

Reconstruction of the International Logistics Network and Port Strategy of the Yangtze River Delta Region in China

Zhang Jixun

Josai University

Abstract

The Chinese economy is growing rapidly in the Yangtze River Delta Region. The government is trying to construct a new logistics network through port consolidation. This article will look at the economic development and transportation system of the YRDR and consider its current state and future impact on the surrounding region and throughout Asia.

Key Words: Port Strategy, Yangtze River Delta, new logistics network, Shanghai Yangshan International Deep Water Port

International sea transport appears to be centered in China when one looks at aspects such as regular sea routes. Due to the remarkable growth of container turnover volume in China on the Asia-North America sea route (the world's most important sea route in 2004), the sea transport of China including Hong Kong made up 68% of the total volume in the east route and 44% in the west route. China is gradually changing from the "world's factory" to the "world's logistics center". Container turnover volume in China made up 14.3% of the world's total in 2003 and that of Hong Kong made up 7.1%, while Japan's turnover volume was only 5.1%. China including Hong Kong ranks No. 1 in the world's container turnover volume.

The Chinese economy is experiencing rapid growth, especially in the Yangtze River Delta Region. Together with personnel and capital flow, material transport is also on the rise and is growing on a very large scale. In order to promote personnel and material flow, the Chinese government has changed its attitude toward the transportation industry and has repositioned the industry as a resource. The government is trying to reconstruct a new logistics network through consolidation, among which port construction and consolidation is a crucial part. Therefore, this article will first discuss the economic development and status of transportation in the Yangtze River Delta Region and explain its features and current issues. Then, this article will focus on the world-renowned Shanghai Yangshan International Deep Water Port, explaining the port construction situation in the Yangtze River Delta Region and the impact of port development on the surrounding regions and other Asian countries.

1. Economic Development & Transportation Status in the Yangtze River Delta Region and its Future Trends

1) *The “Two Advances” of Economic Development in the Yangtze River Delta Region*

The Chinese government set up a target at the 16th National People’s Congress for increasing GDP by a multiple of three by the year 2020. China’s GDP was USD 1 trillion in 2000 and is expected to reach USD 4 trillion by 2020, the same as Japan’s current GDP level. Under this framework, the Yangtze River Delta Region will make 2 advances. The first target is to increase its regional GDP by three times in 2010, ahead of other regions in China, so the region will reach a level of high prosperity. The second target is to achieve modernization by 2020, ahead of other regions. Progress toward the first target is being carried out smoothly, even better than expected. It is reported by Xinhua News Agency that the GDP in 16 cities in the Yangtze River Delta Region reached almost RMB 4 trillion in 2006, RMB 556.3 billion higher than in 2005, according to the Yangtze River Delta Research Center of the Jiangsu Statistics Bureau. China’s GDP reached RMB 20,940.7 billion in 2006, and the Yangtze River Delta Region contributed 18.9% to the total number. The average growth rate in the 16 cities in the region was 14.2%, compared to the average growth rate of 10.7% in China.

Among the 16 cities in the Yangtze River Delta Region, Shanghai was the first city with a GDP that exceeded RMB 1 trillion. The GDP of the 8 cities in Jiangsu Province was RMB 1.7 trillion, and that of the 7 cities in Zhejiang Province was RMB 1.1 trillion.

2) *The State of Transportation in the Yangtze River Delta Region*

Personnel and material flow are among the main reasons for the Yangtze River Delta Region to achieve such a high growth rate.

Table 1 shows that the mileage of railways, highways, river routes, and civil airlines all increased significantly in 2005 compared with 1990 levels. Considering the development of passenger transportation and cargo transportation, Table 2 shows that the passenger transportation volume in the Yangtze River Delta Region was 3,144 million persons in 2005, about 17% of total volume in China and 2.1 times that in the Zhujiang Delta Region. In addition, the cargo transportation volume in the Yangtze River Delta Region was 370.59 million tons in 2005, about 15% of that in China and 2.6 times of that in Zhujiang Delta. The passenger and cargo transportation volume in the Yangtze River Delta Region is in line with its GDP level. Therefore, economic development appears to generate more personnel flow and material flow, and these in turn promote economic development.

