Shanghai Port and Yangtze River Gateway

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ABSTRACT

This paper examines the driving factors to the growth of Shanghai port, especially the important contributions from its hinterland. Apart from a strong direct hinterland in the vicinity of Shanghai, there is a vast indirect hinterland in the middle and upper reaches of Yangtze River that will drive future growth in Shanghai. The Yangtze River is a natural corridor which links the interior regions of China to the Pacific coast and Shanghai is used as the gateway for these interior regions to trade with the rest of the world.

This paper looks into the economic development of various regions along the Yangtze River and contributions to foreign trade of these regions, highlighting the role of gateway by Shanghai. Constraints to the river transport now and future prospects are also discussed. Based on the examination of the regional development along the Yangtze River, it is concluded that, with direct and indirect hinterland of such grand scale and foreseeable development on the hinterland, Shanghai should aim for efficient gateway operations and providing best service to its clients along the golden waterway for domestic/international transshipping, rather than competing with other international shipping centers in Asia Pacific for international/international transshipping.

1. INTRODUCTION

Shanghai port has experienced dazzling growth in recent years. By 2005 Shanghai has become the largest port in the world in terms of total freight handled, and by 2007 the 2nd largest port in terms of total number of containers handled. Faced with such a high growth in demand, port of Shanghai is seriously under capacity shortage. The capacity strain is expected to be relieved after the construction of the new Yangshan deep water facilities is completed, which takes several phases in a couple of years. Now Shanghai has ambition to become an international shipping center. One of the long-term goals of port of Shanghai is to attract more international transshipping business and to play a role similar to Hong Kong, Singapore and Busan, Korea.

This paper examines the driving factors to the growth of Shanghai port, especially the important contributions from its hinterland. While there is already a strong direct hinterland in the vicinity of Shanghai, it should not be overlooked that there is a vast indirect hinterland in the middle and upper reaches of Yangtze River that will drive future growth in the volume of freight especially the container for
foreign trade into Shanghai. The Yangtze River is a natural corridor which links the interior regions of China to the Pacific coast and Shanghai is used as the gateway for these interior regions to trade with the rest of the world.

This paper looks into the economic development of various regions along the Yangtze River and contributions to foreign trade of these regions, highlighting the role of gateway by Shanghai. Constraints to the river transport now and future prospects are also discussed. Based on the examination of the regional development along the Yangtze River, it is concluded that, with direct and indirect hinterland of such grand scale and foreseeable development on the hinterland, Shanghai should aim for efficient gateway operations and providing best service to its clients along the golden waterway for domestic/international transshipping, rather than competing with other international shipping centers in Asia Pacific for international/international transshipping.

Section 2 presents the structure of port of Shanghai with its growth in volume and planned expansion in capacity. Section 3 examines the hinterland to Shanghai, both direct and indirect, along the Yangtze River and section 4 discusses the constraints and plans to improve efficiency in the golden waterway. Section 5 concludes.

2. GROWTH OF PORT OF SHANGHAI

Port of Shanghai is located at the edge of Yangtze River Delta, facing the East China Sea. Being the largest port in China, the volume of the freight and containers handled in Shanghai port has shown tremendous growth in recent years. In terms of total freight, Shanghai port handled 443 million tons in 2005, becoming the largest port in the world in that year. Total freight handled reached 537 million tons in 2006 and 561 million tons in 2007. In terms of number of containers handled, Shanghai port became the world’s 3rd largest port in 2003. Number of containers handled in Shanghai port in 2005 was 18.1 million TEU while that number reached 21.7 million TEU in 2006 and 26.2 million TEU in 2007, representing a yearly growth over 20%. In 2007, Shanghai surpassed Hong Kong for the first time to become world’s 2nd largest container port. Compared with the national total, Shanghai port accounted for 12% of the total freight handled and 24% of total number of containers handled by all of the ports in Mainland China in 2006. Now, Shanghai port has more than 200 scheduled container lines linking more than 300 ports in North America, Europe, Australia, Africa, Northeast and Southeast Asia, with total frequency of more than 2000 container liners each month.

