Port Competition and Co-operation

Case study: Busan Port

by

YOON, MI-SUN

Department of Northeast Asia Logistics System

The Graduate School of Korea Maritime University

February 2007

DECLARATION

This is to certify that dissertation was submitted

in order to obtain dual degrees of Master of Logistics

from the Department of Northeast Asia Logistics System

at the Graduate School of Korea Maritime University

and

Master of Science in Transport and Maritime Management

at the Institute of Transport and Maritime Management

of the University of Antwerp

Approved by

Course Supervisor at Korea Maritime University
Prof. Dr. Ki-Chan Nam

Thesis Promoter at the University of Antwerp
Prof. Dr. Willy Winkelmans

Thesis Supervisor at the University of Antwerp
Mr. Fred Vossen

February 2007

University of Antwerp

Institute of Transport and Maritime Management

Port Competition and Co-operation

Case study: Busan Port

Student : **Misun Yoon**

Promoter : **Prof. Dr. Willy Winkelmans**

Supervisor : **Mr. Fred Vossen**

Academic year : **2005 - 2006**

Dissertation submitted in order to obtain the degree of Master in Transport and Maritime Management

Abstract

The port logistics environment, including seaborne trade, shipping and ports is changing rapidly and continuously. Large containerships, mega carriers and global terminal operators try to achieve economies of scale and economies of scope. As a result of the changing environment, the competition between ports to achieve competitiveness is intensive.

Port competition among China, Japan and Korea is becoming fiercer, both directly and indirectly, resulting from the increased trade in northeast Asia. Port development projects within each country stimulate more intensive port competition. As a result, overcapacity, fierce price competition and overlapping hinterland problems will be caused in the future.

Co-operation for survival is considered as a strategy in order to solve anticipated problems caused by port competition. The Korean Busan port, for instance, could co-operate with China and Japan as well as with other ports in Korea. Terminal operators' expansion through investments, including joint-ventures, will make connections between ports smoother. At the port authority level, continuous co-operative interchange between countries is indispensable. The importance of vertical integration, furthermore, is also growing so that it becomes necessary to co-operate vertically as well.

Table of Contents

List of Tables

List of Figures

Introduction

In recent years, the port logistics environment has been changing rapidly. Seaborne trade increased continuously under the influence of globalization. Large containerships, mega carriers and global terminal operators appear, aimed at achieving economies of scale and economies of scope. In this changing environment, the importance of the port industry stands out in relief, since the port industry positively influences national economies, both directly and indirectly. The competition between ports to get a main position, therefore, is intensive. Ports that can not cope with this situation will inevitably be weeded out.

Especially China is going through a remarkable economic development, resulting in an increased trade in northeast Asia and fiercer port competition among China, Japan and Korea. In order to cope better with this intensive competition, Korea's Busan port concentrated on port development projects. Because Chinese ports are also developing projects on a large scale, Busan faces a dangerous situation with many limitations. Lately, a co-operation plan was drawn up by the administrator of the Ministry of Maritime Affairs and Fisheries in Korea. Detailed research, however, was not conducted. This thesis aims at analyzing the situation and suggesting more detailed co-operation plans.

The first chapter illustrates the aspects of a changing port logistics environment, divided into three parts, namely the seaborne trade, shipping and port environments. The second chapter analyzes port competition and co-operation based on established theory. After

analyzing, the third chapter sets Korea’s Busan port in the fierce competition among northeast Asian ports and considers anticipated future problems. The last chapter then shows co-operation as a strategy to solve the problems caused by port competition.

Chapter 1. Changing Port Logistics Environment

Seaborne transportation has developed significantly since the introduction of containerships in 1960s. Furthermore, in the maritime environment a continuous change could be witnessed for the last decades. In this chapter, the changing maritime environment, related to seaborne trade, is set. This maritime environment can be divided in the seaborne trade environment, the shipping environment and the port environment, each of which will be discussed in a separate section.

1.1 Seaborne trade environment

World trade has been increasing continuously for the last 35 years. Table 1.1 illustrates this tendency. Since 1970, world seaborne trade has more than doubled. For 2003 and 2004 growth rates of respectively 6.92% and 6.93% are registered.

Table 1.1 World seaborne trade in ton-miles (billions)

Section	1970	1980	1990	2000	2001	2002	2003	2004
Total	10 654	16 777	17 121	23 693	23 891	24 172	25 844	27 635
Rate (%)	-	-	-	-	0.84	1.18	6.92	6.93

Source: extracted data based on UNCTAD, Review of Maritime Transport 2005.

The main factors accelerating the increase of world seaborne trade are globalization and the development of marine transportation. The range of activities within national

economies is broadened and increasing interdependence between countries breaks national boundaries. As such, trade liberalization among countries is promoted.

Seaborne trade accounts for about 90% of the world trade (Lee, 1998:22). The reason for this can be found in the developments within marine transportation. Especially the unitization trends, reflected in among others the high degree of containerization and palletization, smoothen the transportation process and decrease its costs.

1.1.1 Globalization and world economy

The global economic environment has been changing continuously. World trade is increasing both globally and regionally as a result of globalization. This is illustrated in the development of the three big economic blocs, namely APEC, EC and NAFTA. Globalization unifies national economies by providing services and products without limitations of boundary, and as such creates a real “world” economy, in which each national economy has mutual relationships and influences each other.

The introduction of the World Trade Organization (WTO) fostered trade liberalization and broke national boundaries. As a result of the increase in world trade, the role of maritime transport in moving traded goods and components keeps growing (Kumar and Hoffmann, 2002:35).

As has been illustrated earlier, world seaborne trade and the world economy are intertwined. In this perspective, Stopford (1997:2) states that seaborne trade is one of

the most important activities within the world economy and the developments between maritime sector and world economy are interactive. Table 1.2 shows the growth rate of merchandise exports and GDP. Global GDP grew at an average annual rate of 2.5% in the period 2000 to 2004 and accelerated world trade growth. On the other hand, world merchandise trade, on average, increased by 4.2% annually from 2000 to 2004. The rate of world merchandise trade thus almost doubled that of world GDP.

Table 1.2 Growth rate of merchandise exports and GDP (%)

Section	1990-2000	2000-2004	2001	2002	2003	2004
Merchandise exports	**6.4**	**4.2**	**-0.5**	**3.5**	**5.0**	**9.0**
GDP at market exchange	**2.5**	**2.5**	**1.4**	**1.8**	**2.6**	**4.0**

Source: extracted data based on WTO, World Trade Report 2005.

World trade and the demand for maritime transport services increase faster than the world's GDP (Kumar and Hoffmann, 2002:35). In the world trade, seaborne trade is generally the most preferred mode because of its comparatively low transport cost. Furthermore, under the influence of globalization and liberalization, both affecting the maritime business, transport costs have been reduced (Kumar and Hoffmann, 2002:43).

1.1.2 Impact of unitization

Unitization increases the efficiency of transporting cargo. Cargoes of different sizes, shapes and weights can be unitized in a designated standard volume or weight. By unitizing, cargoes can be handled using specialized handling equipment and be

transported efficiently, because of the increased flexibility in changing modes. Therefore the total business logistics costs can be reduced. Unitization ultimately aims to maximize profit and efficiency.

