

Prospects for major ports in the Far East

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1. Introduction

Europe, North America, and Far East are the three main economic regions since 1990s. The future of the world economy will be conditioned largely by the performance of these three blocs that will influence the stability in the global economic order.

In Far East, China's rapid economic growth is threatening the projection of Busan Port. The rising cargo volumes and fast development of infrastructure in its ports make it profitable for carriers to increase the number of direct calls rather than looking to move containers between feeder and regional hubs. This rescheduling of liner services to and from China has particularly affected the Korean container port system and its major ports, Busan, Gwangyang and Incheon. Only a few years ago, Busan was positioned as the regional hub for Chinese export cargo. Now days, Busan is struggling to retain the transshipment cargo flows to and from China.

[Figure 1-1] Three main regions of the world economy



Source: Korea Transport Institute

The growth rate of container handling volume in Busan port has been decreasing every year since 2002. The different reasons need to be analyzed and measures have to be taken. Some European ports are attracting companies with high-value-added processes to face this situation; this need to be adopted as a one of the measure for Busan Port. So it is urgent to forecast the future position of Busan port in the Far East and then make proper strategies to survive as main port in the Far East and to add high value.

Chapter 2 will described changes in shipping and transportation in the Far East and the world. Chapter 3 will show a competitive analysis among the Far East, ports of Busan, Shanghai, Qingdao, Tokyo and Kaohsiung. In chapter 3 we examine the present position of Busan port in the Far East. Chapter 4 will analyze the strategies of European main port of Rotterdam and the Asian port of Singapore. Finally chapter 5 shows, from previous studies, prospect for major ports and derived marketing strategy for the port of Busan.

2. The change in the Far East

2.1 The progress and prospects of container volume in the world

The total volume of containers in the world has increased 37 times in the last 30 years (1970~2000). As Table 2-1 shows, it is presumed that the total volume of containers in the world was 266 million TEU. And regionally, East Asia's port handling volume has increased four times to 123 million TEU from 32 million TEU. But North America's handling volume has decreased to 19.6% from 25.6% in 2002. East Asia's volume occupied nearly half of world total volume.

[Table 2-1] The regional volume of container (unit: million TEU, %)

Year	1990	1995	1996	1997	1998	1999	2000	2001	2002
Total volume	85.93	144.04	156.43	174.60	189.62	208.59	233.66	243.59	266.00
East Asia	32.27 (37.6)	62.66 (43.5)	68.38 (43.7)	75.46 (43.2)	80.65 (42.5)	92.02 (44.1)	105.85 (45.3)	110.99 (45.6)	123.31 (46.4)
North and South America	21.57 (25.1)	32.06 (22.3)	33.63 (21.5)	38.10 (21.8)	42.03 (22.2)	44.34 (21.3)	48.57 (20.8)	49.61 (20.4)	52.22 (19.6)
Europe	23.14 (26.9)	34.12 (23.7)	37.71 (24.1)	42.70 (24.5)	47.20 (24.9)	50.49 (24.2)	55.47 (23.7)	57.39 (23.6)	62.11 (23.3)
Etc.	8.94 (10.4)	15.20 (10.6)	16.70 (10.7)	18.35 (10.5)	19.75 (10.4)	21.74 (10.4)	23.78 (10.2)	25.59 (10.5)	28.36 (10.7)

Source: Ocean Shipping Consultants, 2003, World Container port Outlook to 2015

According to Ocean Shipping Consultants (2003), the total container volume of the world will increase to 468 million TEU by 2010, 620 million TEU by 2015 and in East Asia, and 147 million TEU by 2010. (Table 2-2)

[Table 2-2] Forecasted container volume (unit: million TEU)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015
Total	243.6	266.0	287.0	310.1	334.3	358.5	410.9	438.8	467.9	620.0
East Asia	111.0	123.3	134.2	146.2	158.5	171.0	183.9	197.5	225.5	294.8
Northeast Asia	74.5	91.2	98.9	106.7	114.7	122.8	131.1	139.2	147.1	184.7
Southeast Asia	36.6	43.0	47.2	51.8	56.3	61.1	66.4	72.2	78.4	110.2

Source: Ocean Shipping Consultants, 2003, World Container port Outlook to 2015

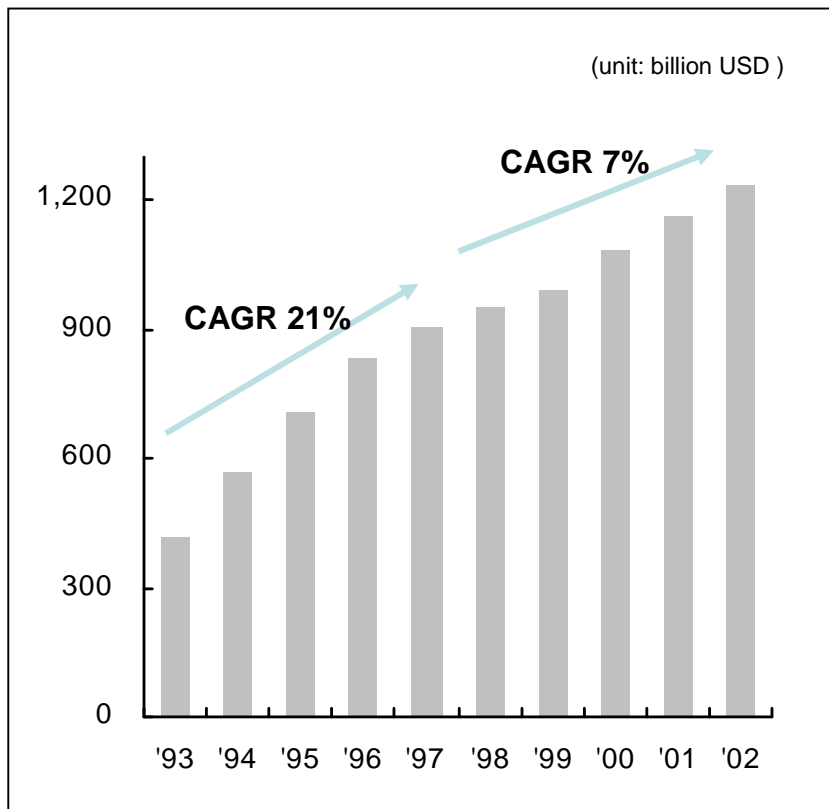
2.2 The change of economy in the Far East

The Far East economy mainly consist of Korea, China and Japan these countries are one of the most dynamic countries in the world and it will be keep going, prospectively. Since China joined WTO in 2001, it has increased rapidly its economic growth and international trade. The annual Economic growth of China was 21% (1993 – 1997) and 7% (1998-2002), the highest in the world. China’s continuous economic growth will also pull Korean and Japan’s economy, so these three countries would stand as core pillar of the world. (Figure 2-1)

These dynamic economic growths of Far East will increase the interdependency among

the different countries within the bloc and will lead to a trend of unification. These countries have good potential markets and common background in culture and geography. Although the competition is and will be strong, GDP will grow, FDI will be settled and cargo volume will increase, making the interaction between China, Japan and Korea necessary.