Figures 1 and 2 show the growth of Shanghai port over last 20 years. It is notable that the volume of freight in Shanghai port remained rather stable until 1998. In fact, total volume of freight was 112 million tons in 1985 and it took 15 years to reach 200 million tons in 2000. The trend of high growth started after 1999 and it took only 5 years for the total freight to exceed 400 million tons. For the container traffic, however, the picture is different. While volume was negligible at the beginning, constant growth over 20 years made Shanghai port the 3rd largest container port in the world. This is due to the fact that container traffic has

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1 Shanghai International Port (Group) Co. website
been mostly driven by international trade, which is not much affected by domestic economic cycles.

Figure 1: Total volumes of freight in port of Shanghai (in million tons)

![Graph showing total volumes of freight in port of Shanghai from 1995 to 2007.](image)

Data source: China Ministry of Communication.

Figure 2: Total number of containers in port of Shanghai (in million TEU)

![Graph showing total number of containers in port of Shanghai from 1995 to 2007.](image)

Data source: China Ministry of Communication.

The main container facilities of Shanghai port consist of Wusongkou, Waigaoqiao and Yangshan.

### 2.1. Wusongkou Port

Wusongkou port is located along the north end of Hangpu River, which flows from southwest of Shanghai to the northeast and flows into Yangtze River at Wusongkou. Historically, Shanghai port facilities were located along the Huangpu River and Wusongkou port was the main port of Shanghai until early 1990s before
the new facilities in Waigaoqiao were available. Currently, Wusongkou port has 9 berths with designed capacity of 2.4 million TEUs of containers annually. The actual number of containers handled, however, has exceeded designed capacity in recent years (see Table 1).

Table 1: Designed capacity and actual volume in Port of Shanghai (in million TEU)

<table>
<thead>
<tr>
<th></th>
<th>Wusongkou</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Year</td>
<td>2003</td>
<td>2004</td>
<td>2005</td>
<td>2006</td>
</tr>
<tr>
<td>Capacity</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Volume</td>
<td>3.4</td>
<td>3.7</td>
<td>3.6</td>
<td>3.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Waigaoqiao</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>2003</td>
<td>2004</td>
<td>2005</td>
<td>2006</td>
</tr>
<tr>
<td>Capacity</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Volume</td>
<td>6.6</td>
<td>9.4</td>
<td>12.7</td>
<td>13.7</td>
</tr>
</tbody>
</table>

Data source: Shanghai Securities Research Center (2007).

The main constraining factor to the Wusongkou port is the water depth. Being on the bank of Huangpu river, the water depth is only 10~10.5 meters for 6 berths, and 10.5~12.5 meters for 3 berths. As it is difficult for the ocean container liners to sail into the Huangpu River and dock in the Wusongkou port, the port is used mainly for smaller domestic container vessels.

2.2. Waigaoqiao Port

Construction of Waigaoqiao port started in 1991 in five phases, with total investment over US$1 billion. At the end of 2006, Waigaoqiao port had 26 berths with designed capacity about 8 million TEU of containers annually. Waigaoqiao port is located on the south bank of the Yangtze River with water depth 10.5~13.2 meters. At present, Waigaoqiao is the backbone of port of Shanghai (Song et al, 2005). In 2005, Waigaoqiao port handled 12.7 million TEU of containers, about 70% of all containers handled by the port of Shanghai. In 2006, after the new Yangshan deepwater port opened for operation, Waigaoqiao port still handled 13.7 million TEU, over 60% of total containers in Shanghai.

The investment and management of Waigaoqiao port has attracted foreign partners. For example, in the phase one project, Hong Kong based Hutchison Whampoa and China Ocean Shipping Company (COSCO) jointly hold 40% of the shares, and in the phase four project, Maersk holds 49% of ownership. These foreign partners not only brought in much needed capital for infrastructure investment, but also the highly valuable expertise in port operation and management. As the result, after Waigaoqiao port opened for operation, it immediately became the most efficient container port in China. As now,
Waigaoqiao is the largest container port in China and the construction of phase six project has started in 2006.