In general, when considering unitization, a distinction can be made among palletization and containerization. Palletization is the phenomenon where non-unitized cargo is transported on pallets, which are basically flat trays suitable for handling by fork-lift trucks (Stopford, 1997:18). Since pallets are usually deployed domestically, difficulties concerning international standardization exist. Containers, on the other hand, are most often used in international transport by ship, so that more than 95% of the containers are constructed according to the standards of the International Standardization Organization (ISO), designating the sizes 20 and 40 feet (Lee, 1998:159).

Stopford mentions unitization as the most important technical development in liner shipping (Stopford, 1997:4). The introduction of containers fostered a further development of shipping lines and safe and efficient maritime transport through container vessels. Furthermore, thanks to the container, parcels can be transported economically over sea, by consolidating Less than Container Loads (LCL) in Full Container Loads (FCL). Efficient handling of containers is guaranteed by specialized handling methods, such as Roll on/Roll off (Ro/Ro) and Lift on/Lift off (Lo/Lo). With these advantages, containerization plays a critical role in smooth hinterland transportation, where sea and land are connected. Therefore door-to-door service is provided and containerization increased world seaborne trade.

1.2 Shipping environment

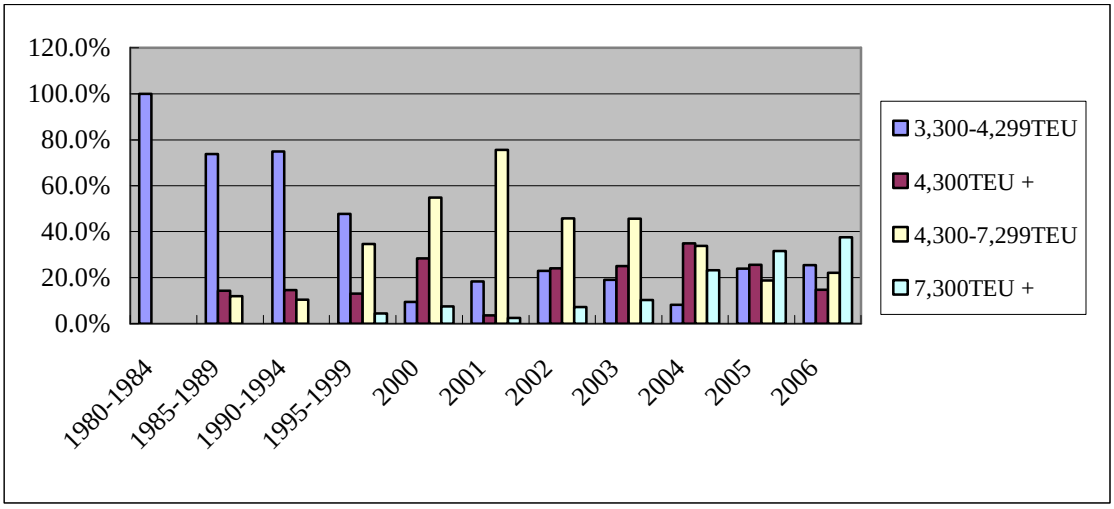
In the shipping environment, outstanding changes concern the deployment of ever larger containerships combined with strategic alliances among shipping lines. Larger containerships reduce unit transportation costs and allow one to benefit from economies of scale, whereas strategic alliances give shipping lines the opportunity to develop their market power, with increased market shares and reduced operating cost as a result.

1.2.1 Evolutions in ship size

In the 1990s, the average containership was able to carry 4,000 TEUs, as opposed to 1000 TEUs in the 1960s. Nowadays, however, one easily finds containerships of 8,000 TEUs operating (Lim, 2004:19). Currently 10,000 TEUs containerships are ordered and Lloyd's Register concludes that vessels up to 12,500 TEUs are feasible (Tozer, 2003). All these larger ships have been introduced and ordered to reduce unit transport costs and achieve economies of scale (Stopford, 1997:296).

Figure 1.1 shows the percentage of containerships of more than 3,300 TEUs by date of build since 1980. From 1980 to 1999, the main container vessel was the Panamax ship of 3,3300 to 4,299 TEUs. In the period 2000-2004 this changed to the Post-panamax vessels of 4,300-7,299 TEUs. Since 2004, however, the amount of ships larger than 7,300 TEUs has increased rapidly. This is reflected in the ship orders, where we see that the number of large vessels amounted to 20 in 2004, 37 in 2005 and already 56 in 2006 (Lloyd's shipping economist, 2006:15).

Figure 1.1 The rate of containerships of 3,300 TEU plus by date of build[1]



Source: Own representation based on Lloyd's shipping economist, 2006. (Appendix Ⅰ)

* On order (by date due for delivery)

As a result of the trend of deploying ever larger containerships, we might expect competition among shipping lines for keeping cargo volume to be fiercer. The rationale can be found in the fact that for an increased capacity economies of scale can only be achieved on the assumption that a proper level of cargo volume is maintained. Lloyd's Shipping Economist (2006:18) prospects that global trade growth and operational changes will cover the increased slot capacity on large containerships in the next three years, on the condition that Asian export trades reach 15%. If Asian export trades drop below 10%, however, some severe overcapacity can be the result. Lloyd's therefore warns for slot overcapacity of larger containerships.

The large containerships influence container terminals by designating a port of call. The competition in ports will also be fiercer as a result of the efforts to attract shipping lines

[1] In service and on order at 1 January 2006

having large containerships. Port development, last but not least, is in progress to attract and keep attracting container cargo. Examples here include the deepening of docks and connecting rivers, such as the recent deepening of the River Scheldt in Antwerp, and the increase in port capacity (e.g. the construction of the Deurganckdock in Antwerp).

1.2.2 Evolutions in ship management strategy

The changing environment, characterized among others by the increase in world seaborne trade and the deployment of larger containerships, promotes strategic alliances among shipping lines. The shipping lines see in the collaboration through strategic alliances a way to secure their competitive position in the changing environment. It is contributed to improve customer service and efficiency of operation as well as to reduce cost. Horizontal integration among shipping lines creates mega carriers, achieving economies of scale through enlarged business scale. Shipping lines also manage whole transportation systems by integrating entire logistics chains vertically. As a result, the limited scope of activities is broadened to achieve economies of scope.

UNCTAD (2005) states that the top 10 of liner operators is responsible for 46.3% of the 2004 world fleet. For the top 20 this percentage even amounts up to 67%. The market power of minor liners becomes stronger because of the enlargement of scope as well as scale. Port calls are reduced to minimize transportation costs for the larger containerships. Therefore, large scale shipping lines with big market power visit designated hub ports, after which feeder services take care of transshipment. This means

that shipping lines as customers of container terminals have the final decision power and stimulate port competition to get lower prices.

1.3 Port environment

In the section on port environment, last but not least, the point of view of port management and the role of ports are discussed. A port is considered as a profit-creating entity and privatization movements are becoming more and more common, in order to manage ports efficiently. Nowadays a port is not just a bridge between sea and land, but a network for flawless transportation and a connection point with the hinterland, to process cargo and add value.

1.3.1 Evolutions in port management

Traditionally, ports were owned by government and managed through port authorities. In the 1980s, however, port privatization was introduced aggressively because of the inefficient management of public ports, reflected in issues such as chronic shortage of port facilities and the limitation of governing finance (Sim, 2001:4). Port authorities then tend to select the so-called “land lord” port system, where the ownership of the port (including berths and regulations) is still in their but where the management of terminals and facilities is entitled to private companies (Sim, 2001:4-5). The introduction of port privatization improved the efficiency of port management and caused ports to be seen as commercial profit centers.