Table 1 Current Transportation Status in China

Item	Unit	1990	1995	2000	2004	2005
Railway mileage	10,000 km	5.8	6.2	6.9	7.4	7.5
Highway mileage	10,000 km	102.8	115.7	140.3	187.1	193.1
River route mileage	10,000 km	10.9	11.1	11.9	12.3	12.3
Civil airline mileage	10,000 km	50.7	112.9	150.3	204.9	199.9

Source: p. 151, *China Statistics Brief, 2006*, written by the National Bureau of Statistics

Table 2 Passenger and cargo transportation volume (2005)

Region	Passenger transportation volume			Cargo transportation volume				
	(10,000 persons)	railway	highway	water way	(10,000 tons)	railway	highway	water way
Whole country	1,847,018	115,583	1,697,381	20,227	1,862,066	269,296	1,341,778	219,648
Shanghai	8,230	4,558	2,468	1,204	68,671	1,313	32,684	34,674
Jiangsu	146,293	7,969	138,287	37	111,988	6,410	76,301	29,277
Zhejiang	159,877	5,145	152,222	2,510	126,400	3,184	81,448	41,768
Guangdong	148,714	7,718	139,158	1,838	119,099	7,816	84,861	26,422

Source: Same as Table 1, p. 154 and p. 156.

3) *The Yangtze River Delta Region's blueprint for transportation consolidation*

In March of 2005, the Chinese Ministry of Communication issued the Outline of Highway and Waterway Development for the Yangtze River Delta Region. The Outline is very important because it is based on research of the status of social, economic, and transportation considerations in the Yangtze River Delta Region, and it introduces a new overall transportation solution concept that focuses on the consolidation of resources. The Outline gives a detailed plan for transportation development in the region.

Since Shanghai is expected to be the international shipping center, the Outline describes the plan for the Shanghai International Shipping Center container transportation system. The system is centered in Shanghai and has two wings in Ningbo Port in Zhejiang Province and Suzhou Port in Jiangsu Province, along with other ports along the Yangtze River to the east of Nanjing. At the same time, a cargo transportation system will be built to transport cargo from Shanghai to other regions through waterways along the Yangtze River, fully utilizing deep-water port facilities in Ningbo and Zhoushan and other resources along the Yangtze River, such as Nanjing. Thus, the container turnover volume in Shanghai is expected to increase to 24 million TEU by 2010 (from 14.55 million TEU in 2004) and reach 37 million TEU by 2020.

Consolidation and integration is the main theme in the Outline, which proposes the following measures for the construction of key ports. Firstly, the construction of a container transportation system centered in Shanghai with two wings in Ningbo, Zhejiang Province and Suzhou, Jiangsu Province is discussed. Sub-ports are planned to be built in Lianyungang, Nantong, Zhenjiang and Wenzhou, together with other supporting ports as well. The Outline also emphasizes the government's strategic goal to build the Shanghai International Shipping Center.

Secondly, because of the construction status of key ports, there is not enough interaction between transportation activities in the different areas of the Yangtze River Delta Region. In addition, there is no information sharing, resulting in low efficiency. How to connect downtown railway stations, bus stations, and ports has been an unsolved problem for a long time. Repeated loading and unloading results in higher costs and longer transportation times and has brought added burden to city transportation systems. Since roads and railways are managed by different authorities, there are lots of repetitive investments. In addition, because highways and urban public transportation systems are managed separately, passengers are inconvenienced. There are almost no direct links between highways, railway stations, and river ports.

Cargo shipments are often sent to container warehouses located close to ports and encased. There is no door-to-door service. In order to solve these problems, the Outline has made detailed plans for key ports. According to the Outline, a focus will be put on the construction of 7 key national ports, including Shanghai, Nanjing, Hangzhou, Ningbo, Wenzhou, Xuzhou, and Lianyungang. At the same time, 12 regional ports will be consolidated, including Suzhou, Wuxi, Zhenjiang, Nantong, Yangzhou, Huaian, Taizhou, Jinhua, Jiaxing, Huzhou, Zhoushan, and Shaoxing.

2. Port Construction Strategy and Consolidation Status in the Yangtze River Delta Region

Through the above analysis, one can see the significance of port construction in the implementation of the Shanghai International Shipping Center plan and in the development of the local economy. Next, the changes brought about by the Yangtze River Delta port construction in the region and the whole country will be analyzed.

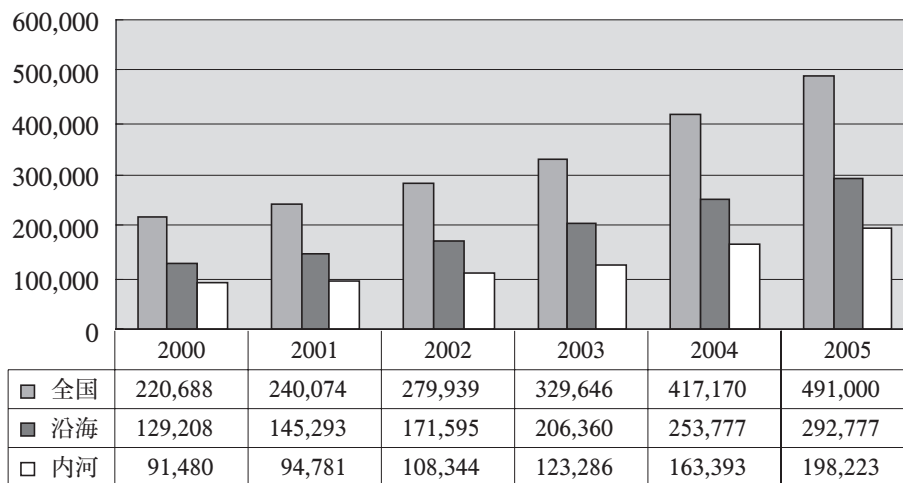
1) *The increase of port throughput and its impact on surrounding areas*

