and figure 5, 6 and 7, the recent change trend of throughputs of petroleum and its products of NP isn't obvious, whereas their proportion in the total reduces year by year, which is mainly caused by the public wharfs. Compared with 2000, the proportion of petroleum and its products(including CO) were both down nearly 12% in 2004. Last year, the whole port accomplished 48.02 million tons of petroleum, natural gas and its products, decreased by 5.5%. Among them were 36.08 million tons of crude oil, down 7.3% and 9.2 million tons of FO, up 77.9% due to the increased demand and production capacity expand of refineries.

NPC is the largest public inland port enterprise for transit and storage of petroleum and LCP in China. It accomplished 24.01 million tons of petrochemical products, 1.64 million tons of LCP and 0.65 million tons of FO in 2005, increased by 10.1%, 2.8% and 142.2% respectively. Qixia operation area is anchor ground with 5 on-water barge transfer berths over 10,000-ton, undertaking the ship-to-barge transshipment of imported CO. Situated in City of Yangzhou, Yizheng operation area is the major constituting part of the corporation. It's a specialized auxiliary port area of Shandong-Nanjing petroleum pipeline and also engages in the storage, transfer and distribution of LCP. The corporation owns 13 productive docks with the maximum berthing capacity of 50,000-ton and has 42 operational storage tanks of all types, with the maximum sized as 5000-cu.m. and a total volume of 250,000 cu.m. Last year, 16 tanks of Liquid Chemical Project Phase 1 and 2 as well as two 20,000-cu.m. tanks of Finished Oil Project Phase 2 are all put into production. Until the end of this year, the scale of tank area will approach 400,000 cu.m., including six 3,500-cu.m. tanks of undergoing Liquid Chemical Project Phase 3 and four

15,000-cu.m. tanks of Finished Oil Project Phase 4.

The company takes petrochemical corporations of Sinopec along YR, oil refineries and chemical enterprises of Sinopec and local chemical industry and chemical fiber corporations as its major clients. The operation covers provinces and cities along YR such as Jiangsu, Anhui, Jiangxi, Hubei, Sichuan and Chongqing. The annual pipeline CO through capacity is 18 million tons, the transfer capacity of LCP and sea-to-river CO is 2 million and 26 million tons respectively. All capacity has surplus.

The operations of NPC can be divided into three parts, those are CO operation, FO operation and LCP operation. As the mainstay of corporation, CO operation is the primary source of earnings for long time. Its revenue accounted for 87.8%, 83.8% and 82.3% of the total in 2002, 2003 and 2004 respectively whereas the revenues of FO and LCP operations occupied only 0.5%, 1.5%, 3.5% and 11.8%, 11.7%, 14.2% in those three years. Along with Sinopec's strategic adjustment of CO flow direction, the earnings from CO operation will decline dramatically, however, the proportion of the other two operations in the total revenue will surge due to economy development and enhancement of corporation's comprehensive storage and handling capacity.

I. CO operation

CO operation comprises the transit and storage of CO shipped to YR by ocean-going vessels and conveyed by pipelines. As is shown in figure 8, the annual handling volume of CO is around 19 million tons in recent years, the throughput amounted to 21.68 million tons last year, up 11.6%. Its operational structure has adjusted, the proportion of sea-to-river CO has rose obviously, from 31% in 2001 to present level between 45% and 55%.

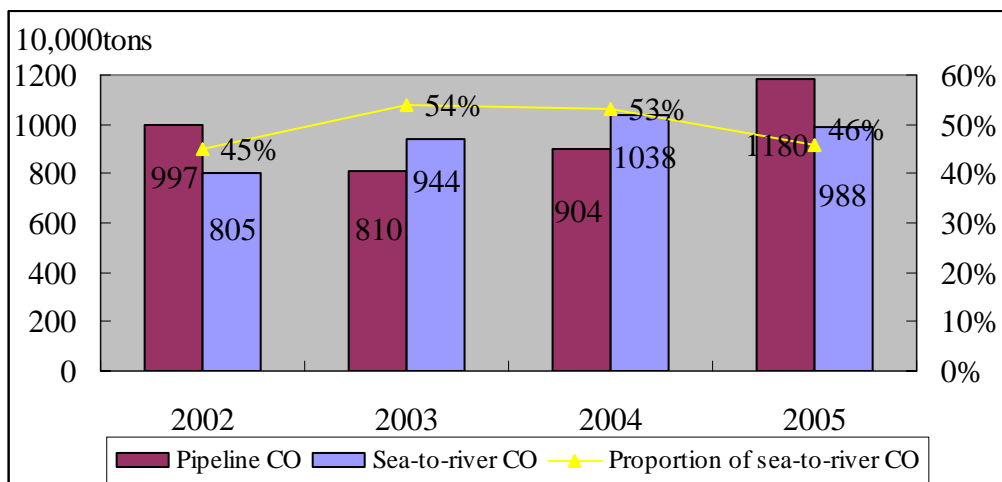


Figure 8 – Operation volume of CO of NPC

Source: Prospectus of NPC

As the handling charges of sea-to-river CO are higher than those of pipeline CO, the operation volume increase of the former has positive effect on the revenue growing of CO operation. Nowadays, ship-to-barge transfer occupies about half of the annual revenue of NPC.

II. Handling and storage of LCP

LCP mostly include such petrochemical products with relatively high requirements about the transit and storage facilities as sulfuric acid, ethylene glycol, cyclohexanone, paraxylene, styrene, liquid alkali, phosphoric acid, bitumen and sugar honey. As NPC's key development operation, their handling and storage volume grows fast in recent three years with the annual increase rate of 33%. (See figure 9). Such dramatic increase benefits from economy development of hinterland, transfer of chemical products market to YRD and the increased demand for industrial chemicals from chemical industry corporations in north of Jiangsu, Anhui, Jiangxi and other provinces as well as from Yizheng Chemical Fiber Corporation(YCFC).

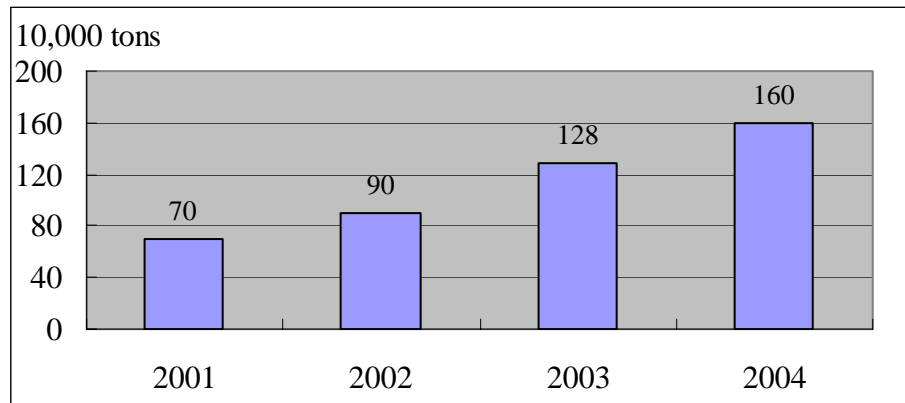


Figure 9 – Operation volume of LCP of NPC

Source: Prospectus of NPC

Along with the expand of processing capacity of chemical industry enterprises in surrounding areas, especially the constant development of Yangzhou Chemical Industry Zone(YCIZ), the LCP operation of NPC will continue to develop rapidly.