[Figure 2-1] The growth of Chinese GDP



Source: The United States-China Business Council, 2003

Far East's trading volume has increased considerable in the last 10 years. According to 'Containerization International Yearbook 2004' this region handled 100 million. TEU, compare to 253.41million in the world in 2004 and it is leading movement of cargo in

the world. The average rate in container volume has increase 5~6%, the Far East has increase 10~12% in the last 10 years.

2.3 The change of logistics in the Far East

The first change in Far East's logistics is the strategy of its different countries looking foreword to become logistics hub. Logistics hub can be defined as: ¹An integrated, sophisticated set of transportation, warehousing and distribution facilities and services under a sophisticated flow of reliable and just on time information systems that provide access to a marketplace. An important requirement for a logistic hub is the ability to combine at one point, the smooth movement of goods using multimodal transport into and out of a country as well as a distribution within the country.

The Far East's countries are gradually becoming more industrialized and it already considered as one of three big trading markets in the world. Hong Kong is expanding its infrastructure to handle expected demand up to 3200TEU. Korea, Taiwan and Japan are also investing in IT, terminal development, and road network to accomplish the demand of the new environment and customers. Japan and Singapore is working to construct logistics center for distribution, processing, store and assembling.

A Second change is the fast develop of Shanghai port. Shanghai government announced a logistics strategy "3 ports, 2 networks" on 16th Feb of 2003. Main object of this

¹ Julian Adolfo Barona Motlak, 2004, Requirements for the development of a competitive logistics hub based on Northeast Asia studies, Korea Maritime University

strategy is to position four clusters such as economy, logistics, trade and finance in the Asian region. These project threatens Korean port's main strategy to become the logistics center of the Far East Asia attracting Chinese transshipment cargo.

Yangsan port is building even 52 berths and water depth is 15M, so it will solve the main problems of Shanghai port such as infra capacity and water depth. When Yangsan port start to operate, the volume of transshipment cargo which has moved from Shanghai to Busan would decrease and post panamax size vessels could call Shanghai port directly.

A third change is the investment of specialize logistics company from Europe and USA in Asian ports. Nowadays companies are more concentrated in their core business leaving the logistics activity to 3PL or 4PL experts. New companies are investing more resources not only improving delivery but also processing, assembling and labeling.

2.4 Change of shipping and port environment

With the development in technology and cargo demand container ships are increasing the size, now is possible to build container ships with a capacity of 12,500 TEU and even 18,000 TEU.

Suez-max size ships, based on the Suez Canal access, and Malacca-max size ships, based on the Malacca Strait, have been introduced. The total length of a Suez size ships are 400m, the width is 50m, the draft 7.04m and the maximum capacity 11,989 TEU.

The Malacca-max size ship will be 400m in length, 60m in width, 21m in draft, and the maximum capacity will be of 18,154 TEU. Compared with ship size of 5,500 TEU ship and a 15,000 TEU ship, second one is 137m longer and 20m wider. (Table 2-3)

[Table 2-3] The information of Post-Panamax Class ship (Unit: m)

Size(TEU)	4,500	4,800	5,500	6,500	7,000	8,000	12,000	15,000
Class	Post-Panamax		Super Post-Panamax		Suez-Max		Malacca-Max	
Length	260.0	262.0	263.0	302.3	326.4	325.0	400.0	400.0
Width	39.4	40.0	40.0	42.8	42.8	46.0	50.0	60.0
Depth	23.6	24.3	24.3	24.1	24.1	27.1	35.0	35.0
Draft	12.5	14.0	14.0	14.0	14.5	14.5	17.04	21.0

Source: Payer, H,1999, Feasibility and Practical Implications of Container Ships of 8,000TEU and Beyond, Terminal Operation Conference & Exhibition, Genoa.

Wijnolst, N., Schlotens, M., Waals, F, 1999, Malacca-Max; The Ultimate Container Carrier, Delft University Press.

Main shipping companies as Maersk-Sealand, COSCO and P&O, are increasing their orders for Ultra Huge ships in 2005, 149 ships higher than 8,000 TEU. The biggest ones are 10,000 TEU for COSCO, and a 9,600 TEU for CSCL.

Changes in ships size are making shipping companies to operate using hub and spoke strategy. In a hub and spoke system of containerized seaborne trade, cargo to a region is delivered first to a major port and then transported to its final destination, whether by sea, rail, road or inland waterways. Similarly, exports from the region are collected in

the primary hub, and then transported to final destination. These hub ports are often equipped to allow for a quick turnaround time of vessels. There are usually two primary characteristics that set them apart from other ports: First they have strategic geographical position, central in a region, usually with an attractive local hinterland with a considerable amount of cargo flowing into the port.. Second, they can accommodate effectively bigger vessels.

3. Competitive analysis among Far East ports

3.1 Present situation

3.1.1 Ports of China

²China has 18,400km of coast line, 6,400 islands, and 222 ports with over 1,000million tonnages of loading and unloading capacity, 39 ports are dealing with over 1,000,000 tones of goods, and 11 ports dealing with over 10,000,000 tones. The Chinese government has a plan to build a thousand more ports by 2010, when their handling capacity would go up to 2,000million tones a year. According to ‘Trend of maritime and fishing’ issues by Korea maritime institute, the Chinese container shipping company COSCO has 110 ships dealing with 240,000 TEU; China Shipping has 90 ships dealing with 177,000 TEU and another Chinese shipping company SINOTRANS, has 36 ships dealing with 28,000 TEU every year.

The development of Chinese ports is mainly controlled by the central government and local government. In Shanghai, most development plan receives permission of Ministry of Communications. Central and local governments in China are interested to invest in port facilities and to develop infrastructures. They have high preferences to work with foreign companies. The government is responsible for the developing superstructure and then, transfers management right to private companies.

² Julian Adolfo Barona Motlak, 2004, Requirements for the development of a competitive logistics hub based on Northeast Asia studies, Korea Maritime University

China's rapid economic growth simultaneously requests enhancement in ports and logistics services. From 1989 to 2001, China recorded 13.6% of constant growth in its trading volume, compare to whereas 6.1% of the trading average value of the world. Chinese total trading in 2002 reach US\$ 6,027,000 million, which was an increase of four times their 1989 total trading amount. (Heo Yun-su, April 2004, A scheme for activating port related industries, Busan Development Institute, Busan)

Ports which in north of china has close connection with Korean ports, especially Shanghai, Qingdao, TianJin and Dalian have recorded high growth rate. These ports related to Korean ports as a competition and supplementation, and now they are under the development and expansion. Therefore it is already started to make direct call port which is mother vessel call these port directly and transport by trunk route. Especially Shanghai and Qingdao seem to promote as logistics main port in that region. (Table 3-1)

[Table 3-1] Container handling volume of China's big 10 ports

(Unit: million TEU)

		Year									Growth Rate	
		1990	1995	1996	1997	1998	1999	2000	2001	2002	90' - 95'	95' - 02'
Total of China		631	1732	1870	1993	2471	2939	3548	4473	5572	22.3	18.2
Ports in North China	Dalian	13	37	42	45	53	65	84	122	135	23.2	20.3
	Tianjin	29	70	82	94	102	114	145	201	241	19.3	19.3
	Qingdao	14	60	81	103	121	125	191	264	341	33.8	28.2
	Shanghai	46	153	197	253	307	396	531	634	861	27.2	28
	Total	102	320	402	495	583	700	951	1221	1578	25.7	25.6

Source: 1) Containerisation International Yearbook, 2004

2) Northeast Asia Director-General Meeting (2nd) Progress Report on "Future

Development of Sea Transportation Corridors in Northeast Asia”, Sept. 17-21, 2002, Seoul, Korea.