With Wusongkou port taking the most domestic container trade, Waigaoqiao is more focused on hinterland-generated but international-bound containers. While equipped with modern infrastructure and advanced management, Waigaoqiao port is still constrained by the water depth in the Yangtze River. Nevertheless, driven by the explosive growth of China’s international trade, container volumes in Waigaoqiao port quickly exceeded its designed capacity as shown in Table 1.

2.3. The new Yangshan deepwater Port

With both Wusongkou port and Waigaoqiao port operating over capacity, and both ports suffering from insufficient water depth in Huangpu River and Yangtze River, the port of Shanghai has to take big steps to acquire new capacity with deep-water facilities. This leads to the designing and construction of the new Yangshan deepwater port.

The Yangshan deepwater port is located in the East China Sea southeast of Shanghai, about 30 km away from the mainland. The port facilities are built around the Yangshan Islands. The port will be developed in four phases. After more than six years of site selection and feasibility study and over three years of construction, plus about US$7.5 billion investment, the phase one facilities were finally completed and opened for operation at the end of 2005. The phase one facilities of Yangshan deepwater port have 5 berths with water depth of 16 meters. The facilities were operating over capacity ever since their opening. While the designed capacity for phase one is 2.2 million TEU, the first-year operation saw the facilities actually handling 3.1 million TEU of containers. Figure 3 shows the throughput of containers in Wusongkou, Waigaoqiao and Yangshan in recent years.

Figure 3. Throughput in major container facilities in the Port of Shanghai (in million TEU)

Data source: Shanghai Securities Research Center (2007)
At the end of 2006, exactly on the same date that the phase one facilities of Yangshan port had operated for one year, the phase two facilities were completed and opened for operation. Investment in the phase two took about US$7 billion. The phase two facilities have 4 berths and a designed capacity of 2.1 million TEU. Further facilities of Yangshan deepwater port are currently under construction. Planned to complete in two stages, phase three facilities will take about US$12 billion investment. First stage facilities with 4 berths are scheduled to complete in 2008 and second stage facilities with 3 more berths are planned to complete in 2010. After both stages are finished, the phase three facilities will add in total new capacity of 5 million TEU. Finally, another 4.5 million TEU capacity is planned for phase four facilities, which is expected to be in operation by 2012.

All in all, the new Yangshan deepwater port will have total designed capacity of around 15 million TEU of containers annually after construction on all four phases are completed. This will finally provide relief on the capacity shortage in the port of Shanghai. Furthermore, with water depth of 16 meter, the Yangshan port is able to serve the 5th to 6th generation container liners.

On the other hand, as the Yangshan deepwater port is located in the middle of the East China Sea, the land/sea interface becomes a critical factor for the efficient operation of the port. As now, the Yangshan port is connected to mainland through a bridge 32.5 km long. The bridge has a capacity of passing 3 million TEU of containers annually, only enough to support the operation of phase one facilities. Therefore, it is critical that the operation of Yangshan port should rely on sea/sea transshipping. As it turned out, the first-year operation of the port saw a 31% rate of transshipping on the phase one facilities (Wu, 2007). With phase two facilities joined operation in 2007, the transshipping rate has to be even higher.

This raised a question that would port of Shanghai, after acquired deepwater facilities in Yangshan, become a serious challenge to the international transshipping centers like Singapore, Hong Kong, Pushan and other ports in East Asia? While, the authorities of port of Shanghai do have ambition that Shanghai should become an international transshipping center, this paper would argue that port of Shanghai would best serve as a gateway for its hinterland.

Figure 4 shows the composition of container throughput in port of Shanghai in recent years.

Obviously, the container volume in Shanghai is largely driven by international trade as the export/import contributed nearly 90% for total container throughput in Shanghai. Nevertheless, it should be emphasized that most containers handled in Shanghai even for foreign trade are generated in the hinterland of Shanghai. Figure 5 presented the ratios of transshipment of containers in port of Shanghai.