Table 1.3 Market shares of Top-5 container terminal operators

	Terminal operator	Country	In mln TEU	Market share
1.	Hutchinson Port (HPH)	Hong Kong	47.8	13.3 %
2.	APM Terminals (P&O Nedlloyd)	Denmark	34.0	9.5 %
3.	DP World (CSX WT and P&O Ports)	V.A.E.	33.3	9.3 %
4.	PSA International	Singapore	33.1	9.2 %
5.	COSCO	China	13.3	3.7 %
	Total		161.5	45.0%

Source: De Lloyd (from Drewry Shipping Consultants Ltd.), 27 February 2006, p. 48

Port privatization causes the number of container terminal operators to increase. Strategic alliances are also popular among terminal operators, to enlarge their market power, reduce risk and attract shipping lines, which are the customers of their terminals. Table 1.3 shows the market share of the top-five container terminal operators. The top-five terminal operators, HPH, APM, DP World, PSA and COSCO have a total market share of 45% in the world terminal market. It can be remarked that until recently PSA held the third place, but after the acquisition of P&O ports by DP World in early 2006 it lost this position. Like this, terminal operators grow horizontally to reach global network connections, besides enlarging business scope vertically by connecting entire logistics chains.

1.3.2 Hub port and new role of port

The deployment of large containerships and the formation of mega carriers through strategic alliances among shipping lines reduce the number of port calls in an attempt reduce transportation cost. Clearly, a specific port will be chosen as a port of call when it contributes to the reduction of cost within the transport chain (Van de Voorde and Winkelmans, 2002:4). Cargoes are consolidated on the chosen hub port according to a regular schedule, while the hub port as a center provides feeder services to relatively small-size feeder ports. This “hub and spoke” concept emphasizes the important role of transshipment for distribution and stresses on the need of a network system among ports.

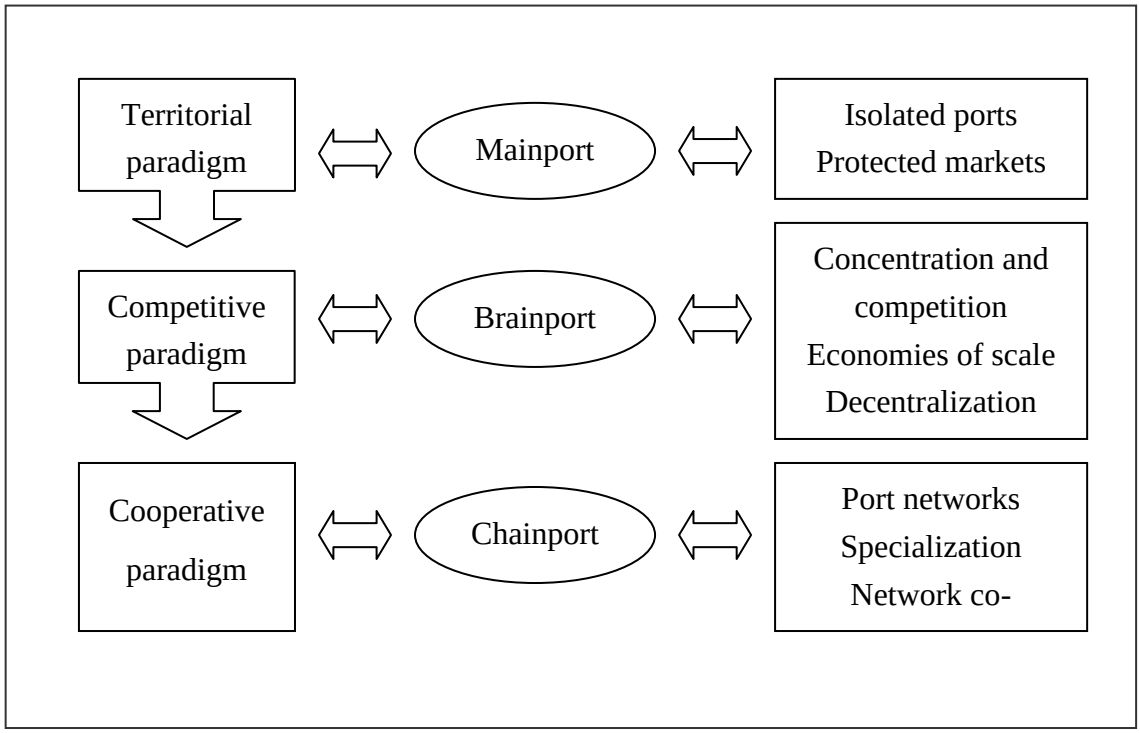
Lee (1998:46-47) defined four generic types of ports, based on the level of center and hinterland, illustrated in Table 1.4. It proves that a modern port goes beyond the existing traditional role as a bridge between sea and land. To be a leading port, a high level of hinterland for flexible connections as well as a high level of center is needed. These changing roles of ports stimulate the competition among ports to achieve the position as a hub port and mega port.

Table 1.4 Evolution of port according to the level of center and hinterland

Section		Level of hinterland	
		Low	High
Level of center	Low	Regional port	Regional mega port
	High	Regional hub port	Mega hub port

Source: Own representation based on Port logistics system, 1998, P. 46-47.

Figure 1.2 Hierarchy and network model for ports



Source: Musso (2005)

According to the changing port paradigm, the role of a port has three classes of hierarchy. Figure 1.2 shows the hierarchy and network model for ports. At first, a port usually processed domestic cargo and had a role as interface between sea and land. Ports, however, are not limited to processing domestic cargo but are entities creating national profit. Because a variety of industries are related to ports, the port sector has an extreme influence on the national economy, indirectly as well as directly (Coeck, 2006). Therefore each port accelerates its port development, which stimulates the fiercer competition among ports even more. Cooperating in order to survive is now seen as the new strategy in the competitive situation. In the cooperative paradigm, the port network is strengthened, which is possible when each part in the whole logistics chain cooperates.

Chapter 2. Theoretical Analysis of Port Competition and Co-operation

In the changing port logistics environment, port competition becomes fiercer and fiercer. Port co-operation is considered as a strategy to survive in this increasing port competition. In the current chapter, port competition and co-operation are analyzed based on existing research. In the next chapters we will then build on this theory to find a solution for Busan port, that suffers from keen competition of other Northeast Asian ports.

Prior to conduct research, it is indispensable to define the market players in port competition. Heaver et al. (2001:298) distinguishes port authorities, shipping lines with terminal operations and independent container terminal management companies in the container business. In our opinion, of these three market players port authorities and terminal operators can be considered to be the most important in the container terminal business. Therefore port competition and co-operation will be dealt with from the point of view of the port authority and the terminal operator.