3.1.1.1 Port of shanghai

Shanghai is the largest commercial port in China. It is located along the largest tributary of the Chang Jiang that is the Huangpu Jiang, which runs north-south through the middle of Shanghai city and is regarded as one of the central hubs for ocean, coastal, inland, river and rail transportation in China. The port of Shanghai The total length of Shanghai's quays is 14km, and 12 terminals with 98 berths are situated along them.

In 1990, Shanghai throughput was of only 460.000TEU. In 2004 the statistics show a handling volume of 14,550,000TEU becoming the third biggest port in the world. (Table 3-1) Attracted by growing exports and rising domestic consumption of raw material, Shanghai is enjoying double-digit traffic growth and the country is rapidly building new facilities to meet demand.

Currently, Shanghai port is handling more than its planed capacity; also, big vessels of more than 7000 TEU can not call due to its shallow draft. The port authority urged to expand facilities, therefore, the Chinese government planed the new deep port that is settle in Yangsan Island, 35 km far from main land. This plan started in 2002 and it will solve the two main problems of the current port. It will have 20million TEU capacity and more than 15m draft. Five berths are going to be operated at the end of this year. Now the construction of the bridge, which connects main land of China and Yangsan

port is almost completed. It is forecasted that throughput will be rapidly increased by handling of transshipment at the end of this year.

3.1.1.2 Port of Qingdao

Located in the Yellow River basin and on the western Pacific Rim, Port of Qingdao is an important hub of international trade and sea-going transportation in China. Being a natural deepwater port, free of silt and freezing. It is located at the starting point of Qingdao-Jinan Expressway and Jiaozhou-Jinan Railway convenient for cargo gathering and transporting. Besides its business coverage in the whole Shandong Province, the Port, with its vast economic hinterland, has extended its business to such provinces and regions as Henan, Hebei, Shanxi, Shaanxi, Gansu, Inner Mongolia, Xinjiang and Sichuan. It has established trade relations with over 450 ports in more than 130 countries and areas.

Port of Qingdao consists of three port areas: Old Port Area, Huangdao Oil Port Area and Qianwan New Port. As a port offering comprehensive services, it can handle a variety of general and bulk cargo, and project equipment. Container, coal, iron ore, crude oil and grain are the five major cargo types of the port, and it also handles fertilizer, alumina, cement, sodium carbonate, rubber, wool pulp, cotton, ironware, lumber, and extra-large shipment.

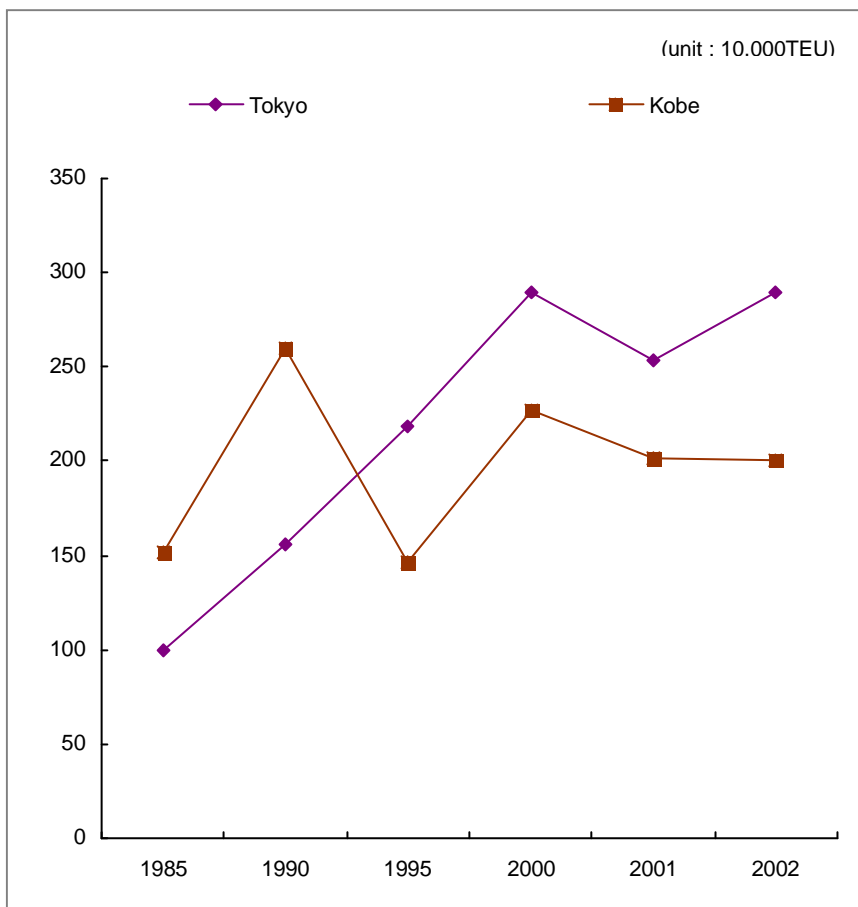
A traffic volume of 5.139 million TEU which has taken the top third place among all ports in China mainland was recorded in 2004. In international respect, the Qingdao

Port Group has successfully established over 20 joint ventures through by cooperating with some of the global top-500 enterprises, multinational companies, and world known shipping companies including Maersk, P&O, COSCO, Evergreen, and OOCL etc., which originate from countries and regions such as UK, Australia, Denmark, Finland, Singapore, Japan, Hong Kong and Taiwan etc., and has achieved good economic and social effects. In domestic respect, alliances with Sinopec, Sinochem Shandong, Kailian Group and other large-sized enterprises or groups have also realized win-win developments. (Port of Qingdao, <http://www.qdport.com/en/>)

3.1.2 Ports of Japan

There are about 15 major container ports in Japan including Kobe and Tokyo. Kobe is the largest one by port infrastructure. It has 32 berths and the deepest depth among the Japanese ports. Although port of Kobe was typical container port before that was occupying outer port merchant ship 70% that entered port in Japan, ranked top 6th ~ 7th in the world 2,710,000 TEU in 1994 as throughput amount. But nowadays it has handled less than 10% of Japanese cargo volume. Because of Kobe Earthquake that ravaged the port's facilities of Kobe in 1995. (Figure 3-1)

[Figure 3-1] Japanese ports container throughput



Source: Ministry of Land Infrastructure and Transportation, 2002. 4.

Containerization International

Port of Tokyo is the biggest one by container throughput in Japan. However, it handles only 3,560,000TEU in 2004 and is less than 30% out of Japanese total container traffic volume 14,566,953 TEU 30%. This is reason that is evenly distributed to port development that is developed in country whole area by local government.