It can be seen that most containers that are transshipped in Shanghai come from Yangtze River, which accounted for 6~9% of total container throughput in Shanghai and the ratio has shown an increasing trend. Other sources for container transshipping come from costal regions, which varied between 2~4% of total throughput, and international origins, which was around 2% of total throughput in Shanghai.
If the Yangtze River is considered as a corridor, then Shanghai will be the gateway of not only Yangtze River Delta, but also the regions in the middle and upper reaches of the Yangtze River. In this sense, the hinterland of port of Shanghai includes some of the most dynamic economic regions in China. These regions have great potential to feed container traffic to port of Shanghai, and then transship to international destinations. Given the scarce capacity at port of Shanghai and the future growth prospects of its hinterland economy, this paper would argue that transshipping in Yangshan port should mostly aim at river/sea or domestic/international type, rather than sea/sea or international/international type as Singapore or Hong Kong is mostly doing.

3. HINTERLAND OF PORT OF SHANGHAI

Hinterland of port of Shanghai is not limited to the vicinity of Shanghai. The west-to-east Yangtze River and the north-south coastline form a T-shaped waterway and Shanghai is right at the center of this waterway system. The Yangtze River serves as a corridor, which links the regions around the Yangtze River in mid and
western China to Shanghai and to other areas along the coast in eastern China. Therefore, through the T-shaped waterway system, direct and indirect hinterland of port of Shanghai may cover the following regions: the Yangtze River Delta, the middle reaches of the Yangtze River, the upper reaches of the Yangtze River, and the coastal regions of eastern China.

3.1. Yangtze River Delta

Yangtze River Delta includes Shanghai and other 15 municipalities in neighboring Jiangsu province and Zhejiang province. This is one of the most dynamic economic regions in China. With less than 6% of total population in China, this region produced around 20% of Chinese GDP, 30% of foreign trade and attracted about 50% of foreign investment in China. In 2005, GDP of this region was over US$400 billion, growing by 13.4% over 2004. Foreign trade generated US$270 billion of exports and US$225 billion of imports in 2005 (China National Bureau of Statistics).

The economy in Yangtze River Delta was under fast industrialization. For Shanghai, the primary sector accounted for 1.3% while the secondary sector and the tertiary sector accounted for 50.8% and 47.9%, respectively, in 2004. For Zhejiang province and Jiangsu province, the structure of the economy is similar with primary sector accounted for less than 10%, secondary sector for more than 50% and tertiary sector around 35-40% (Sun and Zhao, 2006). Shanghai has formed manufacturing industry cluster on microelectronics, petrochemical, automobile, and iron and steel, whereas Zhejiang province and Jiangsu province have heavy concentration on light industry including consumer product and textile industry.

This economic structure has created a large demand for energy and natural resources, which has to be imported from other regions of China and from international markets. In fact, the ports in the Yangtze River Delta handled 35% of coal, 48% of crude oil, and 55% of metal ore, compared with national total, in 2005. Apart from raw materials import that put heavy pressure on port capacities, this region also generated large volumes of foreign trade, which requires ever increasing capacity on gateway port, especially the port of Shanghai. In fact, port of Shanghai has to handle not only freight of foreign trade generated in Shanghai, but also 60% of freight of foreign trade generated in Zhejiang province and 40% of foreign trade generated in Jiangsu province (Sun and Zhao, 2006).

3.2. Middle reaches of Yangtze River

Regions along the middle reaches of Yangtze River include part of Anhui, Jiangxi, Hunan and Hubei provinces, with Wuhan as the main gateway port. The growth rates in GDP of these provinces in recent years are listed in Table 2.

While the growth in GDP of these provinces have been higher than the national average in Mainland China in recent years, the level of economic development in this region still lags behind the coastal regions in China. For instance, compared with the Yangtze River Delta, the industrial structure of this region has higher weight in primary sector, around 20%, and relatively lower weights in secondary sector, between 40~45%, and in tertiary sector, between 35~40%, in 2004 (Sun and Zhao, 2006).
The region around middle reaches of Yangtze River has rich natural resources especially in mineral and ores. Accordingly, the main industries in this region include ferrous-metal processing, nonferrous-metal mining and processing, crude oil and natural gas, textile and food product. Wuhan, the largest city in this region, has also established a strong base for automobile manufacturing in its vicinity. Exports from this region are mostly mineral product, chemical product, agricultural product and iron and steel product, with main markets in Europe, America, Japan and Asia Pacific region.