III. FO operation

Affected by Sinopec’s pipelines along YR, NPC has put forward the idea of strategic transition, that is to change its primary business from CO transit to transit and storage of FO and LCP. Figure 10 shows the operation volume of FO in recent years.

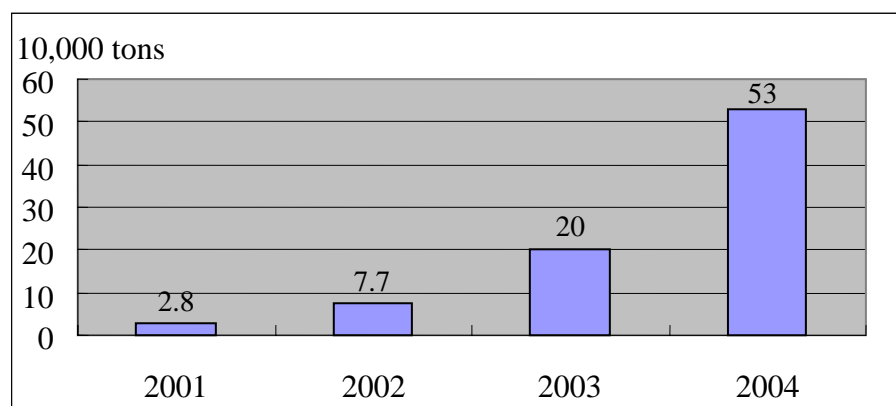


Figure 10 – Operation volume of FO of NPC

Source: Prospectus of NPC

Although FO operation has developed very fast with the growth rate of 165% in 2004, it is still not the primary source of revenue and profit of NPC for lack of relatively large-scale transit and storage facilities. Such insufficient capacity hampers NPC to gain its deserved share in the FO market. With the complete opening of the market, the rapid enlargement of domestic in-use vehicles and development of YCIZ, the transportation demand of FO will continue to surge.

3.2 Factors affecting the development of petrochemical operation

The development of petrochemical operation is effected by many factors. In view of its special operational flow, its important status in NP, taking into account big changes that will take place which will effect NP very negatively, I paid more attention to the environment of this market in the survey.

I. The analysis of factors promoting the operation development

1. External opportunities

Apart from the favorable macro-economic and political environment mentioned in chapter 2, petrochemical market faces its peculiar opportunities.

(1) The opening of FO market

Along with the opening of retail FO market in 2004 and wholesale FO market in

2005, domestic FO market has expanded with exchange volume increases a lot. As a transit and storage enterprise of FO, NPC must can obtain considerable market share.

(2) The increase of transfer volume of industrial chemicals due to double scale of YCFC

As the main support of LCP operation of NPC, YCFC, China's largest production base of modern chemical fiber products and their raw materials, has about 550,000 tons transferred through Yizheng port area annually since 2000, that figure reached over 1 million last year. Its newly approved PTA project which will enhance 1 million tons of production capacity must increase NPC's transfer volume of industrial chemicals to a large extent.

(3) The increase of chemical industry trade volume owing to establishment of YCIZ

Situated in the development zone of national petrochemical industry and adjacent to many large chemical corporations, YCIZ penetrates its service into the petrochemical companies along YR and develops towards comprehensive logistics base with petroleum and chemical products as the dominant cargo resources. It is noncompetitive resource of NPC because the raw materials and finished products of enterprises in the zone must be transported through Yizheng port area. As NPC's important support, it will bring long and stable economic benefits.

2. Competitive advantages of NPC

By communicating with some persons of NPC and analyzing the retrieved questionnaires, I find petrochemical operation possesses some particular advantages

which differ from other operations of NP.

(1) Superiority in bank line resources and infrastructure

Yizheng port area is the best deep water port on the north bank of YR in its lower reaches with a bank line of over 5000 meter which is straight without deposition and aggradation. Along with the increasingly strict control over bank line from the government, deep bank line gradually becomes a kind of irreproducible monopolized resources. Such gift advantage can't be gained by latter competitors.

Owning 13 productive docks, the infrastructure of NPC is incomparable by those downstream companies with only 1 or 2 docks. Nowadays, its hardware facilities and transfer capacity of petrochemical products is top 1 among inland ports. Along with the transfer volume of CO decreases this year, there will be a great surplus of service capacity which leaves for the transfer and storage of LCP and FO.

(2) Superiority in brand

Since 1978, NPC has handled and transferred 360 million tons of CO, LCP and FO safely, efficiently and with high quality for petrochemical corporations along middle and upper reaches of YR. It has accumulated rich experience in port handling and storage. It has also fostered large quantities of talented persons on quality management, operational flow management, safety management and operating management. Neither serious cargo damage or loss nor safety or quality accidents has happened in these years. Its reputation and image in the market are good enough.

(3) Superiority in listed company and capital

Listed company is still a kind of scarce resources in present capital market, its normative management, excellent outstanding accomplishment, prominent image and good public appearance all attract the attention of investors. As a listed company, NPC has entered into a boarder market with wider development space. With stronger market influence, it can participate in investing and being invested to enhance own strength, accelerate structure adjustment and realize further development.

II. The analysis of factors restraining operation development

1. External threats

Apart from industry competition of this market mentioned above, NPC also faces other threats.

(1) Sinopec's adjustment of processing places and transport structure of CO

The six major subsidiaries of Sinopec along YR are major clients of NPC. In the past 20 years', the company has transferred about 350 million tons of CO for Sinopec. However, considering its own benefits and development strategies, Sinopec gradually transfers the oil refineries to coastal areas and adjusts the present flow direction of CO. The projects of Ningbo-Shanghai-Nanjing pipeline, pipelines along YR and Rizhao-Yizheng pipeline will replace traditional water transport of CO needed by refineries along YR with pipeline transportation. Such strategic adjustment will bring serious impact on the operations of NPC.

(2) The increasingly strict requirements of environment protection

The physical and chemical characteristics of CO and LCP determine the high risk of operation. The regions along YR are the production and storage bases for chemical industry. In order to avoid pollution to this river, China has control strictly over the transfer of chemical products in YR. As for the handling and transport of some particular types of products, marine organizations charge high supervision fees which undoubtedly increase the production costs of shippers, so they will probably change to road transport after comparison. Moreover, as lacking in talented people specialized in LCP operation, NPC has to grope its way in the transfer of some products, which increases the operational risk. In case of accidents, there will be huge economic loss and immeasurable social effect.