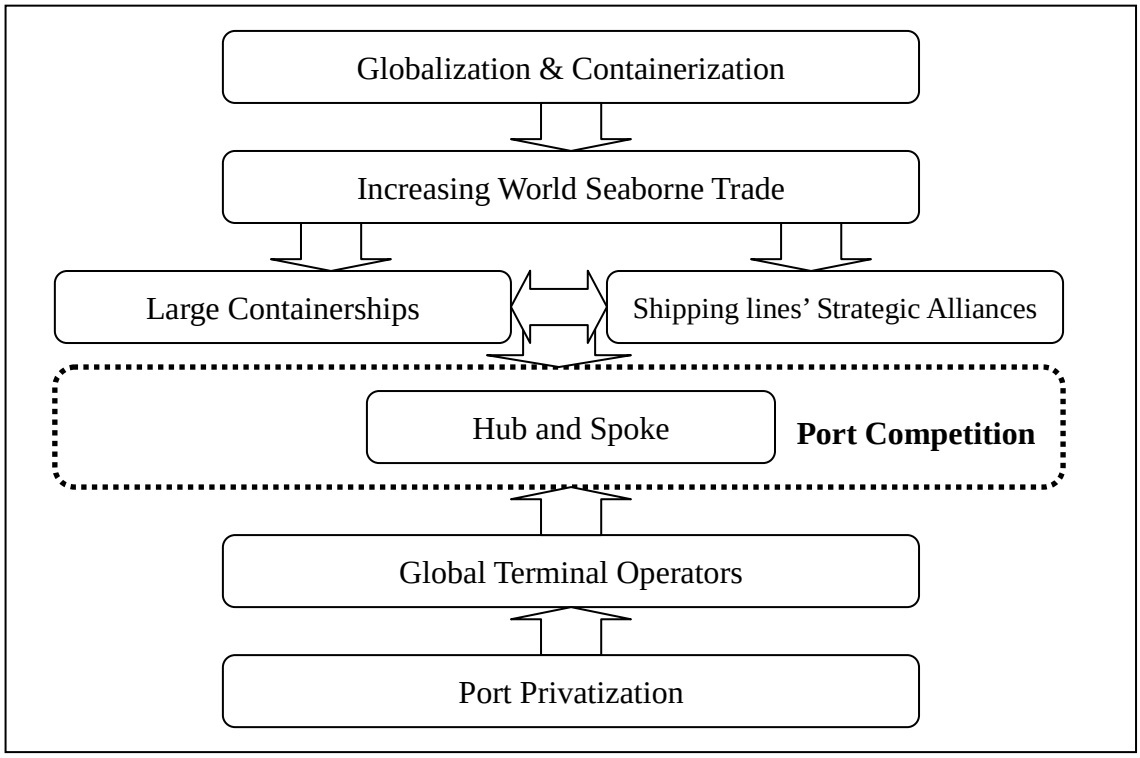
2.1 Port competition and competitiveness

Port competition is unavoidable in the changing environment. In this section, we will discuss both directly and indirectly caused port competition. Afterwards, advantages and disadvantages of port competition will be explained.

2.1.1 Present competitive environment of port

Figure 2.1 gives a round-up of the changing trends causing port competition, discussed in Chapter 1. In general, we can state that changes in the seaborne trade environment, the shipping environment and the port environment are intertwined and cause port competition. This port competition is manifested in hub and spoke systems. Mega carriers, created by the strategic alliances among shipping lines, reduce the number of port calls to minimize transport cost. As a consequence, a minority of ports will hold an advantageous position as a hub port. On the other hand, a majority of ports will fall into the category of feeder ports. The striving for shipping lines' cargoes then causes competition among (big) ports to become extremely fierce.

Figure 2.1 Changing trends of port and port competition

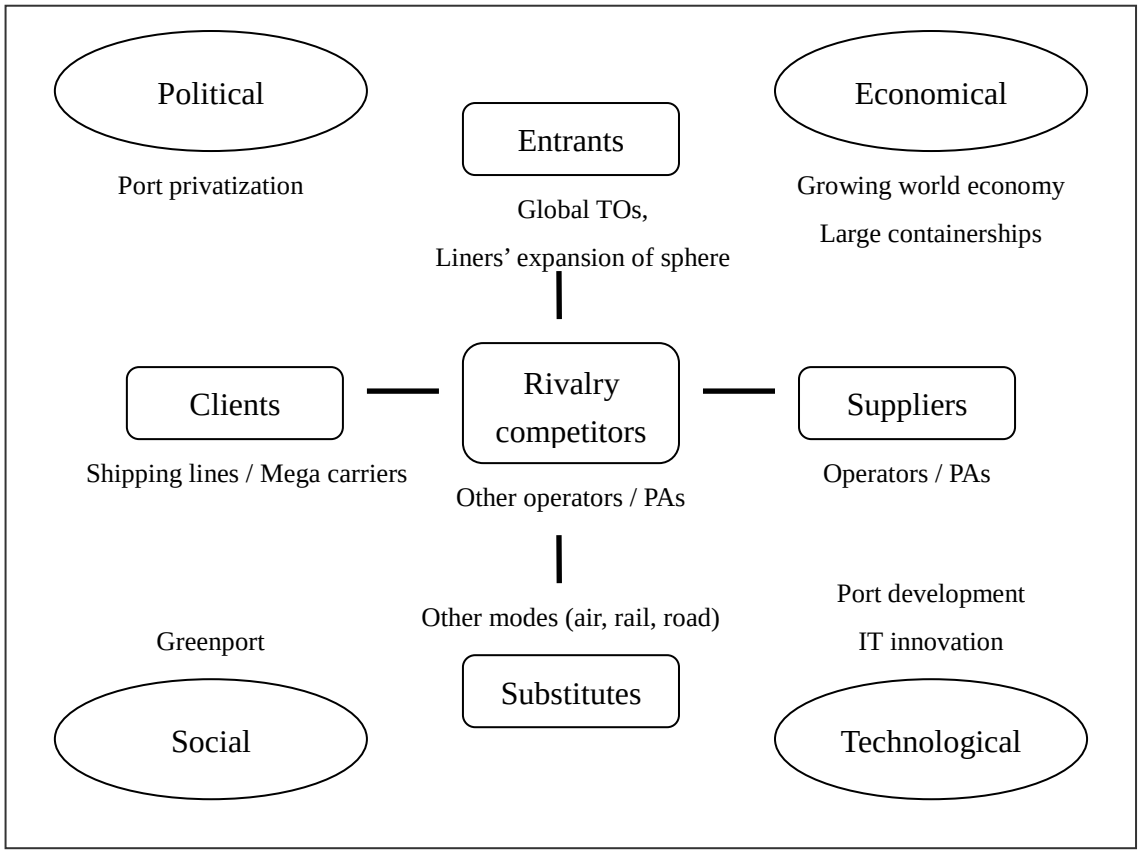


Source: Own representation.

Figure 2.2 illustrates Porter's extended 5-forces model, applied on port competition. Port authorities and terminal operators experience rivalry from respectively authorities of other ports and other terminal operators, within or outside the port they are operating in. Shipping lines, providing cargoes to the ports, can be seen as the clients. By merging, shipping lines enlarge their market power internally and externally and grow as mega carriers. As a result, the number of shipping lines will be small compared to the number of ports and terminal operators. Port competition, therefore, becomes fiercer. In this situation, terminal operators attempt to enlarge their power by forming strategic alliances and linking global networks. Shipping lines expand their business sphere to ports and hinterland transport, in an attempt to increase efficiency of transportation. Sea transport through ports is also threatened by other transport modes such as air, rail and road transportation.