Table 2: Growth rates in GDP of the provinces along the Yangtze River (in %)

<table>
<thead>
<tr>
<th>Year</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yangtze River Delta</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shanghai</td>
<td>10.9</td>
<td>11.8</td>
<td>13.6</td>
</tr>
<tr>
<td>Jiangsu</td>
<td>11.6</td>
<td>13.6</td>
<td>14.9</td>
</tr>
<tr>
<td>Zhejiang</td>
<td>12.5</td>
<td>14.4</td>
<td>14.3</td>
</tr>
<tr>
<td>Middle reaches of Yangtze river</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anhui</td>
<td>8.9</td>
<td>9.2</td>
<td>12.5</td>
</tr>
<tr>
<td>Jiangxi</td>
<td>10.5</td>
<td>13.0</td>
<td>13.2</td>
</tr>
<tr>
<td>Hubei</td>
<td>9.1</td>
<td>9.4</td>
<td>11.3</td>
</tr>
<tr>
<td>Hunan</td>
<td>9.0</td>
<td>9.6</td>
<td>12.0</td>
</tr>
<tr>
<td>Upper reaches of Yangtze river</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chongqing</td>
<td>10.3</td>
<td>11.5</td>
<td>12.2</td>
</tr>
<tr>
<td>Sichuan</td>
<td>10.6</td>
<td>11.8</td>
<td>12.7</td>
</tr>
<tr>
<td>National average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mainland China</td>
<td>8.3</td>
<td>9.5</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Data Source: Based on China Statistics Yearbook.

As the leading hub port for the middle reaches of Yangtze River, Wuhan has made significant investment to upgrade and expand port capacity so as to cope with the growing demand for water transportation along the Yangtze River. By the end of 2007, Wuhan port will be able to handle 500,000 TEU of containers annually. Additional investment in the amount of several hundred millions of US$ are in progression now to further expand capacity of the port and make better utilization of the Yangtze River. It should be noted that the expansion of the port capacities in the middle reaches of the Yangtze River region has direct impacts on port of Shanghai as 30~60% of the containers generated in this region are transshipped in Shanghai to their overseas destinations. Indeed, if Wuhan is the gateway for the provinces around the middle reaches of the Yangtze River on one end, Shanghai will be the gateway to the world in the other end. The corridor linking the two gateways is the Yangtze River.
3.3. Upper reaches of Yangtze River

The regions around upper reaches of Yangtze River cover the two provinces: Sichuan and Chongqing. The industrial structure of these two provinces are quite similar to the regions in the middle reaches of Yangtze River that the primary sector accounted for about 16~21% while secondary and tertiary sectors accounted for about 41~44% and 38~40%, respectively, in 2004 (Sun and Zhao, 2006). Situated in western China, these two provinces have a relatively lower level of economic development than other regions along the Yangtze River. However, the economic growth rates of these two provinces in recent years are still above the national average of Mainland China (Table 2).

The main industries of these two provinces are motorcycle and automobile manufacturing, chemical products and food products. Port of Chongqing is the most important gateway port of the region and 30% of the containers out from Chongqing port are transshipped in port of Shanghai for international destinations.

4. DEVELOPMENT OF THE GOLDEN WATERWAY

In the national strategy of developing mid and western China, the development of the water transportation system along the Yangtze River, the so-called golden waterway, got a high priority (Su, 2004; Li and Wang, 2006). In 1984, the total freight throughput of the 25 major ports along the Yangtze River was about 100 million tons and it reached 200 million tons only in 2000. Into the new century, the throughput of the major ports along Yangtze River has experienced unprecedented growth, almost expanding by 100 million tons every year (Table 3).

Table 3: Freight throughput of major ports along Yangtze River

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total freight (in million tons)</td>
<td>306</td>
<td>430</td>
<td>650</td>
</tr>
<tr>
<td>Total freight for foreign trade (in million tons)</td>
<td>44</td>
<td>51</td>
<td>78</td>
</tr>
<tr>
<td>Total containers (in million TEU)</td>
<td>1.42</td>
<td>1.82</td>
<td>2.60</td>
</tr>
</tbody>
</table>

Data source: Regional Economy Research Center, Shanghai University of Economics and Finance.