(3) The self-built wharfs of shippers

Along with the rapid economy development of YRD and opening of FO market, some foreign and domestic enterprises with big scale and strong strength want to enter the production or trade market of FO and LCP. Owing sufficient capital, they are more willing to construct wharfs by themselves. If such situation comes into true and those self-built wharfs can be used as public wharfs, those enterprises become competitors of NPC and have negative effect on the company development.

(4) Affected by construction of Nanjing No. 4 Yangtze River Bridge, the operations of Qixia anchorage are restricted to a large degree.

2. Disadvantages of NPC

As the only listed company in NP, the administration system of NPC is particular, its relatively simplex operational structure and strategic transition it faces have some

effect on its operation development. If the company wants to realize its second achievement under the deathblow of Sinopec's adjustment of transport structure, it is crucial to overcome its own problems.

(1) High centralization of stock option

NPGC now controls 70.45% of NPC's shares. Such absolute holding status and highly centralized stock option will lead to inflexible operational system. The confirm and implementation of all projects must rely on upper guidance, which causes the low work efficiency.

(2) Weakness of employees' sense of crisis

The superiority complex caused by its monopoly operation for more than ten years makes the employees slack. Their responsibility and sense of service are weak.

(3) Brain strain and unbalance of personnel structure

The incompleteness of personnel fostering and excitation mechanism makes the brain strain. As NPC enters the FO and LCP markets, the staff who are used to CO handling and transfer feel unfamiliar with new cargo types and lack corresponding operating experience, whereas the development and cargo consolidation departments of these two markets are also short of relevant personnel. Presently, the proportion of intellectuals is relatively low which is unfavorable to the enhancement of management level.

(4) Low market-related degree

Because of the particularity of petroleum transport and its unique location, for many years, NPC takes the national dictate planning as its goal, pays more attention to the command and dispatch of operating spot. It lacks deep and comprehensive understanding of the whole petrochemical market. In 2004, the monopolized cargoes occupied over 90% of the total throughput whereas the market-related cargoes only accounted for 10%.

(5) The increase of financial risk

NPC has constructed storage tanks on a large scale since 2002 with accumulative investment of about RMB 120 million. If the Sinopec's pipelines along YR go into production as scheduled and NPC can't make breakthrough in the LCP and FO operations, its financial costs will rise with high sink costs.

(6) The unmatched equipments and facilities increase the difficulty of operating

As NPC used to pay attention to dock construction whereas tank construction lagged, its port through capacity reached to 42 million tons/year with a big surplus and the total storage volume is only 256,900 cu.m. The insufficiency of storage capacity reflects as inadequacy of volume and incompleteness of tank types and kinds. Additionally, compared with bulkhead wharfs of downstream ports, NPC's pontoon wharfs restrict its operational volume and type, increasing the difficulty and risk of LCP operating.

3.3 The development trends of petrochemical operation

I. CO operation

Last year, China's CO consumption volume increased by 5%, considering the rapid growth of GDP, industry and energy structure adjustment as well as fast increase of in-use vehicles, it is forecasted its annual growth rate will maintain at a relatively high level and reach 325 million tons in 2010. Presently, the CO output of our country basically keeps at 150 million tons, as China became purely CO import country in 1993, the import volume amounted to 120 million in 2005 with the average annual growth rate over 20%. It is foresaw that the demand for imported CO and CO transfer from petrochemical corporations along YR will rise stably whereas the demand for CO storage will probably increase to lessen the effect resulted from price fluctuation of CO.

However, the substitution of pipeline for water transport has serious effect on the CO operation of NPC. As Sinopec's pipelines along YR go into production this May, huge changes concerning the transportation system of upstream regions of NP will take place, which lead to structure and mode changes of CO operation. It is forecasted that NP will lose 10 million tons of pipeline CO and 5 million tons of sea-to-river CO in 2006 with the missing revenue over RMB 100 million. This year, the production planning of NPC contains about 7.6 million tons of CO, among which 4.15 million are sea-to-river CO and over 1 million are for local refineries. Sinopec only reserves about 1.8 million tons of CO for Yueyang Petrochemical Corporation to be transferred by NP.

II. FO operation

Along with the opening of FO market, its import volume will increase gradually to ensure the supply of petroleum resources. As the national economy develops, the demand for FO from transport industries and agriculture constantly increases. With

the rapid development of domestic automobile industry, FO consumption from individuals grows considerably, which aggravates the conflict between supply and demand of FO resources. The domestic price of FO continually rises and is universally higher than the international price. After China implements zero tariff for imported FO since 2006, FO from foreign countries will enter into domestic market in big volume.

As the most important transfer and storage base of FO along YR, Yizheng port area faces huge development opportunities. As the CO transfer volume reduces, the transit and storage of FO has become major development operation. Nowadays, domestic and foreign traders have all targeted on China's FO market, they flock to negotiate the transfer affairs with NPC and construct storage tanks of FO in the port area. In view of present growth trend, it is forecasted the transfer volume of FO will reach 2 million tons with the throughput of 3.5 million tons in 2010.

III. LCP operation

Along with the implementation of provincial strategies of developing areas along YR, forming of riverside chemical industry belt and the establishment of NCIZ and YCIZ, the transfer and storage volume of LCP in the hinterland of NP will continue to grow, which provides big development space for LCP operation. NPC plans to construct LCP tanks of 162,800 cu.m to eliminate the restriction on operation development caused by insufficient storage capacity. It is forecasted the transfer volume of LCP will be near 4 million tons in 2010.

Chapter 4 The analysis of container cargoes of NP

4.1 The current situation of container operation

Along with the increasingly high degree of containerization and rapid development of container industry, more and more ports attach the most importance to container transport. As the operation of NP which develops fastest this years, the container throughput grows from 400 TEUs in 1986 to 605,000 TEUs in 2005.(See table 6 and figure 11).