Now Japanese ports faced on decreasing cargo volume and inefficiency of port facilities moreover Japanese cargo which be transshipped in port of Busan is increasing due to

high cost of Japanese domestic logistics. To solve these problems, the Government of Japan has prepared developing plan for 5 years, as super hub port project. Because this plan combines main solidify port and big change. Also competitive power improving efficiency and it is contents that rear hub port which is linked international logistics center and super hub port and develop main important ports of Japan as "Asian physical distribution hub."

3.1.3 Ports of Taiwan

The Port of Kaohsiung is strategically located close to the trunk route of shipping. It has connected to most of the different ports of the world. Its throughput is around 9.7 millions ton of import-export cargo and it handles 2/3 of Taiwan's cargo in 2004. So many large shipping companies recognize the advantages of this port. 9 out of 20 container companies have dedicated terminal in the port and are doing transshipment activities. Maersk takes up 60% of all, APL 70%, Evergreen 46%, Angming and Sealand 40% OOCL 34% and about 15% by HMM as transshipment cargo.

There are special policies to attract Transshipment cargo to the Port of Kaohsiung. First, Main shipping companies are allowed to operate their dedicated terminal. Second, they impose a moderate port handling cost. Third it is operating Export Processing Zone and Kaohsiung Storage and Transfer Area.

Since 1965, Economics department of Taiwan is deregulating to simplify customs processes and encourage settle of FDI. Recently they are operating special areas that

solidify function of warehouse and physical distribution and South Taiwan Technical Industry Park.

Port of Kaohsiung is occupying the constant position which has the 6th largest container handling volume in the world, through the increases amount of transshipment cargo beside thing that handle the Taiwan itself posts based on substantial smaller size enterprises. Present the government of Taiwan is planning that establish strategy to develop Taiwan as 'Asia Pacific area operation center' and it is going to being propelling that rear Port of Kaohsiung among it to main port area.

3.1.4 Ports of Korea

Port of Busan is located in the southeast region of the Korea peninsula, the Port of Busan acts as a gateway connecting the Pacific Rim with the continent of Asia. As the foremost port in Korea, Busan Port processes 40% of total marine export cargoes and 81% of container cargoes in Korea as well as 42% of marine products domestically produced. Busan Port is consisted of Jasungdae, Shinsundae, Gamman, Shingamman, Uam and Gamcheon terminals. Port of Busan is the fifth largest container port in the world in 2004 by container throughput. (Table 3-2)

Port of Busan handled 11.38 million TEU in 2004, which is twice as much as its capacity. This causes the congestion of freight and vessels and results in lower service level than its competitors.

[Table 3-2] Infrastructure of Busan port

(unit: TEU, m)

Classification	Jasungdae	Shinsundae	Gamman	Shingamman	Uam	Gamcheon
Length(m)	1,447	1,200	1,400	826	500	600
Handling Capa (1000TEU)	1,200	1,200	1,200	650	270	370
Berthing Capa	50,000x4	50,000x4	50,000x4	50,000x2	20,000x1	50,000x2
	10,000x1			5,000x1	5,000x2	
Terminal Area (1,000 m ²)	647	1,039	731	308	180	148
Draft(m)	-12.5	-14~15	-15	-12~15	-11	-13
C/C	12	11	13	7	4	4

Source: Busan port authority (<http://www.pba.or.kr/>), 2005

To solve this problem, Busan new port, with 30 berths, is going to be completed in the area of Gadeokdo by 2011. (Table 3-3) This mega project will reduce total logistics costs and will enhance national competitiveness through smooth processing export-import cargoes, expansion of cargo facilities and enhancement of cargo handling capacity.

[Table 3-3] Outline of Busan new port

(unit: TEU, m)

Classification		Overall	Stage 1	Stage 2
		(1995~2011)	(1995~2008)	(2009~2011)
Total	Project Cost	91,542	55,519	36,023
	(100 million won)			
	No of Berth	30	14	16
	Handling volume (10,000TEU)	804	352	452

Source: Busan port authority (<http://www.pba.or.kr/>), 2005

According to Table 3-4, Busan ports handled around 11 million TEU over 2004, and it has been increased year by year. 58 percentages of them are local cargo and 42 percentages are transshipment to different countries in 2004. Chinese cargo accounts for 55-60% and Japanese cargo for 30-35%.

[Table 3-4] Port throughput of port of Busan

(unit: TEU, m)

	2000	2001	2002	2003	2004
Import	2,483,753	2,496,764	2,729,332	3,029,020	3,286,361
	33%	31%	29%	29%	29%
Export	2,551,162	2,513,877	2,792,399	3,005,983	3,308,609
	34%	32%	30%	29%	29%
Transshipment	2,389,956	2,942,983	3,887,457	4,251,076	4,791,942
	32%	37%	41%	41%	42%
Total	7,424,871	7,953,624	9,409,188	10,286,079	11,386,912

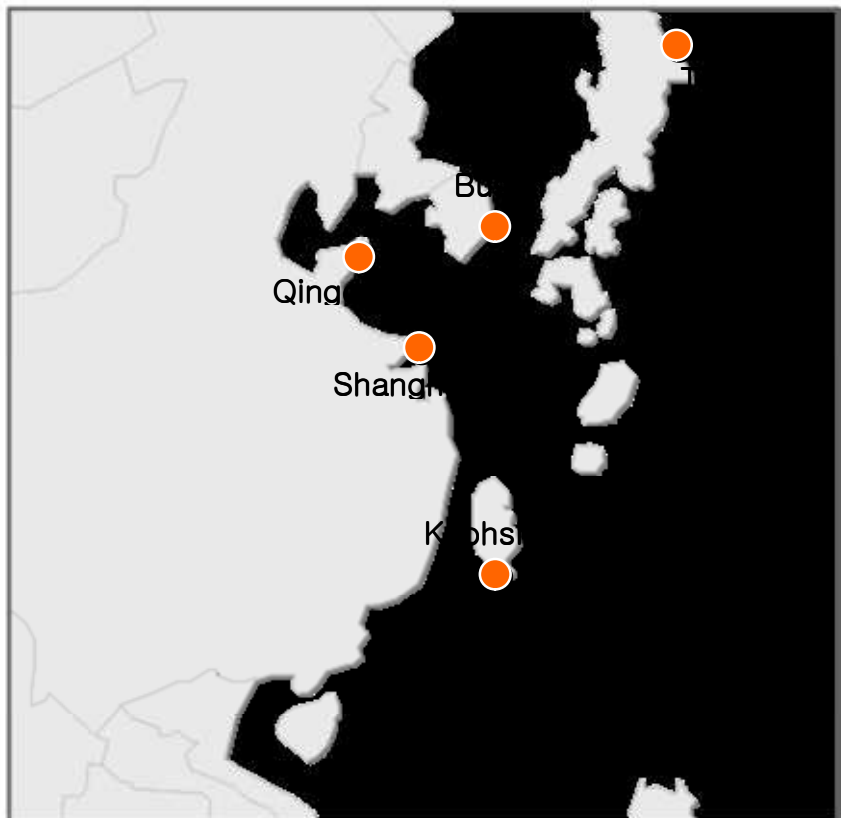
Source: Busan port authority (<http://www.pba.or.kr/>), 2005

3.2 Competitive analysis

The port competitiveness depend on usual factors as: geographical location, equipment infrastructure, its throughput, cost structure and service now, also another factors as port network, logistics information system and Logistics Park are of high importance.