While the strong economic development has presented a golden opportunity for expanding water transportation along the Yangtze River, there are some barriers that have prevented the golden waterway from realizing its full potential. First, the waterway has several shallow sections between the upper reaches and the middle reaches of the river, so that it is difficult for the large vessels to sail directly from Wuhan to Chongqing. This seriously restricted freight flows in the upper reaches of

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3 Chongqing technically is a municipality with a provincial status.
the river. At present, 90% of the container traffic in the Yangtze River is carried between Wuhan and Shanghai in the middle and lower reaches of the river.

Second, there has been a lack of coordination between water transport and land transport along the river. With the development of the new highway system in China, there has been increasing number of bridges built to cross the Yangtze River. On the trunk of the waterway some 2800 km in length, there is one bridge every 30 km on average. Such a high density of the bridges provided convenience for north-south land traffic, but has serious impacts on the west-east water traffic. Since 1980s, there have been dozens of new docks capable of handling vessels of 5000 tonnage built along the Yangtze River. The bridges on the river, however, have only allowed vessels of 3000 tonnage to sail beneath (Sun and Zhao, 2006).

Third, the fleet used in Yangtze River has largely been outdated. In 2003, there were around 2000 shipping companies operating more than 68000 vessels in the trunk of Yangtze River. These vessels are built by different shipyards without a unified standard (Tang, Zhao and Gan, 2005). In fact, there are more than 300 types of different vessels operating in the river and most of these vessels have small tonnage, low speed and poor operating efficiency. While these vessels provided enough capacity to carry dry and bulk goods, there is a shortage for container ships and other special type ships. For container transportation, there are 26 companies operating some 120 container ships in Yangtze River with total capacity of 8000 TEU. The largest container ship in the river has capacity of 144 TEU (Liao, 2007).

The outdated fleet caused inefficiency in the operation of port facilities, as much new facilities built to handle modern container ships is ill equipped to operate with different ships of old types. The passing capacity of the ship lock in the Three Gorges has also been severely depressed as the ship lock had to deal with many vessels of different sizes (An, 2004). Furthermore, port of Shanghai suffers from another problem. As most vessels in Yangtze River cannot sail in the sea, containers generated in different regions along the Yangtze River that are carried by river vessels to Shanghai for transshipping to international destinations cannot directly dock on the Yangshan deepwater port. These containers must be unloaded in Waigaoqiao port, which is located along the bank of Yangtze River, then transshipped by coastal barges for about 70 nautical miles to Yangshan port for further transshipping. This double transshipping not only extended overall shipping time for the clients, but also put great stress on already strained capacity at Waigaoqiao port.

To improve the efficiency of the water transportation along the golden waterway, China Ministry of Communication has developed plans for standardization of river vessels. At the end of 2003, the new standard on container ship and truck ro/ro ship was announced. New standard on other types of river vessels were announced in 2004. It is planned that standardization of river vessels will be carried out in two stages (in two five-year plans) and by 2020 standardization rate should reach 90% for river vessels navigating in the trunk of Yangtze River. The average tonnage of standard river vessels will be 1200 tons (Sun and Zhao, 2006).

Another plan to improve gateway operations in port of Shanghai is to establish river-coast direct shipping route from ports in Yangtze River to Yangshan deepwater port in East China Sea to avoid double transshipping. Indeed, in May
In 2006, the first express route from Wuhan to Yangshan was open so that it now takes two days for the containers generated around Wuhan to arrive at Yangshan port for further transshipping to Europe. Without the river-coast direct shipping, it would take 5 days (Liao, 2007). As the number of containers handled by Wuhan port in recent years has grown at 30% annually, establishment of this express route would significantly enhance the effectiveness of Shanghai as the gateway for the regions in the middle reaches of the Yangtze River. In 2006, construction of the first special river-coast direct shipping vessel, the so-called Yangshan-class container ship, started in Shanghai. The Yangshan-class ship has a capacity of 400 TEU, and is fit for navigation between Wuhan and Yangshan, with annual carriage of 30000 TEU per ship.