Table 6 – Container throughputs of NP

Units: 10,000 TEUs

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TEU	0.04	0.08	0.45	2.4	4.2	5.2	7.3	10.9	12.6	14.9
Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TEU	13.5	13	12.5	15.7	20.3	22.1	30.4	40.5	48.9	60.5

Source: Internal material of NPGC

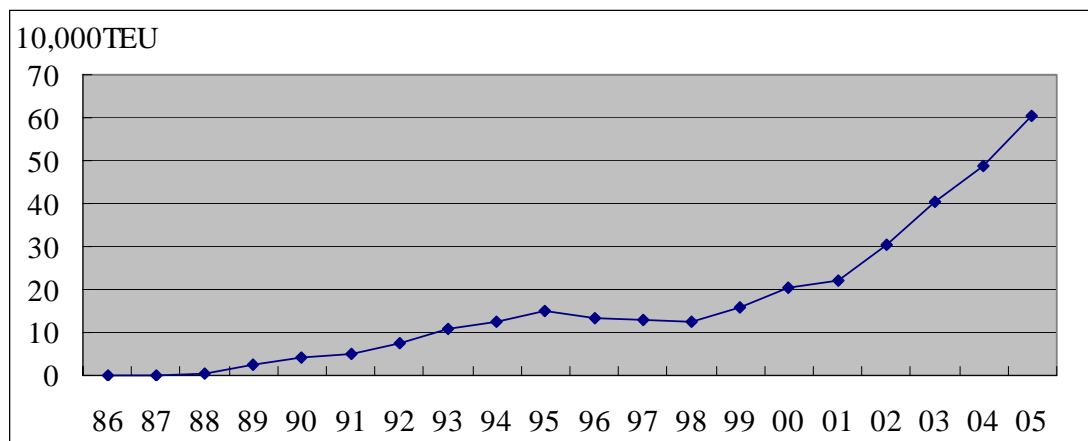


Figure 11 – The trend of container transport of NP

Source: Internal material of NPGC

Last year, NPGC accomplished 260,000 TEUs domestic containers, up 34% and 345,000 TEUs foreign containers, up 15%. As the Longtan Port Project Phase 1 goes into production in May, 2004, the container hardware facilities of NP improved a lot and laid sound foundation for its rapid development.

The container operation of NP was originally mainly operated by Nanjing International Container Terminal Services Co. Ltd. in Xinshengwei port area, a subsidiary of NPGC. It has 3 container berths with the annual through capacity of 150,000 TEUs. With the fast increase of container throughput, this port area has already operated overloadedly in recent years. In order to adapt to the future development, NPGC has strategically adjust the functions and structure of port areas, gradually transfers the container operation to Longtan port area which presently has three berths of 35,000-ton and two berths of 5,000-ton with the through capacity of 520,000 TEUs. Along with the equipment of necessary facilities, technology and using of reserved store yard of container terminal of phase 1, the capacity will reach 1 million TEUs before 2010. After the completion of Longtan Port Project Phase 4, the annual through capacity will amount to 1.25 million TEUs.

NP has a group of high-quality container management and operating staff. The container terminal has established information management system, EDI system and wireless data transport system. Altogether more than 10 domestic and foreign shipping companies have opened up many container lines in NP, including some regular near-sea shipping lines from Nanjing to Southeastern Asian such as Hong Kong, Japan, Korea, Bangkok and Vietnam, over 200 domestic feeder lines monthly

to Shanghai where containers can be transshipped to other places all over the world, and more than 40 regular domestic lines monthly to Guangzhou, Haikou, Shekou, Tianjin, Dalian and so on. NP is the port on the main line of YR which has opened up the most container lines.

4.2 Factors affecting the development of container operation

NP possesses important status in the international and domestic container transport in the YR valley due to its developed transportation network and convenient transshipment conditions. Considering the effect from the macro-economic and political environment as well as national foreign trade situation have been mentioned above, I analyze other factors which have direct influence on the container operation development of NP.

I. The analysis of factors promoting the operation development

1. External opportunities

(1) Shipping structure adjustment in YR valley

As Yangshan Port goes in production, the container transport in YR valley changes from transshipment via Hong Kong or Japan by seagoing vessels to via Shanghai by barges. Located at the intersection of B&C class routes of YR, NP has the qualification to become the important feeder port of Yangshan Port to transship the cargoes from the upstream regions.

(2) Structure change of container ports

Along with the size upward of containerships, only those ports with geographical location predominance could become the trunk hub ports. The build of SISC will rely on those feeder ports to a greater extent, which facilitates the feeder transportation development of NP.

(3) Rapid development of domestic container transport

Due to the big development potential of domestic container transport, the competition to be its pivot port is increasingly fierce. Owing provinces with strong comprehensive economic power as its hinterland, NP has the opportunities to develop such transportation.

2. Advantages of existing container transport resources

(1) Internal resources of NP

① Tangible resources: The situation of hardware facilities, human resources and opening up of container lines have been mentioned in the former section.

② Intangible resources: The scientific development view, innovative operating ideas and fresh sense of service and brand of NPGC must accelerate the container operation development of NP.

(2) External resources of NP

① The supporting city

Supported by developed economy of Jiangsu Province, especially by Nanjing City, NP has expanded its hinterland range due to the convenient transport conditions. The implementation of provincial strategies of developing areas along YR will improve the investment environment of Nanjing City. By virtue of preferential policies as well as improved hard and soft environment, the economic development zones in Nanjing and Longtan Logistics Park have attracted and will attract domestic and foreign enterprises to set up factories, carry out export processing and comprehensive logistics services in the zones. The existing four national and five provincial development zones have become important bases of local technology industry and production and processing bases of multinational companies, providing considerable container cargoes for NP. Moreover, the approved bonded logistics center not only can supply Longtan port with stable and big volume of container cargoes, also can expand its service functions to enhance competitiveness through district-port linking.

② The attracted hinterland

The economy of NP's hinterland is developed with high degree of export-oriented. Apart from the direct hinterland——Nanjing City and Chuzhou City of Anhui Province can provide stable container cargoes, NP also has spacious indirect hinterland connected by road, railway and inland water networks, which can be divided into five major regions as follows: Anhui Province; economic regions in YR valley; western Jiangsu Province including Zhenjiang, Yangzhou, Xuzhou, etc.; partial areas of Shandong and Anhui Provinces along the Tianjin-Pukou Railway and partial areas of Shanxi, Henan and Anhui Provinces along Xining-Nanjing Railway. Additionally, Lukou International Airport of Nanjing can attract some containers with top grade or urgently needed goods.

II. The analysis of factors restraining operation development

1. External threats

(1) The competition between surrounding ports to scramble for container cargoes
Confronted with the structure change of foreign trade container transport in YR valley, the competition between NP and surrounding ports is increasingly fierce. Some medium and small ports such as Yangzhou and Wuhu have carried out handling of container feeder barges which are originally operated in NP, shunting its container volume and affecting the container operation.(More details in chapter 3.)

(2) The competition between local land and water container transport

The widened Shanghai-Nanjing Highway speeds up the road container transport between these two cities. Compared with water transport, road transport is quicker and more convenient, it is more attractive to those foreign trade goods with high time requirements. Moreover, direct scheduled trains also ran between Shanghai and Nanjing with the advantages of fast, punctual and unaffected by weather conditions. However, due to the high cost and small carrying volume of land container transport, its influence on the container operation development of NP is relatively limited.