In this chapter, it is going to be comparing the main ports in Korea, China, Japan and Taiwan such as port of Busan, Shanghai, Qingdao, Tokyo and Kaohsiung. These ports were considered due to their close competition with Busan port in container transshipment cargo and also to their level of container handling in 2004.

[Figure 3-2] Main Ports in the Far East



Source: Arthur D. Little, 2003, Benchmarking

3.2.1 Port Infrastructure

Nowadays, Far East ports have suffered from lack of infrastructure. In order to preoccupy the cargo that is increasing rapidly, the neighbor countries have been implementing their plans to expand the capacity of port infrastructures until 2020.

In case of berth number, Kaohsiung has the largest amount with 27 berths, followed by Shanghai with 22 berths, Busan 21 and Tokyo 15. Qingdao has the smallest amount with only 7. (Table 3-5)

[Table 3-5] Present situation and development plan of Far East main ports

Port	Present Berth Number	Short-term development plan	Whole development plan
Busan	21	3 berth to 2005	30 berth to 2011
Shanghai	22	14 berth to 2006	52berth to 2020
Qingdao	7	3 berth to 2006	14 berth to 2011
Kaohsiung	27	5 berth to 2008	23 berth to 2020
Tokyo	15	n.a.	n.a

Sources: Korea container terminal authority, 2005.3, Trend and analysis of main ports in the world

All the different ports mentioned are facing serious problems with infrastructure capacity. Terminals are investing resources and expanding facilities to be more efficient and attract more cargo.

According to table 3-6, port productivity which is handling number of container box during the unit time when vessel comes alongside the pier to time of finish handling, shows that Kaohsiung has the most efficient one and the others has problem in their productivity.

[Table 3-6] Port productivity (unit: TEU/hour)

Port	Busan	Shanghai	Kaohsiung	Tokyo
Port Productivity	65	57	90	60

Source: Korea maritime institute, 2002.4, Study of plan to increase of port's productivity

Port of Busan is building the new port in Gadeok. It will have 30 berths and more than 15m of water depth. Its handling capacity is projected to be 8.04 million and the objective is to be a transshipment hub T/S. Its facilities are inside Busan-Jinhae Free Economic Zone. It's a major project to develop Busan as a logistics hub. Busan new port will enhance competitiveness in the area solving the congestion in the old port.

Shanghai authority is building the Yangshan deepwater port, which has 52 berths and 15m of water depth. Yangshan island is 30 Km from Shanghai southern where is far

from around 30km from Shanghai's southern coast. According to the master plan, the whole project will be completed by 2011 and the annual handling capacity of the deepwater port will increase to around 25 million TEU.

Port of Qingdao has old facilities and has built two modern areas with advance facilities to increase its handling capacity. It is going to operate a new terminal in 2006 which has 3 berths, 17.5m of water depth.

Port of Kaohsiung is using 27 berths and another 23 berths are under construction, It will be completed by 2011. Compare with the other competitors, Kaoshiung has the best capacity also, in case of handling productivity has a high competitive advantage compare to the other ports in Northeast Asia.

Port of Tokyo has total 15 berths and it consist of Oi, Aomi and Shinagawa container terminal. To enhance port's capacity and efficiency, it had redeveloped the area to convert the eight existing berths into seven large-scale berths in order to be able to cope with the increased size of container vessels. The project started in 1996 and will be completed in 2003.

3.2.2 Port throughput

Port of Busan handled around 11million TEU in 2004, making it the world's number five, only giving way to Hong Kong, Singapore, Shanghai and ShenZhen. Of total traffic, 60% is local cargo and 40% is transshipment. Of this latter figure, Chinese cargo

accounts for 55-60% and Japanese cargo about 30-35%. Port of Busan comes down in the ranking after 2001 but port of Shanghai overtook Busan in 2002 and then now is third port in the world by throughput volume.

Port of Shanghai and Qingdao recorded double digit growth rate in 2004. Shanghai handled around 11 million TEU and recorded the third largest container port in the world in 2004. Port of Qingdao's container throughput reached 5.139 million TEU, which has taken the first largest container port among all ports in North China.

Port of Kaohsiung handled around 9.7million TEU and recorded 9.84% of growth rate in 2004. And Port of Tokyo recorded 7.3% of growth rate which is the lowest figure among the competitors.

In case of transshipment cargo's volume Busan port handled 4.2million TEU, Kaohsiung port handled 3.11 million TEU and Tokyo port handled under the 5% of total cargo in 2002 moreover amount of transshipment cargo in Busan and Kaohsiung has been increased so these ports have a competitiveness as hub port otherwise Tokyo's seriously short of cargo amount to be a hub port.

The importance of feeder service on container shipping is increasing and feeder service is becoming an essential factor when port's policy make. After attracted transshipment cargo, profit is created not only in a in-out of mother vessel but also in a handling facilities. Temporary storage facilities can make a high value without hinterland traffic

connection. Due to its market and GDP growth it is necessary to try to handle cargo from and to china to become the logistics hub in this area.

[Table 3-7] Throughput of Far East's main ports (unit: million TEU)

YEAR	2001	2002	2003	2004	Average growth rate (%) (2003-2004)
Busan	7.906	9.453	11.281 (5)	11.442 (5)	9.93
Shanghai	6.334	10.898	10.408 (3)	14.550 (3)	29.14
Qingdao	2.640	3.410	4.238 (14)	5.140 (14)	21.23
Kaohsiung	7.540	8.493	8.843 (6)	9.710 (6)	9.84
Tokyo	2.770	2.712	3.310 (17)	3.560 (19)	7.30

Sources: Korea container terminal authority, 2005.3, Trend and analysis of main ports in the world

3.2.3 Logistics Park

According to the information of Busan Metropolitan city (2004), Shanghai port and Kaohsiung port have about 793.2 ha and about 470 ha of Logistics Park each. Busan, compare to the other competitors in the Far East is deficient in such projects. The construction of Busan Newport and the establishment of its three different Free Economic Zones will urge settlement of Logistics Park but only different steps will be ready in 2005. So government has made effort to develop a logistics parks, in result there are some free trade zone where are operating and has planed in Yongdang Region

in North Port and Western area of Gamcheon Terminal.

[Table 3-8] Free Trade Zone of port of Busan

	Yongdang Region in North Port			Western area of Gamcheon Terminal(2004)	
Location	Sinseondae Terminal Region	LME Warehouse	Chunil CY Region	Hanjin Terminal Region	Reclamation region 7 of CJ
Area	1,000,000m ²	16,000m ²	7,000m ²	130,000m ²	148,000m ²

Source: Busan port authority (<http://www.pba.or.kr/>)

To see the current situation of logistics parks in other ports, In case of Shanghai Waigaoqiao Free Trade Zone, the largest FTZ in China set up in 1990. According to Shanghai port authority, the area for development in the zone is 10 square kilometers. At present, the first tract of-land is already under the custody of the custom office. An area of 5.5 sq. km is ready, equipped with a complete utility system. Through five years of development, an area of 3.5 million sq. meters has been put into construction, 1.4 million sq. meters has been completed, which includes office buildings, standard factory building, public warehouse and other service facilities, with the plentiful daily supply of water, electricity, gas, power and communication.