The external factors, in the social, political, economical and technological field, are also shown in Figure 2.2. As a political factor, the increased attention for port privatization can be mentioned, causing ports to become more and more "commercial" and focused on profits, which stimulates port competition. From an economic point of view, the growth of the world economy and the concept of economies of scale introduced in the shipping area play an important role. Port enforces development technically and the conspicuous innovation of IT improves port efficiency. Socially, to conclude, the concept of strengthened harmonization between port and city is important to mention.

Figure 2.2 Porter's extended 5-forces model applied on port competition



Source: Own representation based on the competitive forces, Vermeylen, 2005.

2.1.2 Aspects of port competition

Van de Voorde and Winkelmans (2002a:11-12) propose three levels of port competition, namely intra-port competition at operator level, inter-port competition at operator level and inter-port competition at port authority level. The distinction between the (private) operator and the (public) authority levels is made since both serve a different purpose. Private undertakings aim to maximize profit and minimize costs whereas public initiatives aim to provide a utility (Van de Voorde and Winkelmans, 2002b:139).

Intra-port competition at operator level is the competition among terminal operators

within a port. Although there is no intra-port competition under the public management, port privatization causes intra-port competition among operators. Since a port is considered as a profit-creating entity, its commercial function is stressed upon. Therefore the competition of terminal operators within a port is increasing.

Inter-port competition at operator level is competition of terminal operators operating in different ports. This level of competition usually appears in ports within the same range, characterized by shared hinterlands (Van de Voorde and Winkelmans, 2002a:12). Competition among terminal operators became a factor stimulating strategic alliances.

Competition among port authorities of different ports is called inter-port competition at port authority level. Usually government still owns the ports and the port thus still has a public character. Port competition, here, therefore is not devoid of any political influences.

Competition among transport modes is a fact. Ports not only compete with other ports, but also indirectly with other modes of transport. This is of course caused by the fact that marine transportation through ports is only one kind of transportation. Basically, deep sea shipping competes with air freight for high value cargo and short sea shipping competes with road and rail (Stopford, 1997:9). The increased amount of goods shipped in parcel size stimulates quick air transport. Land bridge systems through railways, such as the Trans Siberian Railway, the Trans China Railway and the American Land Bridge, clearly illustrate that railways can also be a competitor of marine transportation.

2.1.3 Advantages and disadvantages of port competition

In the modern society, we witnessed a shift of market power from supplier to customer. Furthermore, customers are becoming more and more demanding. Suppliers have no other choice than to fulfill the requirements of these customers, since customers are less loyal and switch easier to a competitor.

An analogous situation can be found in the port industry. If a port as a supplier cannot meet the requirements of shippers or shipping lines, these customers will leave the port or potentially even look for another transport mode. Port competitiveness is thus indispensable in order to survive in a world characterized by fierce port competition. Port competitiveness determines the power to compete, it implies the capability and ability (Winkelmans, 2005b). To achieve competitiveness, each port develops plans. These can be external, such as strategic alliances with other ports, or internal, for instance facilities development. Most of all, in order to develop competitive advantages, it is important to have core competences through unique capabilities (Winkelmans, 2005b). These activities, however, can have a positive as well as a negative influence, resulting in advantages and disadvantages of port competition.

Integrated logistics systems in ports are getting more and more important. Their goal is to lower total costs while increasing customer service. Of these total costs, one of the factors most directly affecting transport decisions is the transportation cost (Blauwens, et.al., 2002:181). The basic elements of customer service, on the other hand, are availability, operational performance and service reliability (Bowersox, et.al., 2002:73).

As stated before, it is necessary to provide improved service at a lower cost. From this point of view, it is necessary for a port to have economic advantages and operational efficiency. Ports, for instance, enlarge their capacity to reduce queuing and speed cargo handling services. Furthermore, the introduction of new facilities and equipment helps to improve efficiency and performance. Advanced information systems enable to prepare a plan for stacking, as well as loading and unloading, and provide reliable tracking and tracing. Like this, port competition advances the development of ports.

Nevertheless, overheated port competition leads to negative results. The disadvantages of overheated port competition are the possibility of overcapacity, excessive price competition and overlapping hinterlands. Capacity is directly connected with port service, because congestion – seen as a problematic sign of lowering service levels – is caused by the lack of port capacity. Since congestion causes queuing as well as avoidable time costs, the shortage of capacity lowers port efficiency. Some ports, however, are expected to have problems of overcapacity, as a result of excessive expansion in a reaction on competitive forces. Another possible problem is fierce price competition. Prices can be seen as one of the most important factors for shipping lines to select a port of call. Since port prices are directly related to benefits, overheated price competition can reduce the benefits of port businesses and lead to a great losses for both competitors. Lastly, the hinterland function is enhanced and port development goes side by side with the hinterland improvement projects. It is not easy, however, to define the boundaries of hinterland. The scope of hinterland is wide and so is its influence. It is thus possible in port competition to cause overlapping of hinterlands between countries. Double investments are the result and competition in the overlapping hinterland is

stimulated. Ultimately, port competition will be keener because the hinterland is one of the factors for shipping lines to select a port.

2.2 Port co-operation

Section 2.1 dealt with port competition. In this section, co-operation is considered as a strategy against competition. Port co-operation is discussed separately according to the aspects of competition illustrated in paragraph 2.1.2. Lastly, the advantages of port co-operation will be explained and limitations are examined.

2.2.1 Co-operation as a strategy

The development philosophy of port development faced with competition changes from ‘hardware’ to ‘software’. Hardware of port development includes the construction of infrastructure and superstructure. Software of port development includes port management on behalf of port privatization for high efficiency, know-how, IT technology for supporting and network structure. Now, however, software of port development can be expected to be the factor of determining importance in port competition (Van de Voorde and Winkelmans, 2002a:6).

The forth generation of ports is introduced by UNCTAD and characterized by co-operation in combination with competition together with horizontal and vertical integration (Jung, 2002:15). Port co-operation can be considered as a strategy against

competition. Song (2003:32) said co-opetition is a way of collaborating to compete. [2]

2.2.2 Aspects of port co-operation

Port competition is caused within or among ports, while the competition among transport modes or chains was also considered. Port co-operation can be divided in a similar way. Port co-operation is considered by horizontal and vertical integration. Horizontal integration includes the co-operation within or among ports and can be divided by three types according to the three levels of port competition, namely intra-port co-operation at operator level, inter-port co-operation at operator level and inter-port co-operation at port authority level. Each level of co-operation will be explained with a case. Last but not least, vertical integration among modes or chains is also introduced.