Port throughput in China reached 4.91 billion tons in 2005, more than double compared with 2.21 billion tons in 2000. Geographically speaking, port throughput in costal regions took 60% of the total volume in 2005, much higher than that in central regions. Port throughput in costal regions grew by 2.3 times to 2.93 billion ton in 2005 compared with 1.29 billion ton in 2000. This growth rate is higher than the country's average as well as that in central regions. Therefore, port development in costal regions is the main force driving port development in China. The Ministry of Communication expects that port throughput in 2010 will reach 6.1 billion tons, among which 4.5 billion tons will be in costal regions.

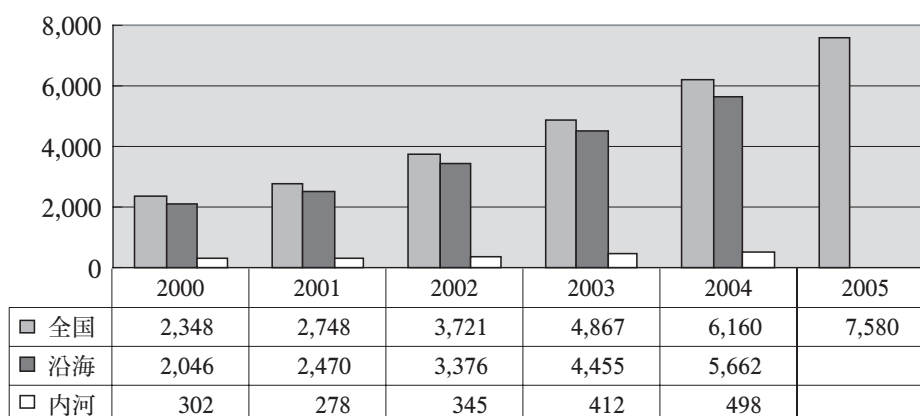
In addition, container turnover volume reached 75.8 million TEU in 2005, 3.26 times higher than 23.43 million TEU in 2000, and about 5 times of that in Japan (about 15 million TEU). Such strong growth shows no signs of slowing down.

We can see from Chart 2 that container turnover volume at main ports along China's Eastern Sea shore reached 56.62 million in 2004, about 92% of the total volume.

Chart 1 Port throughput growth in China (unit: 10,000 tons)



Source: Information from Ministry of Communication and *China Statistics Brief 06*

Chart 2 The trend of container turnover volume in China (unit: 10,000 TEU)

Source: Same as Chart 1.

Chart 3 shows the ranking change of major container ports in the world. In 1980, no Chinese port made the ranking list. However, in 2005, China's Shanghai and Shenzhen Ports ranked No. 3 and No. 4 in the world, respectively. Though not listed in the chart, Tsingdao Port (6.3 million) ranked No. 14, Ningbo Port (5.21 million) ranked No. 17, Tianjin Port (4.8 million) ranked No.18, Guangzhou Port (4.65 million) ranked No. 22, and Xiamen Port (2004, 2.87 million) ranked No. 26. All these ports are among the Top 30 in the world. In 2004, Guangzhou Port enjoyed the fastest growth rate of 41% in terms of container turnover volume, followed by Ningbo (+30%), Tianjin (+26%), Shanghai (+24%), Tsingdao (+23%), Dalian (+20%), and Shenzhen (+19%). The growth rate also reflects the economic

Chart 3 Container turnover ranking for major ports in the world

1980 (Unit : 1,000 TEU)			2005 (Unit: 1,000 TEU)		
place		turnover	place		turnover
1	New York	1,947	1 (2)	Singapore	23,192
2	Rotterdam	1,901	2 (1)	Hong Kong	22,427
3	Hong Kong	1,465	3 (3)	Shanghai	18,084
4	Hyogo	1,456	4 (4)	Shenzhen	16,197
5	Kaohsiung	979	5 (5)	Pusan	11,840
6	Singapore	917	6 (6)	Kaohsiung	9,470
7	San Francisco	852	7 (7)	Rotterdam	9,300
8		825	8 (9)	Hamburg	8,050
9	Hamburg	783	9(10)	Dubai	7,619
10	Auckland	782	10 (8)	Los Angeles	7,485
13	Yokohama	722	21(20)	Tokyo	3,759
16	Pusan	634	27(29)	Yokohama	2,900
18	Tokyo	632	※(32)	Hyogo	2,177

Source: Containerization International Year Book, 1980. March 2006, Containerization International and material from Japan National Land Agency

Notes: ①TEU is Twenty-foot Equivalent Unit.