2. Disadvantages of NP

(1) Single service function of port container operation

(2) Low reputation among foreign shippers

- (3) Lack of modern management measures and high-level management persons who will adapt to future development
- (4) Unmatched hard and soft technology of Longtan port area, such as incomplete port environment and unconnected port railways

4.3 The development trend of container operation and throughput forecast

4.3.1 The development trend of container operation

Recently, revolving around the build of SISC, NP positions its container operation to serve the Shanghai Port-centered international container transport system of YRD, mainly develops domestic feeder transportation and enhances its service quality, also develops domestic trade transportation and near-sea shipping. Based on this position, the development trend and major functions of container operation of NP are:

1. It is the domestic feeder pivot of foreign trade transportation in Shanghai Port-centered YR valley.
2. It is the transshipment trunk pivot of near-sea cargoes from Nanjing and upstream regions.
3. It is the main domestic trade pivot which connects the middle and upper reaches of YR with coastal regions of southern China.

4.3.2 Forecast of container throughput

Based on the historical development trend of container transport, I analyze the distribution, the volume and flow direction of container cargo resources as well as their development situation to forecast the container throughput of NP in 2010.

I. Forecast of foreign trade container throughput of NP

Table 7 – Volume and source of container cargoes of NP in the first half of 2004

Major regions of port hinterland	Nanjing& Chuzhou	Regions in Anhui Province	Regions in YR valley	Western Jiangsu Province	Regions along Tianjin-Pukou Railway	Regions along Xining-Nanjing Railway
The proportion of volume(%)	50	33	2	15	About 1000TEUs	
Collective and distributive transportation modes	Road	Road& water	Water	Road	Railway	

Source: Internal material of NPGC

As is shown in table 7, the foreign trade containers are primarily from Nanjing, Anhui and other regions in YR valley. Therefore I divide the forecast into following two parts. All the forecast is in an optimistic scenario.

1. Forecast of foreign trade container throughput of Nanjing City

(1) Forecast of gross foreign trade value of Nanjing City

By analyzing the local foreign trade situation in the past three years, I find the gross value increased at an extra-high annual growth rate of 45.7%, 40.3% and 31.3% respectively, reached USD 27.09 billion in 2005, among which gross export value was USD 14.25 billion, up 36.2% and gross import value was USD 12.85 billion, up

26.2%. Although foreign trade develops very fast recently, the increase rate gradually slows down. However, along with the promotion of projects which attract foreign investment, implementation of development planning along YR and construction of large quantities of key projects in the future five years, the foreign trade value of Nanjing City will keep growing at a relatively high rate. Referring to the national and local forecast of foreign trade situation in near future, I conservatively believe the annual growth rate of gross foreign trade value of Nanjing City would maintain at about 20% till 2010. Therefore, the value will amount to about USD 67.4 billion in 2010, including USD 31.9 billion for import and USD 35.5 billion for export.

(2) Forecast of foreign trade container throughput of Nanjing City

According to the statistics from Nanjing Customs, the local containerizable rates of foreign trade cargoes are 93% for export and 82% for import in 2005. The export of mechanical, electrical and high-tech products occupied 91.2% of the total export of Nanjing City. As the government intensifies investment attraction, the export of industrial finished goods and products with high-added value will further increase, which leads to the rise of containerizable cargoes rate. With the popularity of door-to-door transportation, increasingly more cargoes will be transported by containers. Based on the change trend of recent years, I forecast in 2010 the local rates of containerizable cargoes are 85% for import and 95% for export, the corresponding containerized rates of these cargoes are 73% and 85%, the average weight of heavy boxes will rise by 2% for import and 1% for export annually and other parameters are vaguely regarded as unchanged. (See table 8.)

Table 8 – The calculation parameters of foreign trade container productions of Nanjing City

Parameters	2005 actual		2010 forecast	
	Import	Export	Import	Export
Rate of containerizable cargoes(%)	82	93	85	95
Containerized rate of containerizable cargoes(%)	68	82	73	85
Generative weight of unit production value(ton/USD10,000)	4.1	3.8	4.1	3.8
Average weight of heavy boxes (ton)	7.2	9.5	8	10
Rate of empty boxes(%)	25	6.3	25	6.3

Combining the parameter analysis of foreign trade container productions of Nanjing City with forecast of foreign trade value, it is forecasted Nanjing City will generate about 1.8 million TEUs foreign trade containers in 2010, among which 0.8 million TEUs are import containers and 1 million TEUs are export ones.

Nowadays, about 35% of the locally generative foreign trade containers are transported via NP, considering the improved container transport conditions with the production of Longtan Project Phase 1 and the construction of logistics base and bonded logistics center in the rear of port area, the proportion of these containers which are transported by water to Shanghai for transshipment will rise to a great extent. It is forecasted this proportion will be around 45% in 2010, that is to say the foreign trade container throughput of Nanjing City will reach 0.8 million TEUs.

2. Forecast of foreign trade container throughput of other regions in the hinterland

(1) Forecast of foreign trade container productions of other regions in the hinterland

With the implementation of development strategies along YR of Jiangsu Province, strategies of economy development in middle China and strategies to develop

economic belt along YR, the economy and container volumes of Jiangsu, Anhui and other provinces and cities in YR valley will all develop rapidly. Moreover, according to the plan of Railway Ministry, China will pay more attention to the railway container transport in the future to facilitate the prosperity of economic zones along the railways. Therefore, the provinces along Xining-Nanjing, Tianjin-Pukou, Nanjing-Hangzhou and YR-side Railways will generate big volume of containers.

Based on the statistics analysis of past years, I roughly forecast the foreign trade container productions of major provinces in YR valley supposing they will maintain their average annual growth rate of container generation till 2010. The figure of Chongqing can't be calculated for lack of statistics. However, with the formally storage of Three Gorge Dam, the shipping conditions of middle and upper reaches of YR have been radically improved, Chongqing, Chengdu and their hinterland will form the third economic delta in China, thus accelerating the increase of container productions. Referring to statistics of other provinces, I estimate the average annual growth rate of Chongqing City is about 17%. Table 9 shows the forecast result.

Table 9 – Forecast of foreign trade container productions of major regions in YR valley

Units: 10,000 TEUs

Regions (provinces or cities)	Actual			Average annual growth rate	2010 forecast
	2000	2001	2003		
Jiangsu	154.7	178.8	274.1	21%	1040.7
Anhui	15.9	19.4	24.8	16%	70.1
Jiangxi	7.1	8.2	11	15%	29.2
Hubei	11.1	11.8	16.3	14%	40.8
Hunan	10.4	10.9	16	15%	42.6
Chongqing	—	—	20.5	17%	61.5
Sichuan	9.4	10.5	13.5	13%	31.8

(2) Forecast of foreign trade container throughput of other regions in the hinterland

As for Jiangsu Province, 61% of the foreign import containerizable cargoes are imported via local ports, 38.2% via Shanghai port; whereas for foreign export containerizable cargoes, the corresponding proportions are 29.4% and 67.7%. The volume and flow direction of foreign trade containerizable cargoes of major regions in YR valley are shown in table 10.