Intra-port co-operation at operator level is the co-operation regarding terminal operations within a port. Inter-port co-operation at operator level, on the other hand, is a co-operation of terminal operators among different ports. According to the research of Song (2002), competition between the ports of Hong Kong and Shenzhen is increasing, so that Hong Kong decided to cooperate with Shenzhen port, instead of continue competing. This cooperative strategy has for objective to strengthen the position in times of high competition of South China, by a joint venture. In this Hong Kong-Shenzhen example, for the terminal operators there are elements of competition as well as co-operation, both within and among the ports. Usually the co-operation within or

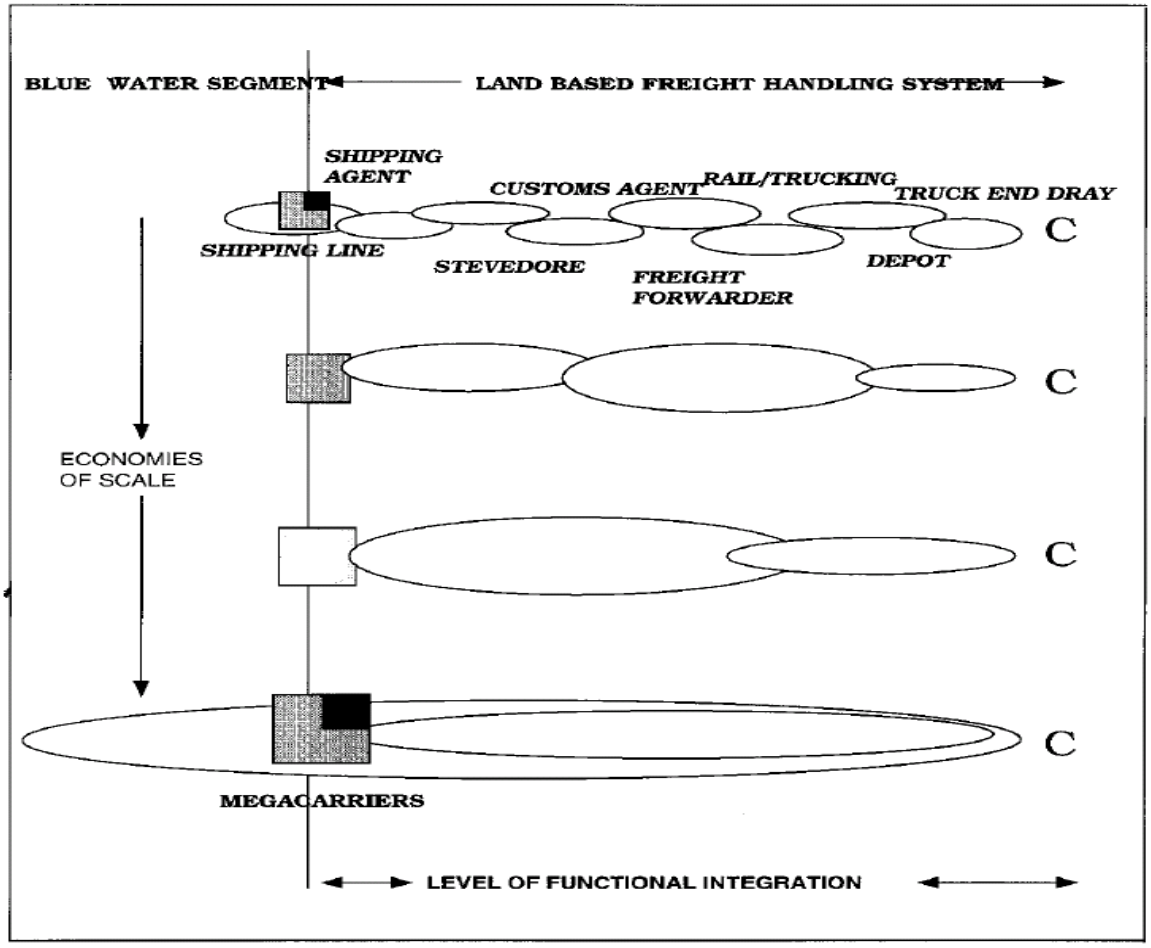
[2] co-opetition means “co-operate to compete”, Jorde and Teece, 1989.

among ports is accomplished by the same terminal operator. Terminal operators are used to expand their power sphere through investments, such as joint venture, because co-operation through joint venture enhances the competitiveness as well as the market power (Song, 2002).

Inter-port co-operation at port authority level is the co-operation of port authorities among ports. For example, Copenhagen Malmö Port as a limited company was founded by Copenhagen port of Denmark and Malmö port of Sweden on 1 January 2005 (Copenhagen Malmö Port website). Both ports had already cooperated before they found Copenhagen Malmö Port and considered a closer co-operation. The aim of the co-operation is to realize economies of scale through collaboration of marketing and operations, and finally to improve competitiveness.

Port competitiveness is affected by external factors, such as links in supply chains, as well as internal factors, such as competitive port user costs and efficiency of operations (Carbone, 2003:306). With the introduction of Supply Chain Management (SCM), the integration of services among logistics chains is becoming more and more important. The integration of supply chains provides interrelated and improved logistics services. Figure 2.3 shows the value chain systems in a port. Connections and functions between value chains undoubtedly have to be strengthened.

Figure 2.3 Value chain systems in port Chang



Source: Robinson (2002)

2.2.3 Advantageous port co-operation and limitations

According to UNCTAD (1990:7), highly suggested areas for port co-operation are technical training, harmonization or exchange of tariffs and information for common services. The other areas are harmonization of statistics and operational documents or procedures, relationships between port users (including conferences) and pooling of port services or equipment. Song (2002:109) states that co-operation leads to advantageous results: risk reduction, economies of scale, rationalization, technological exchanges, co-

opting or blocking competition and overcoming government-mandated trade or investment barriers. Both parties can be stronger by sharing techniques and information through co-operations. Finally, co-operation as a strategy of competition can be a competitiveness among parties. The parties, especially, are expected to be largely complementary. If they can co-operate through each party's core competence, they can have unique a competitiveness and achieve a competitive position.

In co-operation, it is not easy to coordinate common interests. Especially, the co-operation between countries will be much more difficult than within a country. According to UNCTAD (1990:6), the impediments to co-operation are a lack of financial resources, political will and unsuitable structures, fierce competition, political conflict, insufficient communication links between countries, different languages and so on. In co-operation, most of all, "complementary" co-operation is ideal. Co-operation is not unilateral but mutual, so it can be accomplished when mutual interests exist. Therefore, it is necessary to find complementary relationships for sustainable development. The management of relationships, last but not least, is difficult but also a factor of major importance.

Chapter 3. Competitive Environment of Busan Port

Chapters 1 and 2 treated the subject from a rather theoretical point of view. This chapter, as well as Chapter 4 puts things in a different light, by providing a practical analysis in the northeast Asian port environment. Port competition, there, is fierce, since the cargo volume in the major constituent countries of the northeast Asian area, namely China, Japan and Korea, is steadily growing. In this chapter, in a first section the current situation and development of northeast Asian ports are compared. The aim, then, is to analyze the position of Busan port, located in South-Korea. Some anticipated problems, faced by northeast Asian ports as a result of the considerable amount of competition, are discussed in the third section of this chapter.

3.1 Northeast Asian port competition

In this section, port competition among the northeast Asian ports is examined. As said before, northeast Asia mainly comprises China, Japan and Korea. The ports in these countries will be our further focus. Total throughput forecasts for the northeast Asian ports amount to 64.16 million TEU for 2010, and even 73.44 million TEU in 2015. The average annual growth rate is estimated to be 7.4% between 2005 and 2010 versus 4.8% between 2010 and 2015 (Busan Port Authority, 2004:73). Increasing international trade is considered as the drive behind this growth. It is easy to see, then, that competition among Chinese, Japanese and Korean ports is extremely fierce.