②※ For ranking below 31, there is no specific sequence.

③() refers to the ranking in 2004.

④New York refers to New York Port and New Jersey Port as a whole.

development status in the region. Interestingly, Singapore, which fell behind Hong Kong five years ago, exceeded Hong Kong again. Since Hong Kong is close to Guangzhou and Shenzhen, its container turnover volume decreased more severely than expected. Taiwan's Kaohsiung Port suffered negative growth for the first time in 14 years. Its turnover volume in 2005 dropped by 3% compared to the previous year, to 9.47 million TEU. The growth of Pusan Port in Korea has also slowed down. Its turnover volume in 2005 only went up slightly to 11.8 million TEU, compared with 11.43 million TEU in 2004. Thus, port construction and development in China has started to make a visible impact on surrounding regions.

Looking at major ports in Japan, the container turnover volume of Yokohama Port ranked No. 13 (722,000) in 1980, but fell to No. 27 in 2005. The ranking of Tokyo Port also fell from 18 (632,000) to 21 (3,759,000). Hyogo Port, which together with Hong Kong ranked No. 14 in 1980, fell to No. 32 in 2005. It shows that the "world's factory" is moving from Japan to China.

2) *Fast growing port construction and consolidation*

There are 130 open ports in China now. When coastal cities were opened up to other countries in 1984, there were only 270 berths for large ships above 10,000 tons, and many ships were delayed. The author also personally suffered from this lack of capacity. When traveling in 1980 from Amagasaki Port, Japan after finishing his government-sponsored study in Osaka Foreign Language University, the author had to wait for 3 days on international waters before the ship could get into Tianjin Port, China. Since then in the past 20 years, port construction in China has experienced rapid growth. By 2004, there were already 790 berths for large ships at sea ports and 154 berths at river ports.

The rapid growth of port construction was due to the fact that it was part of the Five-Year National Economic Development Plan. The Outline of this plan is a good example. China's Ministry of Communication set up a target in the eleventh Five-Year plan for transportation development (2005–2010), specifically to develop ports in the Yangtze River Delta Region,

Table 3 Changes in the number of berths and turnover volume at major ports in coastal regions

Item	2000	2001	2002	2003	2004	2005
Turnover volume (100 million tons)	12.9	14.5	17.2	20.1	25.4	29.3
Container (10,000 TEU)	2,046	2,470	3,376	4,455	5,662	—
Number of berths	3,700	3,718	3,822	4,274	4,197	—
Berths for boats above 10,000 tons	651	677	700	748	790	—
10,000~30,000 ton	437	451	457	464	465	—
30,000~50,000 ton	105	113	113	128	143	—
50,000~100,000 ton	90	91	103	125	145	—
Above 100,000 ton	19	22	27	31	37	—
Number of specialized berths	332	349	441	472	524	—
Crude oil	37	40	57	49	54	—
Oil products	42	45	63	88	74	—
Coal	82	86	102	100	110	—
Grain	24	24	32	26	27	—
Container	80	83	98	134	155	推測 170

Source: Materials from China Ministry of Communication

Zhujiang Delta Region, southeast coastal region, and southwest region.

3) *The location of the Yangtze River Delta Region in China*

Located in the Yangtze River Delta Region are Shanghai Port, Lianyungang Port, Ningbo Port, and four national ports, including Nanjing, Hangzhou, Wenzhou and Xuzhou Ports. The turnover volume of Shanghai Port grew by 3.1 times to 440 million tons in 2005 compared with 140 million tons in 1990. Shanghai Port has ranked No. 1 in China for 15 consecutive years.

Table 4 Turnover Volume at Major Ports in Costal Regions (Unit: 10,000 tons)

Port	1990	1995	2000	2003	2004	2005
Total	48,321	80,166	125,603	201,126	246,074	292,777
Dalian	4,952	6,417	9,084	12,602	14,516	17,085
Yingkou	237	1,156	2,268	4,009	5,978	7,537
Qinhuangdao	6,945	8,382	9,743	12,562	15,037	16,900
Tianjin	2,063	5,787	9,566	16,182	20,619	24,069
Yantai	668	1,361	1,774	2,936	3,431	4,506
Tsingdao	3,034	5,103	8,636	14,090	16,265	18,678
Rizhao	925	1,452	2,674	4,507	5,108	8,421
Shanghai	13,959	16,567	20,440	31,621	37,896	44,317
Lianyungang	1,137	1,716	2,708	3,752	4,352	6,016
Ningbo	2,554	6,853	11,547	18,543	22,586	26,881
Fuzhou	561	1,032	2,426	4,753	5,939	7,443
Xiamen	529	1,314	1,965	3,404	4,261	4,771
Shenzhen		3,080	5,697	11,220	13,537	15,351
Guangzhou	4,163	7,299	11,128	17,187	21,520	25,036
Zhanjiang	1,557	1,885	2,038	2,866	3,780	4,647
Other ports	5,037	10,762	23,909	40,892	51,249	61,119