Port of Qingdao makes effort to attract global companies in their logistics park. Regarding to FDI, the Qingdao Port Group has established over 20 joint ventures by cooperating with some of the global top-500 enterprises, and world known shipping companies including Maersk, P&O, COSCO, Evergreen, and OOCL, achieving good economic and social welfare. Locally, alliances with Sinopec, Sinochem Shandong, Kailian Group and other large-sized enterprises or groups have also realized win-win developments.

Recently Kaohsiung is operating special areas that solidify function of warehouse and physical distribution and South Taiwan Technical Industry Park. Tokyo is remodeling their warehouses and distribution centers, which complement terminal functions, have been set up in reclaimed areas behind each terminal and arterial routes. Other roadways has also been developed to facilitate distribution activities

Comparing rental costs Busan has the most competitive price, 0.47USD per 1 square meter per year, Shanghai and Kaohsiung have comparatively high prices.

[Table 3-9]Comparison of the charge for hire of hinterland site (unit: USD/m²)

PORT	Charge for hire	Use of hinterland
Busan	0.47	Free trade zone(Busan new port)
Shanghai	6.82	Bonded warehouse
Kaohsiung	4.71	Export processing area

Source: Busan-Jinhea free economic zone authority (<http://eng.bjfez.net/>), 2005

3.2.4 Port cost

Port cost is one of main factor when shipper decides where to call. It is hard to accurately make a comparison, in this study, it is only compare handling charge and rental fee of port facilities by tariff of each ports.

On the basis of port of Busan, port's cost of Shanghai is cheaper than Busan but Kaohsiung and Tokyo are more expensive than Busan. So port of Busan has a competitive advantage about the port's cost. But recently Japanese government is going to down their port cost as Busan's to improve their competitiveness. .

[Table 3-10] Port cost of main ports in Far East

Port	Port Cost
Busan	100
Shanghai	84
Kaohsiung	161
Kobe	219

Source: Korea shipping garget, 2001, "2001 statistics book of shipping and logistics", P 97

3.2.5 The service of Port

Port service depends on several factors such as terminal facilities, technology of handle of cargo, customs procedures and number of employees who have enough skill and

experience. In the information made by the World Bank in 2001, it shows a service level rate on port's service.

According to the following table 3-11, Ports of Korea and China recorded the lowest service level among the competitors. And Taiwan port recorded the highest service level among the Far East Asian ports.

[Table 3-11] Index of port efficiency

National	Port Efficiency	Ranking
KOREA	4.12	5
CHINA	3.49	6
JAPAN	5.16	4
TAIWAN	5.18	3
HONGKONG	6.38	2
SINGAPORE	6.76	1

Source: Clark,X.,Dollar, D., Micco, A., 2001.2, Maritime Transport Costs and Port Efficiency, World bank

4. Some Cases in European Ports and Asian port

In this chapter, by researching of advanced foreign ports' general information and management strategies to survive as main port and to add values, we derived proper strategies for port of Busan. The Port of Rotterdam, successful European port, is studied, and the Port of Singapore where operating add high value industry is researched.

4.1 Port of Rotterdam

The Port of Rotterdam is the largest European port and one of the largest ports in the world in terms of both gross tonnage and TEU handled. And it is also Europe's most important port for oil & chemicals, containers, iron ore, coal, food and metals. Located on the North Sea - the busiest sea route in the world - this Dutch port serves a European hinterland of about 380 million consumers.

It covers an area of 40 kilometers, from the center of the Rotterdam city to the North Sea. The port and industrial area covers total 10,500 hectares (26,000 acres). Annually, around 30,000 seagoing vessels and 130,000 inland vessels enter the port of Rotterdam. The port of Rotterdam is a major factor in the national and regional economy. It has occupied 10% of GDP, which is about 30 billion USD, of Nederland, 100 thousands people out of 380 thousands total population of Rotterdam city.

There are some key factors in port of Rotterdam became as hub port in Europe. First of all, it is Distriparks. Rotterdam has a port offering all the value added facilities and services a company would need in a European distribution center; multi-user and dedicated terminals, capable of handling vessels carrying over 7000 TEUS aspect of transport and distribution services including many third party logistics service providers, comprehensive multimodal transport facilities to every major European destination. To maximize the benefits of mainport Rotterdam to shippers and the container transport industry, the port of Rotterdam offers specialized distribution areas known as Distriparks. Three Distriparks such as Eemhaven, Botlek and Maasvlakte, have been set up in the port area, each with specific characteristics to meet the needs of the companies established there.

Distriparks are advanced logistics parks with comprehensive facilities for distribution operations at single location; a location close to the container terminals and multi-modal transport facilities, employing the latest in information and communication technology. The companies situated in the distriparks are handling various types of activities and services such as freight forwarding, warehousing and distribution, value-added activities and customs representation.

Second factor is inland traffic network in hinterland which likes a hub-spoke. Goods bound for the hinterland can leave the port by river, rail, road, pipeline or sea. In case of road, it is directly connected with England to Hungary and Scandinavia peninsula. Moreover railroad network is connected with almost main industry areas such as Moscow, Prague, and Milan everyday. It is possible to transport to the Czech Republic,

Switzerland and Poland by railroad within 24hour. Rotterdam operates 30 routes of inland navigation services and provides short sea shipping and feeder service to Eastern Europe and Northern Africa everyday.

³Feeder services mean a key link to international transport of containers via large vessels between Rotterdam and destinations in USA, the Far East, South America and Africa. Mainport Rotterdam is the hub for feeder transport via smaller vessels to and from dozens of ports throughout Europe.

Short sea concentrates on maritime transport between Rotterdam and smaller ports in neighboring locations. There are many sailings a day in the form of scheduled services and charter: for any type of cargo; container, general cargo, trailers, dry and liquid bulk. Reducing loads on the road and other land-based transport facilities, reducing cost, stimulating the economies of other network ports, short sea provides boundless possibilities. Specialized vessels guarantee optimal handling of specialized cargoes. Made-to-measure transport. Ro-Ro offers an extra dimension for the speedy movement of wheeled stock. Within a day, you are door-to-door, for instance, deep into the heart of Great Britain.

The Rotterdam short sea terminal is the key location close to the coast where sea connections arrive. The connection to inland shipping and rail shuttles, with a number of departures directly from the terminal, is excellent. More and more companies are becoming convinced of the advantages of short sea and feeder transport. Because the authorities are encouraging its use, facilities are being ever better supported.

³ Rotterdam hinterland connection 2001 brochure

[Table 4-1] Modal split freight traffic

Modal split	Proportion of modal (%)
Road	39
Rail	11
Inland navigation	26
Short see/feeder	24

Source: Port of Rotterdam, 2001, Rotterdam hinterland connection brochure

4.2 Port of Singapore

Port of Singapore is the world's largest transshipment hub and it is operated by PSA which is a global leader in the ports and terminals business. Functioning as one integrated facility, it has four terminals at Tanjong Pagar, Brani and Pasir Panjang, handle over 60,000 containers and 60 vessel calls on an average day.

Moreover, Singapore port provides 200 shipping lines with connections to 600 ports in 123 countries. This includes daily sailings to every major port in the world. It handled 21,340,000TEUs, which of 80% consist of transshipment cargoes, in 2004, has the second rank container handling volume after Hong Kong.