3.1.1 Present situation of northeast Asian ports and competition

Based on 2005 data, Containerization International (2006) includes twelve ports in northeast Asia in the top 30 container ports, as illustrated in Table 3.1. Ports of relevance for this work are Busan (Korea), some Japanese ports and the Chinese ports Shanghai, Qingdao, Ningbo and Tianjin.

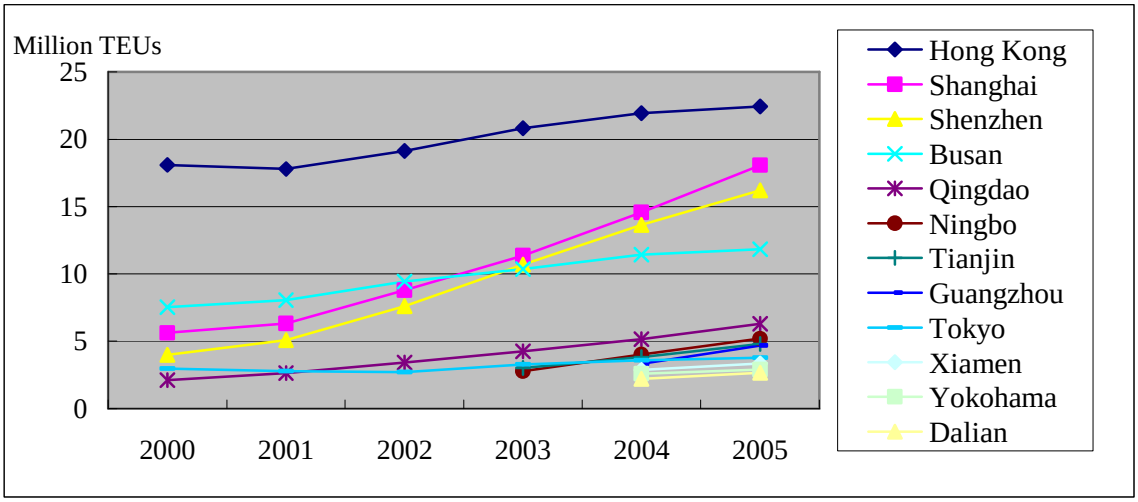
Table 3.1 Throughput of 12 northeast Asian container ports within rank 30 in 2005

Country	Rank 2005	Port	2004 (millions of TEUs)	2005 (millions of TEUs)	Growth rate (%)	Occupy rate (%)
Korea	5	Busan	11430000	11840445	3.6	5.4
Japan	21	Tokyo	3580000	3759000	5.0	1.7
	27	Yokohama	2576522	2900000	12.6	1.3
China	2	Hong Kong	21932000	22427000	2.3	10.3
	3	Shanghai	14557200	18084000	24.2	8.3
	4	Shenzhen	13650000	16197000	18.7	7.4
	13	Qingdao	5139700	6310000	22.8	2.9
	15	Ningbo	4005500	5191000	29.6	2.4
	16	Tianjin	3814000	4801000	25.9	2.2
	18	Guangzhou	3308200	4684000	41.6	2.2
	23	Xiamen	2871000	3343000	16.4	1.5
	30	Dalian	2211200	2651000	19.9	1.2
Total			89077326	102189450	14.7	46.9
Total (Ranking 1-20)			196343766	217723058	10.9	100.0

Source: Containerisation International, March 2006.

Figure 3.1 shows the continuously increasing throughput pattern for 12 northeast Asian ports, caused by the general increase in international trade of northeast Asia. As also could be derived from Table 3.1, the growth rate of Chinese ports is especially outstanding, since on average their throughput in TEU increased by 22.4% in 2005. For Korean and Japanese ports, however, rather low growth rates were recorded. We might expect this growth trend of Chinese ports' throughput to be continued in the future. Shanghai, for instance, is expected to be the world's leading port, after having increased its throughput in excess of 26.5 million TEU in 2007. The "domestic" market share of Shangai among Chinese ports, however, is most likely to decrease, as a result of the large competition from other national ports (Fossey, 2006).

Figure 3.1 The increasing pattern of northeast Asian throughput



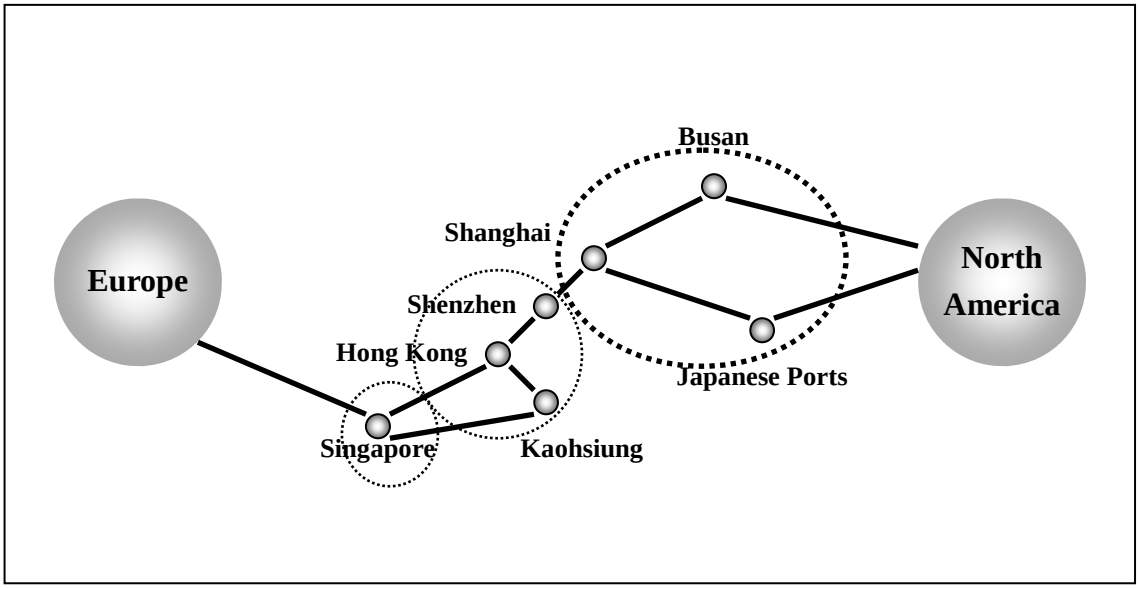
Source: Own representation based on Review of Maritime Transport, 2001-2005. (Appendix 2)

In order to be able to take a closer look to the specific competitive situation in northeast Asian ports, it is helpful to consider a traditional shipping route on the Europe-Asia Eastbound route. Outside Europe, vessels traditionally call at each one of three – what

we call – “competitive spheres”. A first sphere is situated in southeast Asia, where Singapore dominates. Subsequently, the route goes to a second sphere, composed of ports as Shenzhen, Hong Kong and Kaohsiung. Some Japanese ports, as well as Busan and Shanghai, finally, form the third sphere. Figure 3.2 aims to clarify this.

Chinese mainland ports are definitely on their way up, which causes significant levels of competition with ports in their close environment. In the second competitive sphere, Hong Kong is threatened by a growing Shenzhen. The rapid growth of Shanghai’s port, on the other hand, threatens especially Korea’s Busan port. Starting from 1999, Busan port was with a third place-ranking worldwide the leading port in the third competitive sphere. Nevertheless, in 2003 it lost this position as a consequence of the rapid growth of Shanghai in 2003 (Figure 3.1). Since 2003, therefore, the competition between Shanghai and Busan has reached record heights.