Table 10 – The volume and flow direction of foreign trade containerizable cargoes of major regions in YR valley

Regions	Nanjing Customs (%)	Shanghai Customs (%)	Local Customs (%)	Others (%)
Anhui	17.05	48.55	26.15	8.35
Jiangxi	14.6	9.55	21.05	54.8
Hubei	3.35	29.1	47.15	20.35
Hunan	2.35	17.25	40.15	40.35
Chongqing	1.9	18.2	62.65	17.3
Sichuan	4	23.35	47.4	25.25

Source: Internal material of NPGC

With the completion of Yangshan port construction, a majority of inland container barges can't call that port directly due to the route and ship grade. By virtue of its location, port facilities and collective and distributive transport conditions, NP becomes the optimal transshipment base of upstream containers. Moreover, as the cooperative partner of Longtan Container Terminals Ltd., Shanghai Port Container Co. Ltd. certainly will lead the containers of its other partners, i.e. ports along middle and upper reaches of YR, to be transshipped via NP. As the Beijing-Shanghai express railway, railways along YR, Xining-Nanjing and Nanjing-Hangzhou Railways with multiple tracks go into production, the transportation conditions of NP will improve, which will attract more transshipment container cargoes. Therefore, considering

above factors, I think the proportion of foreign trade containers from major provinces in YR valley which are transshipped via NP will rise by 50% in 2010.

When calculating the throughput, as the containers of Anhui Province mostly enter port by road or railway transportation, the throughput equals to the transshipment volume, whereas containers of other provinces along YR are mainly transported by waterway, this part of throughputs are doubled transshipment volumes. Table 11 shows the forecast results of transshipment volumes and throughputs from those provinces in 2010.

Table 11 – Transshipment volumes of foreign trade containers from major provinces in YR valley via NP and corresponding throughputs in 2010

Units: 10,000TEUs

Regions	Forecasted container productions	Forecasted transshipment proportions via NP (current proportion * 1.5)	Transshipment volumes via NP	Throughputs
Anhui	70.1	25.58%	17.9	17.9
Jiangxi	29.2	21.90%	6.4	12.8
Hubei	40.8	5.03%	2.1	4.1
Hunan	42.6	3.53%	1.5	3.0
Chongqing	61.5	2.85%	1.8	3.5
Sichuan	31.8	6.00%	1.9	3.8
Total	276			45.1

Due to imbalance of heavy and empty boxes of NP's container import and export, I estimate the proportion of empty allocation is 5%, thus it can be forecasted the foreign trade container throughput of NP will amount to about 1.3 million TEUs $((0.8+0.451) * 1.05\%)$ in 2010. As per statistics of recent years, nearly 35% of the foreign trade containers of NP are for international lines whereas 65% are for domestic feeder lines. Considering these proportions maintain relatively stable, I

suppose they are roughly unchanged till 2010, then the international containers of NP are 0.46 million TEUs and domestic feeder containers are 0.84 million TEUs.

II. Forecast of domestic trade container throughput of NP

Along with the worldwide rapid development of container industry, China's domestic trade container transport develops very fast in recent years. The domestic trade container throughput of NP grows from 68,000 TEUs in 2000 to 260,000 TEUs in 2005, with the ultrahigh average annual growth rate of 30.8%. Considering the possible fluctuation and imbalance in the economy development as well as leaving some leeway to the forecasted results, I estimate the container throughput of domestic trade will rise by 20% to 25% annually till 2010. Therefore, it is forecasted the domestic trade container throughput of NP will reach about 0.7 million TEUs with the assumed annual growth rate of 22%.

In sum, it is forecasted the container throughput of NP will be 2 million TEUs in 2010, among which 0.46 million are for international lines, 0.84 million for domestic feeder lines and 0.7 million for domestic trade lines.

Chapter 5 The strategic development countermeasures of NP

5.1 The strategic development positioning and overall goal of NP

5.1.1 The strategic positioning and overall goal

After entering new century, NP faces development opportunities from three aspects: firstly, provincial and local development along YR and development of modern service industry; secondly, national construction of ports in YRD; thirdly, large-scale development in western China.

Nanjing City establishes the positioning of five centers, those are international shipping logistics center along YR, advanced manufacture center in YRD, provincial modern service center, important national educational center and afforested center in eastern cities. In order to be the international shipping logistics center along YR, it is necessary to construct NP to be top 1 pivot port in this valley to serve the whole province and the whole valley.

City, regional and valley development, even the development of middle and western regions all provide spacious development room for NP and also bring forward new and higher requirements for its development. Based on the status and role of NP in the economy development of region and the whole YR valley, NPGC has established the strategic positioning of one pivot port, two centers and three logistics bases,

which is according to strategic deploy of provincial and local development along YR as well as the requirements of its own operations development. The overall goal of NP is to base itself on Nanjing region and YR valley, face the world, aim to be a modern and multi-functional sea-river pivot port; an assistant hub responding to SISC and a port economic center in the implementation of development strategies along YR; also attach more importance to the construction of container logistics base supported by Longtan port area, the energy and chemical cargoes logistics base supported by port areas on north bank of YR and foreign trade cargoes transfer base supported by Xinchengwei port area.⁵

5.1.2 The development ideas of major cargoes

Based on the change of major cargoes in recent years, NPGC forms its development ideas of cargoes revolving around the strategic positioning and overall goal of NP.

1. NPGC would put the most emphasis on the container operation development by taking Nanjing City and Nanjing region as the core, middle and upper reaches of YR as the main route, Tianjin-Pukou, Xining-Nanjing and Nanjing-Tongling Railways as the wings and highways as the radiate networks. Apart from responding to and receiving radiation from SISC, it should also bring its own advantages into full play and extend upstream.
2. NPGC would accelerate the development of foreign trade metallic ore, steel and grain transport.

⁵ Ma Xuefu. (2004, February). The discussion of development strategies of ports. Nanjing Port, (2), 2-3.

3. NPGC would exert itself to build the featured brand of commercial vehicles.
4. NPGC would stabilize its coal and CO operations, develop LCP operation with great exertion.

According to different development positioning and goals, I sum up corresponding strategic countermeasures of two major cargoes of NP in the following sections based on the analysis in the former chapters.

5.2 The strategic countermeasures based on the change of petrochemical cargoes

The change of petrochemical cargoes is the biggest problem confronting NP this year. The Sinopec's adjustment of CO transport structure brings considerably negative effect on the throughput and profit of the whole port. Therefore, how to adopt measures actively to realize the second achievement of NPC is the most important issue to resolve.