Source: *China Statistics Brief 06*

Like Shanghai Port, Ningbo Port has also experienced rapid development. The turnover volume of Ningbo Port was only 25.54 million tons in 1990, and it ranked No. 6 in China. However, its turnover volume has rapidly increased to 268.81 million tons in 2005, which brings its ranking to No. 2. In 2005, the total turnover volume of Shanghai, Ningbo and Lianyungang Ports was 772.14 million tons, about 26% of the total volume in China. If the volumes in the other four national ports including Nanjing and Hangzhou are added, the total port turnover volume in the Yangtze River Delta Region will be an even larger amount.

4) *The Yangshan Port - Regional Transit Center*

Yangshan Port, the World's Largest Container Port

In October 2005, Shanghai Yangshan Port started operation, attracting much attention from the world. Yangshan Port is located at the outskirts of Yangtze River's entry point, 27.5 km to the southeast of Luchao Port, Nanhui District, Shanghai. It is the only deep water port in the East China Sea where super-large ships can dock directly. The first stage of

construction of Yangshan Port includes 5 container berths, each with a berth length of 1,600 m and a land area of 1.53 km². The loading area covers 720,000 m². The turnover volume at Yangshan Port was 7,558 TEU on the first day of operation, about 10% of annual turnover amount at Naha Port in Japan (Nihon Keisai Shinbun, December, 2005). The first-year target for Yangshan Port is 3 million TEU. If the construction of the port is completed by 2020 as planned, its container turnover volume would reach 25 million TEU, twice as much as the total turnover volume of the five major ports in Japan (04), including Tokyo, Yokohama, and Hyogo.

Yangshan Port is not a Sino-foreign joint venture project. It is funded and constructed by the Shanghai Shengdong International Container Berth Company, invested by SIPG. There are fifteen new cranes at the port, each with a 65-meter arm. The port itself has a total length of 1,600 m and water 16 meters deep.

There are two reasons for the construction of Yangshan Port. Firstly, Shanghai's economy has enjoyed double-digit growth for the past 14 consecutive years from 1992 to 2006, with an annual average growth rate of 11.9%. This is much higher than the average in China, and such a strong momentum of growth in Shanghai requires a new logistics system.

Secondly, there is a fatal weakness in the rapidly-growing economy of Shanghai in that there is no deep water berth for super-large container ships. This is because Shanghai Port was originally a river port along the Huangpu River, a branch of the Yangtze River. For this reason, Shanghai set up ten 11-meter deep berths in the Waigaoqiao Region. However, large container ships cannot get in during low tide because the water is only 7 meters deep in the waterways of the Yangtze River. In 1996, the government approved the Shanghai International Shipping Center project (transit port). To support this project, the Shanghai municipal government has decided to develop the waterways within 10 years into navigation channels that are 7.2 to 12.5 meters deep. The plan was approved in 1988.

However, the types of main container ships increased from 6,000 to 8,000, and some of them require 16-meter deep waterways. Therefore, the Shanghai International Shipping Center project must be modified. It has been decided that offshore artificial ports will be built in Xiaoyangshan and Dayangshan, in the Zhoushan archipelago. The plan was quickly approved and construction started in 2002.

Yangshan Port has the following features:

- Ports constructed by connecting small off-shore islands. (Yangshan Port)
- A 32 km long bridge connecting the shore and port. (Donghai Bridge)
- A new city that will be built with such functions as customs clearance and container logistics, with a population of more than 500,000. (New Port City)

Yangshan Port is not only just a port, but also a regional transit central composed of Yangshan Port, Donghai Bridge and New Port City. By 2020, thirty berths are planned to be built to the east and west of the 5 berths built during the first stage of construction. After that, 20 more berths will be built to the south of Dayangshan, and the second Donghai railway bridge will be built at the same time. The short-term plan is as follows:

Second stage of construction	4 berths to be completed by 2006
Third/fourth stage of construction	7 berths to be completed by 2010

However, the current situation indicates that container turnover volume has grown by as much as 24% compared with 2005. If the annual growth rate maintains a 20% level until 2010, there will be a shortage of berths again. So, port construction needs to be accelerated and the project needs to be carried out earlier than planned in order to meet the requirements

of high turnover growth.