On one hand, planned standardization of river vessels would improve efficiency of the gateway operations for the middle reaches of Yangtze River. On the other hand, it is also under plan that seagoing vessels should be able to sail into the Yangtze River in its lower reaches. As now, 80% of containers generated in the direct hinterland of Shanghai (Shanghai and neighboring cities in Jiangsu and Zhejiang provinces) are transported by land to port of Shanghai, which has seriously strained road system around Shanghai. If large seagoing vessels would be able to sail directly to the ports in lower reaches of the Yangtze River, the efficiency of Yangshan port in transshipping containers generated in Yangtze River Delta region would be further strengthened.

Making the ports in the lower reaches of the river accessible to the seagoing vessels necessitates the upgrading of waterway conditions, especially the water depth. There was a three-stage plan for deepening the waterway in lower Yangtze River. The first-stage work started in 1998 and completed in 2002, which provided an 8.15-meter water depth at the entrance to Yangtze River course. The second-stage work started in 2002 and finished in 2005. In November 2005, Ministry of Communication announced that the Yangtze River 10-meter deepwater course had reached Nanjing, which indicated that the 430 km waterway from Shanghai to Nanjing now was accessible to the 3rd and 4th generation container ships. The third-stage work started in 2006 and, upon its completion, would deepen the water depth further to 12.5 meters.

When the standardization of river vessels and deepening of watercourses are completed as planned, Yangtze River will truly become a golden waterway (Jin, 2006). Coupled with the completion of further facilities at the Yangshan deepwater port, port of Shanghai will be the gateway to the largest waterway system in the world (Feng, 2006; Ye and Jin, 2007).

5. CONCLUSION

Strategically located at the center of Yangtze River Delta, one of the most dynamic regions in China, Shanghai has experienced dazzling growth in recent years. Port of Shanghai has become the largest port in the world in terms of total freight handled, and the 2nd largest port in terms of total number of containers handled. Faced with such a high growth in demand, port of Shanghai is seriously under capacity shortage. The capacity strain is expected to be relieved after the construction of the new Yangshan deep water facilities are completed in a couple of years. Now Shanghai has ambition to become an international shipping center.
One of the long-term goals of port of Shanghai is to attract more international transshipping business and play a role similar to Hong Kong, Singapore and Busan, Korea. However, given the driving factors to the growth of Shanghai port, it is clear that port of Shanghai is best served to play the roles of a gateway port for domestic/international transshipping, rather than international/international transshipping, as Hong Kong, Singapore, and Pusan are doing.

In other words, port of Shanghai should be mainly supported by its hinterland-generated freight. While there is already a strong direct hinterland in the vicinity of Shanghai, it should not be overlooked that there is a vast indirect hinterland in the middle and upper reaches of Yangtze River that hold great potential and will drive future growth in the volume of freight especially the container for foreign trade into Shanghai port. The Yangtze River is a natural corridor, which links the interior regions of China to the Pacific coast through Shanghai. While the economic development in interior regions generally lags behind the coastal regions, the regions along the Yangtze River have experienced higher growth rates than the national average in China. At present, growth on water transportation along Yangtze River already surpassed growth of GDP by many times, the potential of this golden waterway, however, has not fully developed yet.

Large portions of the freight and containers generated in the regions along the Yangtze River and carried in the river require transshipping to international destinations in Shanghai. As Yangshan deepwater port is built in the middle of East China Sea, some 30 km away from the mainland, the efficient operation of the new facilities in Yangshan critically depends on the smooth feeding from the Yangtze River. As now, water transport in Yangtze River is severely restricted by several factors, most importantly the outdated river fleet and limited water depth in the river course. However, large amount of investment are being made and necessary steps are taken to push for direct sailing from Yangtze River to Yangshan and unleash full potential of the golden waterway in the future.

In conclusion, with direct and indirect hinterland of such grand scale and foreseeable development on the hinterland, growth of domestically generated containers would most likely outpace planned expansion in capacity in Shanghai. Therefore, Shanghai should aim for efficient gateway operations and providing best service to its clients along the golden waterway for domestic/international transshipping, rather than competing with other international shipping centers in Asia Pacific for international/international transshipping.

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