In 2005, in the light of construction of Sinopec's pipelines along YR, NPGC and NPC jointly intensified the external cooperation. Firstly, by friendly negotiation with Sinopec, Sinopec promised to take NP as its only CO transfer port in the lower reaches of YR to transfer the sea-to-river CO needed by its subsidiaries along YR, also it will support NP to develop the storage and transit of LCP. Secondly, they have signed agreement with Sinochem to found Yangzhou Sinochem Port Co. Ltd. which engages in transfer, storage and distribution of FO. Thirdly, they cooperated actively with YCIZ to support its investment attraction by low logistics costs and superior geographical location.

Since 2006, as Sinopec's pipelines go into production, NPC will enter into a difficult period of operational transition. As an important constituting part of energy and chemical cargoes base of NP, NPC must formulate effective strategic countermeasures to support the comprehensive development of NP.

1. Keep on grasping CO transfer and provide high-quality service

NPC should continuously grasp the handling and transfer of pipeline CO and sea-to-river CO, especially should pay more attention to the transfer between first carriers and local refineries. Meanwhile, it should organize the existing carrying capacity scientifically to enhance the transfer efficiency and service quality.

2. Further intensify the adjustment of operational structure

NPC has continuously adjusted its operational range to adapt to the strategic transition. As it is crucial to the existence and development of the company, NPC should make best use of its present resources to accelerate such adjustment. It should, firstly aim at large-scale chemical industry zones in Nanjing City and surrounding areas, large chemical companies and petrochemical corporations along middle and upper reaches of YR, find out their requirements and serve voluntarily; secondly expand operational field, actively open up new type of handling cargoes, foster new clients to enlarge the scale of LCP and FO operations. Meanwhile, reinforcing the connection between old clients and shaping company's brand image are also important; thirdly follow up new projects entering chemical industry zones and old projects of expanding production or capability, also should improve necessary port service for NCIZ and YCIZ; fourthly pay attention to internal adjustment, including leaders management, allocation of market development personnel, department set-up

and operational system to suit the requirements of LCP and FO operations development; fifthly intensify the infrastructure construction and technology reform, speed up the construction of storage tanks and adjust the functions of tank areas to adapt to the entry of LCP and FO markets.

3. Grab the bank line resources to restrain the construction of new wharfs

Nowadays, deep bank lines are invaluable scarce resources. There is about 1.1 km unutilized deep bank lines downstream the company on which YCIZ plans to build wharfs. NPC should take on or participate in the exploitation of this section by proper means in due course to avoid self-building wharfs by other enterprises as well as prevent YCIZ from cooperating with others after construction of wharfs.

4. Participate in national plan of strategic petroleum reserve

Due to instability of international oil price, China decides to establish strategic petroleum reserve bases to evade the risk of oil price-hike. Considering the four oil depots of national planning phase 1 are all located in costal regions and adjacent to ports or connected with ports by pipelines, it's necessary to build national strategic petroleum reserve depots along YR. Sinopec now has definitely declared to actively support NP build oil depot in Yizheng. Therefore by virtue of such support and many internal as well as external advantages of NPC, it's very possible for this depot to be located in Yizheng with the company as the main body or passage.

5. Prepare to build bonded zone of FO in port area

As a special economic zone where tariff is exempted and cargoes can freely pass in

and out, bonded zone has considerable attraction for those FO import enterprises by relatively low cost and simplified import procedures. As the presently owned port facilities and storage volume of Yizheng port area basically conform to the new national regulations of FO import, NPC has the capability to build bonded zone.

6. Strengthen external cooperation by making use of port advantages

Joint venture and cooperation are important means of structure adjustment. NPC should aim at large enterprises and bring in big projects. By overall planning, it should make best use of its resources, compare and select scientifically to establish win-win and stable cooperation relationship. Presently, NPC should push the implementation of cooperative projects with Sinochem and strengthen the cooperation between China National Petroleum Corporation.

5.3 The strategic countermeasures based on the change of container cargoes

According to the operational development strategies of NPGC, container transport development is the most important, the company should exert itself to realize its leap-forward development. NPGC has formulated the short-term development ideas of container transport of NP till 2010 that based on domestic feeder transport, develop near-sea shipping transport and duly open up main line transport.

Confronted with fierce competition among container ports in YR valley, NPGC has adopted a series of marketing measures to actively participate in such competition and has obtained good results.

1. Establish service bra

In order to maintain and increase its market share, NPGC adopted brand strategy that cooperating with Sinotrans Jiangsu Co. Ltd., agents and other port enterprises to create the brand of sunnyexpress to improve the service environment of two foreign trade direct lines from Nanjing to Japan and South Korea. It can provide fast, safe, accurate, cost-saving, convenient and satisfying freight transport service by enhanced service quality, simplified procedures, improved efficiency and lowered cost. It soon established good image and obtained high reputation in the market.

2. Price competition

NPGC has took flexible price mechanism to adapt to the market change. For instance, as for containers from Anhui regions, it lengthened the lading and unlading time and reasonably remitted relevant miscellaneous charges. In view of the situation that large quantities of empty boxes are transported by container trucks from Shanghai to Nanjing, NPGC readjusted its unlading charges of barge and road transport to lead containers develop towards large-scale water transport. Moreover, it resolved the procedure problems of Customs transfer and formulated favorable policies to attract more transshipment containers upstream.

3. Integrate water transport links

NPGC has adopted many measures to integrate the water transport links to reduce costs such as increasing barge frequency to provide more choices for shippers, increasing direct sailings to Shanghai to accelerate the export speed of cargoes and enlarging barges to reduce unit cost of container transport to attract more cargoes.

According to the functional positioning of container operation, NPGC should also

carry out the following measures apart from strict implementing the above ones.

1. Make further efforts to open up lines

Shipping companies has the most important status and role in container transport. NPGC should take full advantage of its cooperation with Shanghai Port and Cosco to reinforce collaboration and communication with shipping companies to open up more near-sea shipping lines, domestic feeder lines and domestic trade lines, increase their frequency and expand the radiation of lines. Meanwhile, it should build close connection with other transportation modes in the hinterland to further develop multimodal transportation, especially the railway-water container transport.

2. Reinforce market development and cargo consolidation

Firstly, NPGC should select talented people to join the group of market development and cargo consolidation, whereas continuously enhancing the corresponding capability of existing personnel. Secondly, as for the direction of market development, it should stabilize the cargoes supply of surrounding areas, especially those of three major development zones, aim at big traders and grasp big projects. Thirdly, regarding the manner of market development, it should publicize promoting effect of ports on cities' prosperity, enable the government to pay sufficient attention to port development and actually participate in the infrastructure construction and port departments completion. Additionally, it should make use of media, commercial or charitable activities to enhance its reputation and create the market.