Donghai Bridge, the World's Longest Bridge Connecting Yangshan Port

Donghai Bridge, a bridge well-known around the world, starts from Luchaogang County, Nanhui District, southeast of Shanghai, and connects directly to Yangshan Port. The construction of Donghai Bridge was completed on May 25, 2005. In August 2006, the author did research on Yangshan Port and the bridge as an expert in a research project initiated by the Japanese Ministry of Education, Culture, Sports, Science, and Technology and was shocked by the length and scale of Donghai Bridge. The bridge has a design length of 32.5 km and a width of 31.5 m, with 6 lanes in two directions and a speed limit of 80 km/h. Cargoes in the Yangshan Port container base are shipped all over China via this bridge. Correspondingly, Yangshan Port has become one of the major ports in Asia due to the availability of this bridge.

A New Port City for the 21st Century

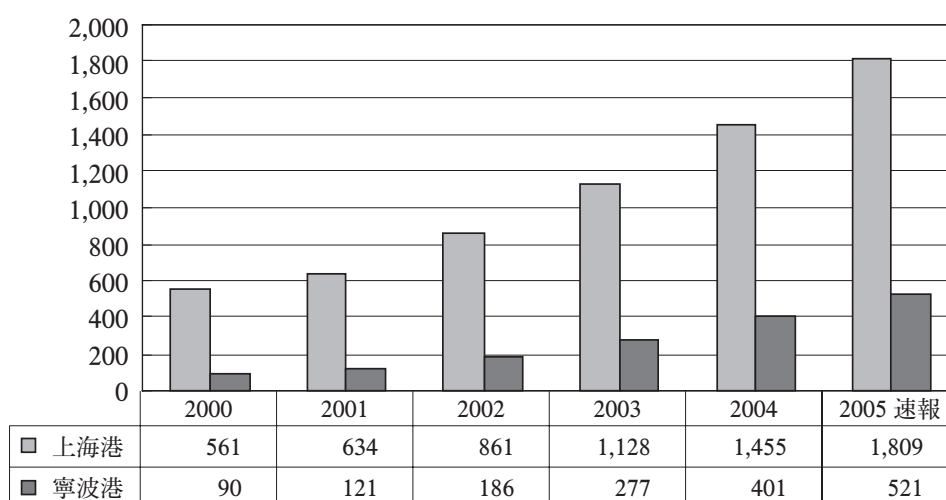
The New Port City project is being carried out together with the Yangshan Port and Donghai Bridge projects. In the center of the city, an artificial lake covering an area of 5.6 km² is planned. Other city functions are located around the lake, including residential areas and facilities for finance, trade, business, tourism, education, scientific research, and so on. A boulevard lined with trees will be built along the river. The city's planned area is 100 km², with an expected population of 600,000. The city is located 50 km from downtown Shanghai (40 minutes by car) and 37 km from Pudong Airport (30 minutes by car). An R3 station of the magnetic suspension train is also planned for the city.

The completion of this New Port City will absorb some population from Shanghai City. At the same time, it will become a model city for the 21st century, having manufacturing industries, high-tech R & D facilities, and a logistics network. It will definitely become a high standard for city construction in China in the future.

5) *The development of Ningbo Port and Shanghai*

Previously, some basic information about Shanghai Port, the largest port in China, was discussed. The biggest competitor for Shanghai Port may be Ningbo Port, also a major port located in the Yangtze River Delta Region.

Chart 4 Container Turnover Volume of Shanghai and Ningbo Port (10,000 TEU)



Source: Same as Chart 1.

Ningbo Port is developing faster than Shanghai Port. Chart 4 shows that container turnover volume of Ningbo Port was only 900,000 TEU in 2000 but increased to 5.21 million TEU in 2005. The number grew by 5.8 times in just 5 years, and the volume of Shanghai Port only grew by 3.2 times during the same period. This shows that the container turnover volume in Ningbo Port has an average annual growth rate of 30–50%, higher than Shanghai Port.

Compared with Shanghai Port, the biggest advantage of Ningbo Port is its deep water area in Beilun Region to the east of the city and the deep water area near the Zhoushan archipelago. In 2001, the world famous Hutchison and Ningbo government built the NBCT 3 berth jointly, causing container turnover volume at the berth to increase by 50% in the second year. While building this berth, the Ningbo Port Bureau also built four other berths and developed a container port construction project located near the Chuanshan Peninsula to the east of Beilun. In addition, the Dashudao Port Project (4 berths) funded by the Hong Kong China Merchants Group began smoothly. We can say that another difference between Ningbo Port and Shanghai Port lies in the fact that Ningbo has actively introduced foreign capital in its port development.

In November 2005, the Zhejiang government consolidated Ningbo Port and Zhoushan Port and started to build Jintang Port, the deepest container ship port in China (–18 meters). This was once part of Zhoushan Port. The plan is aimed at allowing regular container ships carrying iron ore, coal and crude oil to dock at the port directly, and this makes the port one of the top three in the world, next to Shanghai.