So its position is the World's busiest hub for transshipment traffic. It is also the world's biggest bunkering hub, with 23.6 million tones sold in 2004. The chemical store market in Singapore is highly developed, because it has a lot of bunker storage facilities and

low tariff rate. So there are almost of refinery in the world and bunker price in Singapore became the standard in the Asia. The Singapore government has opened customs clearance and tries to make their bunker storage market competitive.

Major logistics activities linked to the Port of Singapore have been developed in the above indicated areas, which collectively are known as the Distribelt. In this area is used as add high value area such as pecking, labeling, assembling, grouping, by attracted multi-national companies and global logistics companies. There are four Distripark in Singapore such as Keppel Distripark, Alexandra Distripark, Pasir Panjang Distripark and Tanjong Pagar Distripark. By these Distriparks, port of Singapore has created around 16.5 billion USD, which is 11.5% out of total GDP in Singapore, per average year.

The reason, why the Port of Singapore is highly developed, is not only the government's strife, but also, its continuous expansion. Now, the Port is building 3 more terminals, named Pasir Panjang Terminal to deal with expected handling volume in the future. The PPT aims to make their ports efficient and competitive by reducing time when ships come and leave along side pier. Besides, they try to make waiting time to "0" and meet their customer's needs.

Second, the Port of Singapore has strong willing to attract shipping companies. The port does not lend their ports. They operate all of the ports, and try to sufficient shipping companies' wants by taking whole charge.

Third, the Port of Singapore extends their business to oversea area. The PSA Corporation is making inroads into foreign market with their successful marketing skill. The International Business Department of PSA is looking forward to making 30% of their profit from abroad business field. They aspire to operate Chinese and Southeast Asian ports, to build world class ports network.

5. Prospect for major ports in the Far East and some marketing strategies for Busan port

By chapter 3, we can forecast the hub port in Far East in the near future by comparative analysis, and this analysis also shows us the current position of Busan port in the competition. And by chapter 4, we derive some marketing strategy for port of Busan to survive as main port in the Far East and to add high value.

5.1 Prospect for major ports in Far East

Now, ports in the Far East struggle to become the hub port in the region. Therefore it is necessary to forecast the winner of this competition and future's structure of this region then prepare our response plans for expected situation.

As a result of comparative analysis on port infrastructure, port throughput, Logistics Park, port service and port cost in chapter 3, we could find some factors as follows. In respect of port infrastructure, Far East ports have suffered from lack of infrastructure. In order to preoccupy the cargo that is increasing rapidly, the neighbor countries have been implementing their plans to expand the capacity of port infrastructures until 2020. In case of berth number, Kaohsiung has the largest amount with 27 berths, followed by Shanghai with 22 berths, Busan 21 and Tokyo 15. Qingdao has the smallest one with only 8.

In case of expansion scale, Shanghai will have 36berths by 2006 and 74berths by 2020, followed by Busan with 51, Kaohsiung with 50 and Qingdao with 21. By this expansion, lack of infrastructure should be getting better and better then automatically productivity and efficiency on the ports would be increased.

In respect of port throughput Chinese ports recorded more than 20 percentages of average growth rates during 2003 to 2004, besides Shanghai recorded nearly 30% of average growth rates during same period. Then Busan and Kaohsiung recorded single number of average growth rates during the period, and it seems to decrease than before but transshipment cargo is increasing constantly. But Tokyo recorded the lowest one among the competitors.

In case of Logistics Park on the port hinterland, Shanghai and Kaohsiung port have about 793.2 ha and about 470 ha of Logistics Park each. Also Port of Qingdao makes effort to attract global companies in their logistics park. Regarding to FDI, the Qingdao Port Group has established over 20 joint ventures by cooperating with some of the global top-500 enterprises, and world known shipping companies. So Busan compare to the other competitors in the Far East is deficient in developing and operating logistics park. But comparing rental costs Busan has the most competitive price, 0.47USD per 1 square meter per year, Shanghai and Kaohsiung have comparatively high prices.

In case of port cost, on the basis of Busan, port cost of Shanghai is cheaper than Busan but Kaohsiung and Tokyo are more expensive than Busan. So port of Busan has a competitive advantage about the port's cost.

In case of port service, ports of Korea and China recorded the lowest service level among the competitors. And Taiwan port recorded the highest service level among the Far East Asian ports.

In consequence, after be completed the Yangsan new port, port of Shanghai might be the hub port in the Far East. Moreover, after be completed the expansion of port infrastructure in north Chinese ports, Chinese transshipment cargo on Busan port is going to decrease by direct call to China. And the chance of Tokyo port getting the promotion as hub port is slim, considering the long economy slump in Japan, high cost of domestic logistics and high tariff of ports. It is possible for port of Kaohsiung to continuously develop through the increase in transshipment cargo, active policies in port operation and attracting global logistics companies and shipping companies.

In view of results so far achieved, port of Busan has good prospect after open the Busan new port but it will be no longer than six years when after Chinese ports complete of expansion their port infrastructure by 2011. Therefore transshipment cargo from and to China in Busan port can expect to decrease. Fortunately, transshipment cargoes from and to Japan in Busan port are steady increasing now.

5.2 The some marketing strategies for Busan port

On the basis of results from forecasting of future situation among Far East ports and researching of advanced ports in the world, now we should derive proper strategies for port of Busan.

5.2.1 A strategy to attract big shipping companies

As we have seen, Shipping companies enlarge the size of their ships and reduce call at ports to pursue Economies of Scale. In case of Busan port, increased direct calls to China make shipping companies to skip call to its port. Therefore, it immediately causes reducing Busan port's transshipment cargo volume. When the shipping companies change the route, it is really difficult to get it back, so it is very important that not letting the shipping companies leave. However, Busan port has some problems with the depth of port and a difficulty keeping their feeder service companies. Having a joint venture with big shipping companies will be a good answer for Busan Port.

There are many ways to attract global shipping companies, one is that make them invest in port and offer the dedicated terminal. Needless to say port's tariff and productivity is one of most important factors, so Busan should have competitiveness on them. Also offering the regular feeder service with proper price is good strategy.