3. Form competitive price mechanism

On the basis of adapted price competitive measures, NPGC should formulate supporting policies for newly opened lines and favorable policies for handling, transfer and positioning of empty containers to become the allocation base of empty boxes upstream. It should also actively strive for beneficial policies from provincial and municipal governments to facilitate its container operation development.

4. Accelerate the connection with Longtan bonded logistics center

NPGC should optimize the operating procedures between port area and bonded center to realize the benefits of district-port linking. It should make use of policies of bonded center and logistics base to enlarge container transfer business in surrounding and upstream regions to increase container throughput. Moreover, it should further link with other national and provincial development zones and large local enterprises to enhance its service functions and service level of container operation.

5. Develop new technology

In order to realize further development in market competition, NPGC should take full advantage of information technology and perfect the application of EDI system to share data among port enterprises, shipping companies, agents, Customs and clients. Thus, the port becomes the information center of container transport, its service quality, operational efficiency and through capacity under existing hardware facilities are all enhanced.

6. Elaborately organize production

In order to stabilize and attract more cargoes, superior hardware conditions are

absolutely necessary, however, efficient production and high-quality service are the success trumps. Therefore, NPGC should intensify scientific allocation, enhance operational efficiency, improve service quality of port handling to ensure punctuality of sailings, also should reasonably arrange berths and back-up yard, timely fit out equipments to ensure safe production.

5.4 Development countermeasures of other aspects of NP

Other than seeking development from operational measures of major cargoes, it's very important for NPGC to perfect other auxiliary operations and strengthen its internal management.

1. Develop port relevant industries and operations

Port relevant industries and operations are indispensable important constituting part of port economy, support and supplement the major port operations. Developing such industries is significant for NPGC to enhance economic strength, optimize operational structure, avoid market risk and establish harmonious port. As for port equipments manufacture, port equipment factory should reinforce market research, carry out market segmentation, aim at target markets, intensify market development, adopt modern marketing mix tactics to increase its realistic market share and reserved share of potential market. It should strengthen the research and development power of products and constantly increase their technology content to make good technical preparation for further development. Furthermore, NPGC should also make great efforts to develop tug and barge transport, tally and inspection.

2. Pay attention to the development and management of human resources

NPGC should intensify the overall planning and macro-control of human resources, innovate mechanism and strengthen personnel management and training. It is very important to foster a group of management and production talented people to increase enterprise's development momentum.

3. Strengthen internal management

Internal management of enterprises is the inherent basis of market competitiveness. NPGC should strengthen its safety quality management, financial management, operational and business management, equipments and facilities management as well as audit supervision to ensure stable development of NP.

Chapter 6 Conclusion

This research paper is exclusive and particular. Applying the PEST analysis and Michael E. Porter's Five Forces Model, I start from analyzing external macro and industry environment of NP and sum up the development opportunities and describe its competition environment. When analyzing the competitors of NP, I compare them in terms of different cargoes in order to clearly find out its positioning in the whole industry. Then combining with my survey in NPGC, I elaborate on the current situation, competitive advantages and existing problems of NP. This part of analysis is based on the questionnaires investigation of 100 employees in NPGC and has solid factual foundation.

In the subsequent two chapters, I detailedly analyze the current situation, affecting factors and development trends of two major cargoes of NP, those are petrochemical cargoes and containers. This part is crucial for me to make clear the direction of port development in order to formulate corresponding strategic countermeasures.

At the end of my paper, based on the strategic development positioning and overall goals of NP, then referring to NPGC's development ideas concerning cargoes, I sum up the strategic development countermeasures from the view of different cargoes.

1. Petrochemical operation: NPGC should exert itself to realize the second achievement of NPC.

As Sinopec's pipelines along YR go into production in 2006, NPC should further intensify the operational structure adjustment, make great efforts to develop LCP operation whereas maintain CO transfer, also should grab the nearby bank line resources, participate in national plan of strategic petroleum reserve, prepare to build bonded zone of FO and strengthen external cooperation.

2. Container operation: NPGC should exert itself to realize leap-forward development of container operation.

Container operation development is the most important task of NPGC. In accordance with its functional positioning, the strategic development countermeasures are making further efforts to open up lines, reinforcing market development and cargo consolidation, forming competitive price mechanism, accelerating the connection with Longtan bonded logistics center, elaborately organizing production and making full use of information technology to enhance the service level and efficiency of the whole port.

As for other auxiliary port operations and internal management of NPGC, I also bring forward corresponding countermeasures to ensure the stable development of major port operations.

The purpose of this paper is to discuss the way of operational development of NPGC in present fierce market competition. I hope it could have some significance for the decision-making layer of NPGC and also give reference to port enterprises when making strategic decisions.

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Appendix 1 Questionnaires

Elements	Advantage or not (✓ or ✗)	Rank
1. Geographical location: the distance from the international main routes, collective and distributive transport conditions, etc.		
2. Natural conditions: depth of route, conditions of bank line, weather effect on the port operations, spacious degree of water area, etc.		
3. Hardware facilities and equipments: the capability of handling equipments(advanced level and quantity), the capability of storage facilities(warehouses and yards, the depth of land-based area and development margin), efficiency of equipments, sufficient degree of facilities' capacity(number of berths and water depth), etc.		
4. The supporting city: its celebrity rating, attraction to the foreign investment, development level of shipping, financial and insurance, communication, logistics and processing industries, importance attached by local government, etc.		
5. The range, economic situation and development trend of hinterland: national economy and foreign trade, development planning of transportation, the layout and scale of inland depot, the national policies about regional development, etc.		
6. Soft environment of port: speed of customer clearance and exchange settlement, etc.		
7. Operating mechanism and management level: cooperation with other enterprises, diversification of operations, management efficiency, ability of operational personnel, information degree, etc.		
8. Service quality: the appraisal from shipping companies, shippers, other clients and partners, punctuality of ships and vehicles, the service concept and innovative consciousness of employees, efficiency of port operations, the crowded degree of port, cargo damage rate, etc.		
9. Port charges: the convenience, rationality and transparency degree of charge items		
10. Brand advantage		
11. Capital advantage: the ability to attract external investment		
12. Listed company advantage		

Elements	Weakness or not (✓ or ✗)	Rank
1. Deficiency of reform and innovation, slow reaction to the market		
2. Disparity in service quality, insufficient sense of hardship		
3. Inadequate mold and consolidation of enterprise culture		
4. Brain drain, unbalance of structure and not high management level		
5. Being in the initial phase of administration system reform		
6. Insufficient port infrastructure capability		
7. Deficient specialization degree		
8. Deficient information degree		
9. Low market-related degree and inadequate understanding of market operation		
10. Insufficient acknowledge of status of NP by Nanjing government		
11. Incompleteness of river bank economy of Nanjing: the guidance ideas to develop river bank industries are indefinite		