There were 13 berths at Ningbo Beilun Port at the end of 2005, and 8 ports are still under construction. Together with the 6 berths at Jintang Port which are being built, Ningbo Port is going to become a major container port. If the above plan is carried out successfully and the berths are used, Ningbo Port will exceed the current Hong Kong Port (24 berths) and become a large port with 27 berths. (Information from the Japan International Logistics Seminar)

Table 5 A comparison of the two container ports in the Yangtze River Delta Region

Port	2004 (10,000 TEU)	2005	Number of Berths in Operation	New Berths Planned by 2010
Shanghai	1,455	1,809	31	11+?
Ningbo	401	521	13	14
Total	1,856	2,330	44	25+?

Source: Same as Chart 1.

6) *The construction of the Hangzhou Gulf Bridge*

The cargo turnover volume of Shanghai Port was 446 million tons in 2005, the largest in the world. Its container turnover volume is expected to exceed that of Singapore and become No. 1 in the world within three years. If Yangshan Port operates smoothly, its container turnover volume is expected to exceed 30 million TEU by 2010.

Yangshan Port is located offshore, about 30 km from the shorelines of Shanghai. Super-large container ships are expected to be able to get in and out of the port within 24 hours. This could reduce freight costs to some extent, but there are also problems:

- Since Donghai Bridge will be closed whenever there is strong wind or fog, the shipping schedule needs to be changed very often.
- Cargoes need to be loaded 50 km from the current port.
- Since Yangshan Port is located far from current distributing centers such as Waigaoqiao, transportation costs may increase.

- The construction cost for Yangshan Port is three times as much as that of Ningbo Port, so this might present a problem to the proprietors of the project.

On the other hand, construction at Ningbo Port is going full swing, with a target of building a large port by 2010 with a container turnover volume of 10 million TEU. It is difficult for Jiangsu Province and the municipality of Shanghai, the two largest points of origin of goods in the Yangtze River Delta Region, to increase their turnover volume because they are located far from Ningbo. The Hangzhou Gulf Bridge (36 km) currently under construction could significantly reduce the distance from Jiangsu and Shanghai to Ningbo. The bridge is expected to be completed in 2008. With this bridge in operation, the distance from Wuxi and Suzhou in Jiangsu to Ningbo or Yangshan would be almost the same. Thus, cargo owners can choose either port freely. Therefore, Ningbo Port may end up being the biggest competitor for Shanghai Yangshan Port.

3. The Impact of Logistics Network Consolidation in the Yangtze River Delta Region

The impact of logistics network consolidation in the Yangtze River Delta Region is mainly reflected in the following three aspects:

- The impact on the Shanghai International Shipping Center
- The influence on the manufacturing base in the Yangtze River Delta Region, and
- The impact on neighboring countries.

1) *The impact on the Shanghai International Shipping Center*

Port competition in the Yangtze River Delta Region has been a focus of media attention in recent years. The Shanghai municipal government would like to strengthen its position in the Yangtze River Delta Region by building Yangshan Port. On the other hand, the Zhejiang provincial government would like to challenge Shanghai by adopting a unified plan to consolidate Ningbo Port and Zhoushan Port. In addition, the Jiangsu government has consolidated Zhangjiakou Port, Taicang Port and Changshu Port and named the new port after consolidation as Suzhou Port in order to participate in the port competition in the region. These issues have caused concerns in the central government, so the government has set up a “one-body, two-wing” port development strategy for the Yangtze River Delta Region, centered in Shanghai. The Yangtze River Delta port development strategy is mainly about the coordination of regional ports and seeks the co-development of Zhejiang, Jiangsu and Shanghai. It specifies the roles and functions of each port in the transportation market and makes a target of building the Shanghai International Shipping Center.

2) *Influence on the Manufacturing Base*

Geographically speaking, the two factors hindering economic development in the Yangtze River Delta Region are the gulf of the Yangtze River and the Hangzhou Gulf. The former one cuts communication between the south and north, and the latter one blocks east Zhejiang from other regions. Under the new transportation plan, there will be new bridges connecting the separated regions. The manufacturing industry in the Yangtze River Delta Region will also enjoy continuous expansion, together with transportation development along the Yangtze River and the coastline. Jiangsu Province recently proposed a riverside development strategy aimed at developing manufacturing industry in the eight cities along the Yangtze River, including Nanjing, Wuxi, Changzhou, Suzhou, Nantong, Yangzhou, Zhenjiang

and Taizhou, which cover an area of 400 km². The GDP in the region is expected to triple by 2010 compared with 2000. Zhejiang Province has also proposed the Hangzhou Gulf Development Strategy. Under this strategy, information technology, modern medical industries, petrochemical industries, and textile and clothing industries will be further developed in the Hangzhou Gulf, mainly in these 6 cities: Hangzhou, Ningbo, Jiaying, Huzhou, Shaoxing and Zhoushan. Emphasis will be given to the development of science and education, with the goal of transforming the region into a “golden industrial band” in the southern part of the Yangtze River Delta Region, combining the functions of industry development, city life, and logistics networks. The reconstruction of the Yangtze River Delta logistics network will surely contribute to the above strategies set in Jiangsu and Zhejiang.