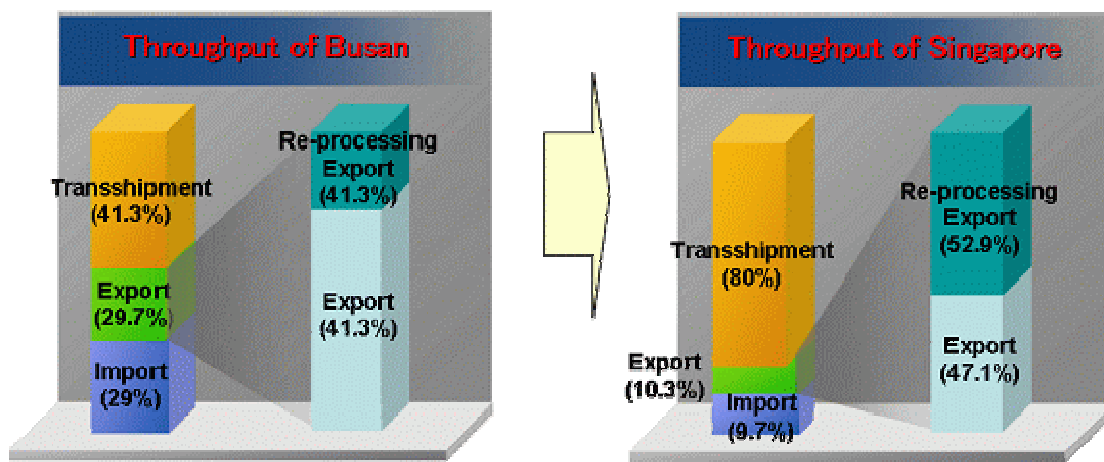
The importance of feeder service on container shipping is increasing and feeder service is becoming an essential factor when port's policy is made. After attracting transshipment cargo, profit is created not only in an in-out of mother vessel but also in handling facilities. Temporary storage facilities can make a high value without hinterland traffic connection. Due to its market and GDP, growth it is necessary to try to handle cargo from and to china to become the logistics hub in this area.

5.2.2 Raising ports related industries

Just growing of the quantity of handling volume, we can not expect high profit. It just causes bigger congestion. Attracting the regional distribution center like the EDCs (European distribution center) in Europe and distribution center like the Distripark in Rotterdam can bring second or third high value.

[Figure 5-1] Enhance the re-processing and export

Enhance the Re-processing / Export



Source: Arthur D. Little, 2003, Design to attract global logistics company

The first way to add value is creating processing circulation. Global companies' product bases are distributed around the world for their aims; this trend would cause needs of processing circulation for ports. Especially, now China works as world's factory. Therefore, it makes surrounding countries to add more processes to the good, they circulate. Developing ship industries including oil industry is good alternative, too. As you can see in Fig.5-1, Busan port has changed from its simple way to handling volume with value added business. This change needs the port to be competitive and needs to induce international logistics companies.

If the port can not induce international logistics companies, they have to raise logistics companies which based in the country. Logistics activities always can be done by logistics companies, there is no way to build global logistics network without any logistics companies. Now Busan port, can shortly make profit by trading with Japan, they have to induce a company which has business field in Japan's market. Moreover, Companies that have already big business field in Northeast Asia. Busan port has to raise Korean logistics companies; HanJin, DaeHan, Kukbo and CJ-GLS, as well as foreign big companies. Leading them to M & A or strategic alliance, which make the companies bigger.

Many countries thrive to attract foreign capital by developing the Back Yard, designating the Free Trading Area and Duty Free Area through their main ports. It can be predicted that extending of FTA would break the trading barrier, therefore the international companies would extend their business field to any other countries more easily. Under this trend, the international logistics companies would try to concentrate on their storages.

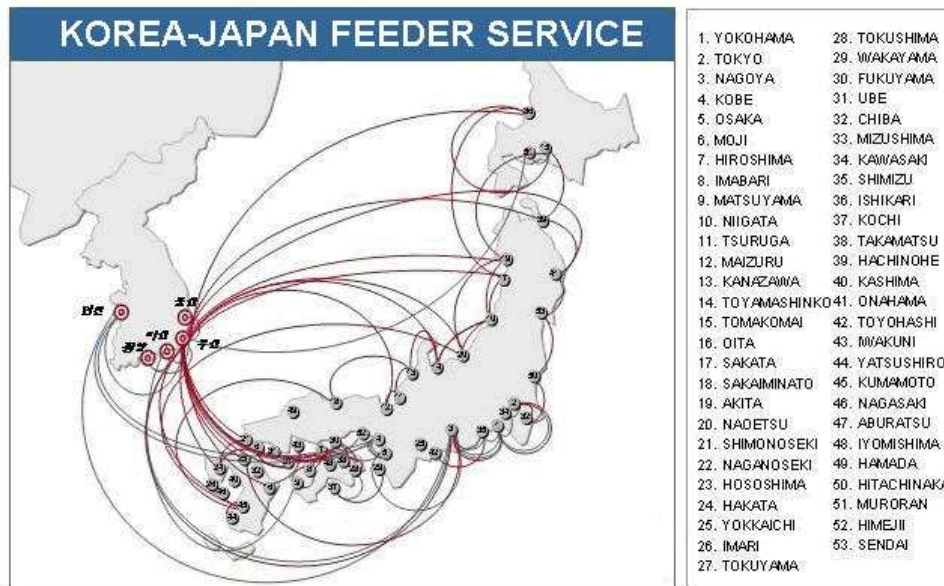
5.2.3 Attracting transshipment cargo and multilateral market

For Busan port, the amount of trading is mostly fixed. In a long term of view, it will be decreased by leaving middle and small size manufacturing companies. Therefore it is very important to keep the transshipment cargo volume constant. According to the data from Busan port authority, now Busan port's main trading country is China; Dalian,

Tienjin and ShenZhen, it needs to be corrected their strategy concerning increasing direct calls from China.

The amount of trade with Japan constantly increases. Because of expensive inland transportation cost in Japan, it is easier for shipping companies to bring their shipment by sea route. The total amount of transshipment to Japan was 30% out of country's total transshipment, and it is increasing every quarter. As we can see in Fig. 6 between Korea and Japan, there are more than 50 feeder sea routes. So it is important to meet the shipping companies' needs and make it more active. Further research and analysis have to be conducted to develop the natural merit with Japanese trading.

[Figure 5-2] Korea-Japan feeder service



Source: Arthur D. Little, 2003, Design to attract global logistics company

6. Conclusion

China's distinguished economic growth as the world's factory has changed the environment of shipping and transportation and it will accelerate keen competition in Far East. This kind of change is threatening Busan Port, Korea which aspires to be the main hub port in Far East, suggesting Busan Port to adapt to new shipping and transportation circumstances and to make the effort to be an extremely competitive port.

With the development of Chinese ports and economy, shipping and transport environments; the condition of hub port plan of Busan port has become worse. Moreover, Busan ports handled around 11million TEU over 2004, 60% of them were local cargos and 40% are transshipment consisting of Chinese cargos which accounts for 55-60% and Japanese cargos about 30-35%. Volume of import and export in Korea is almost fixed, moreover we should consider reduction of volume by moving facilities to abroad.

Therefore we must find a solution of this struggling situation. As we searched in the previous chapter, we found some strategies in some developed ports in Europe and Asia.

First strategy is that we should attract big shipping companies. Nowadays container shipping companies have pursued Economies of Scale. So they only call at hub port in that region.

Second one is that developing industries which related to port. There are two methods. First one is that create re-imported cargo after distributing and processing. And second one is that affecting and fostering a global logistics companies in a port's logistics park.

Third strategy is that attracting transshipment and multilateral market Therefore we need more effort to Japanese market such as enhancing scope of routes and frequency of service. Port of Busan can get the chance as a major gateway for Japan. Carriers and Japanese companies are making greater use of Busan because it has proven to be cheaper to transship cargo through Busan than making direct calls at mainland Japanese ports.

In order to find proper answers for these studies, further research, and more in particular disaggregated empirical research is required. From a detailed and correct data, this will allow us to gain a quantified insight into the complexity of and interaction between various links in the struggling situation.

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