3) The impact of Shanghai Port on major East Asian ports

The impact on major East Asian ports

Though it may seem a bit early to say what kind of impact the reconstruction of the Yangtze River Delta logistics network will have on the economic development in neighboring countries and regions, some projections can be made. Now, the effect of the operation of Yangshan Port on future development will be analyzed. The opening of Yangshan Port has already started to impact major East Asian transit ports such as Hong Kong, Kaohsiung, and Pusan. As a transit port, Hong Kong Port is not only influenced by Shanghai Port, but also Tsingdao and other northern ports. Its cargo turnover volume is going down significantly. The development of Shanghai Port and its container transport system will lead more large ships to go to Shanghai Yangshan Port directly instead of making a transit through Hong Kong.

Chart 3 shows that Hong Kong Port's turnover volume only increased by 3% in 2005, while the expected growth was 3%–4%. The expansion of Shenzhen Port and the completion of Guangzhou Nansha Port also affected Hong Kong Port. After being the world's largest container port for several years, Hong Kong Port had already been replaced by Singapore. In the future, the rankings for Shanghai, Ningbo and Shenzhen Ports are expected to go up, while Hong Kong Port's ranking will likely continue to fall to third or fourth place in the world.

Due to the water line limitation at Shanghai Port, large container ships on major sea routes usually unload their cargo at Hong Kong Port or Pusan Port. In the future, if Shanghai Yangshan Port runs at full operation, transit cargoes may go directly to Shanghai Yangshan, instead of unloading at Hong Kong, Pusan, or Kaohsiung. Kaohsiung, which ranks No. 6 in the world, has also been affected. Its turnover volume went down by 3% in 2005 for the first time in 14 years. Pusan's turnover volume, 11.8 million TEU with a growth rate of 3%, was also lower than expected.

Compared to Hong Kong and Kaohsiung, The Korean ports of Pusan and Gwangyang will be affected even more. According to a report by the China Business News, the Korean Consulate has pointed out in its investigative report on Shanghai's logistics capability (released in 2005) that the container turnover volume of Pusan Port will likely be reduced by as much as 30% if Yangshan Port opens. Moreover, the Korean Consulate observed that if Yangshan Port runs at full capacity, it would become a super-large transit port, three times as big as Pusan Port. Thus, if Pusan Port does not improve itself effectively, it will not be able to compete with Shanghai as a global container transit port. (China Business News, 2005)

Development through competition

However, Yangshan Port might also bring positive impacts on other East Asian ports. Competition in the East Asian sea transport market centered in China may promote overall

development in the region and bring new business opportunities. East Asian countries will invest more in ports and roads to enhance port competitiveness, which would generate positive effects such as creating more job opportunities.

For example, the Secretary for Economic Development and Labour Bureau in Hong Kong pointed out clearly at the legislative council on December 7, 2005 that Hong Kong will simplify the procedure for ships to get in ports and reduce port usage fees. More anchor areas will be built. In addition, he also said that in 2005, Hong Kong government started research on the No.10 container port construction project at Dayu Island, an isolated island in the west of Hong Kong. (China Business News, 2006)

The Korean government also proposed policies designed to strengthen port competitiveness. For example, it is now building a new port in Pusan, aiming at making it one of the largest transit ports in Northeast Asia. At the same time, it is also developing Gwangyang Port. If the plans are carried out smoothly, there will be forty more deep water berths in Pusan Port and Yangguang Port, and container turnover volume would increase by 15 million TEU.

Around the same time that Yangshan Port opened, the Japanese government approved the Overall Logistics Policy Outline (2005–2009) in November 2005. It is an overall logistics plan for port construction. According to the Outline, a highly efficient logistics network will be built to meet the demands of fast growing East Asian ports. The Outline specifically points out those regions close to the coast of east China should set up their individual development strategies and global logistics strategies based on actual situations, so as to strengthen the cooperation between East Asian countries and China.

4. Conclusion

A new era has come in which logistics development in East Asia is centered in China. Competition and prosperity are the main themes in this new era of global competition. The development of Shanghai Port is the result of competition from surrounding regions. Without competition, Shanghai would never have been so prosperous. East Asian countries and regions should introduce competition in the East Asian economic community and seek co-development. Only by doing so can they achieve a win-win situation in their local regions and in East Asia as a whole.