Figure 3.2 Composition of port competition



Source: Own representation.

3.1.2 Port development of northeast Asia

From the shipping lines' point of view, competitiveness can be translated in the 3C-concept. 3C stands for Convenience, Connectivity and Cost benefits (Han, 2002:15). Convenience is related to port services, including port facilities and capacity. The feeder service network and hinterland connections define a port's level of connectivity. Cost benefits, last but not least, are closely related to the concept of the Port User Costs, as discussed in literature (see e.g. Winkelmans, 2005a). Each port conducts port development to increase competitiveness. In the northeast Asian port competition – our third competitive sphere – Korean and Chinese ports seem to concentrate on port construction, such as new berths. Japan, on the other hand, looks for increased competitiveness in changing port management.

Table 3.2 shows the plans for port development in Korea and China. As for Korea, Busan's existing "North Port" planned to develop one more berth by 2006. Busan's "New Port" opened with 3 berths in January 2006. Plans to construct an additional 27 berths by 2011 are drawn up. Gwangyang port also planned to develop 21 berths. In east China, Shanghai wants to construct 52 berths by 2020 while the ports of Ningbo, Qingdao and Tianjin are currently under construction as well.

As explained earlier, Japan changes tack by focusing on changes in port management instead of direct physical expansion. The country adopted the 'super-major ports' plan, to foster six large-sized ports (Lim and Lee, 2005:62-63). The vision on port management changed from a strategy of decentralizing ports, where the country was

characterized by a huge degree of “port dispersion”, to a more centralized approach. ‘Super-major ports’ wants to make satisfactory profits by selecting and concentrating on major ports. Therefore, Japan selected six ports and bound three zones, namely. Kehin port (Tokyo and Yokohama), Hanshin port (Osaka and Kobe) and Iseman (Nagoya and Yokkaichi). By reforming these port management and logistics systems, Japan is looking for improved efficiency.

Table 3.2 Plans of port development in Korea and east China

	Section	Berths	Berth length	Depth of water	Term
Korea	Busan north	1	300	16	~ 2006
	Busan new	30	9950	16	~ 2011
	Gwangyang	21	7350	16	~ 2011
China	Shanghai	52	21200	16	~ 2020
	Ningbo	18	-	17	~ 2009
	Qingdao	21	-	17.5	~ 2020
	Tianjin	10	3200	16	~ 2010
Japan	Super-major ports	Kehin : Tokyo port and Yokohama port			
		Hanshin : Osaka port and Kobe port			
		Iseman : Nagoya port and Yokkaichi port			

Source: own representation based on Lim and Lee, 2005

3.2 Competitive position of Busan Port

Now the competitive position of northeast Asian ports is set, we can proceed to the discussion of Busan in particular. As was shown before, Busan is part of the third competitive sphere and, as such, faces competition from mainly Shanghai and some Japanese ports.

Table 3.3 SWOT analysis of Busan port

Strengths	Weakness
• Geographical advantage • Low cost for port use • Governmental support	• Narrow hinterland area • Shortage of special human resource • Chronic congestion • Backward facilities and logistics service
Opportunities	**Threats**
• Increasing seaborne trade • Connection with TSR and TCR • Development of Busan new port	• Competition with China and Japan • Increasing customer demand

Source: Own representation.

In general, we can state that the major factors affecting port competitiveness are facilities, position, costs, service level and hinterland (Han and Woo, 2004:98-103). Based on these five factors, Table 3.3 provides a SWOT analysis for Busan port. Typically, a SWOT analysis examines the internal strengths and weaknesses of an entity, as well as the external opportunities and threats in its environment. For the purpose of our analysis, however, it suffices to discuss weaknesses and threats for Busan port.

Three major weaknesses of Busan are its narrow hinterland area, chronic congestion due to a shortage of capacity and the presence of old facilities. The earlier-mentioned Busan New Port project is in progress to cope with these problems. The project is expected to reduce congestion by providing increased capacity, as well as to offer flexible hinterland connections.

Table 3.4 Comparison of transportation cost between road and port in Japan

(Unit: 1,000 Yen, basis on 10t truck)

Main (A)	Destination (B)	Local port (C)	From A to B	From C to B
Tokyo	Hokkaido	Tomakomai	230	31
	Tohoku	Niigata	79	46
	Koushinetsu		53	35
	Kanto	-	39	-
	Tokyo	-	34	-
Osaka	Hokuriku	Maizuru	63	46
	Chubu	-	53	-
	Kinki	-	36	-
	Sanin	Sakai	58	31
	Chugoku		57	38
	Shigoku		76	51
	Kyushu	Mogi	90	36

Source: Arthur D Little Ltd., 2003.

As depicted in Table 3.3, a major threat for Busan is the competition with Chinese (Shanghai) and Japanese ports. Chinese ports are currently characterized by large-scale

construction works. Their major competitiveness, however, is low price, as will become clear later on (see e.g. Table 3.7). Especially Shanghai has low port user costs and provides an interesting incentive system. Nevertheless, their port and land logistics systems are comparatively outdated (Yoon, 2005).

The major strength of Japanese ports is their automated facilities. On the other hand, the weaknesses are both a high port user cost (see Table 3.7) and a significant road transportation cost (Table 3.4). Busan therefore should work out countermeasures based on these particular weaknesses of Chinese and Japanese ports. This would certainly increase Busan's competitiveness.

3.3 Anticipated problems caused by competition

In Paragraph 3.1.2 we explained that in northeast Asian port competition, Japan concentrates on the reformation of port management. Korea and China, it was argued, concentrate on the port and hinterland construction projects. The competition between Korea and China, in particular, has become extremely fierce and is expected to cause problems in terms of overcapacity, price competition and overlapping of hinterland.

3.3.1 Overcapacity

Some ports compete with severe excess capacity (Van de Voorde and Winkelmans, 2002a:9). With the increase in international trade through Asian ports, huge investments are made in capacity expansion projects. In the third competitive sphere, port

competition between Korea and China is especially fierce, what results in huge projects in both ports. Aim of this competitive development plans is to achieve the position of hub port in the area. This "war of expansion", however, warns for overcapacity in the future (De Lloyd, 2006). Shanghai port, for instance, plans to construct 56 berths by 2011 and 16 berths by 2020 (Korea Shipping Gazette news, 2006). Busan, on the other hand, also has some considerable expansion plans in mind.

Table 3.5 Forecasting throughput and Capacity of Busan Port

(unit: 1,000 TEU)

Section	2001	2002	2003	2004	2005	2011*	2020*
Total TEU	8,073	9,453	10,408	11,492	11,843	14,038	22,688
Growth rate (%)	-	17.1	10.1	10.4	3.0	-	-
Port Capacity	4,188	4,860	4,860	4,860	4,860	14,643	14,643
More or less	- 3,885	- 4,593	- 5,548	- 6,632	- 6,980	+ 605	- 8,045
Rate of Berth Occupation[3] (%)	51.9	51.4	46.7	42.3	42.3	104.3	64.5

Source: Own representation refer to Busan Port Authority, 2004 Port of Busan Container Statistics

*: Forecasting

Table 3.5 shows the planning of Busan's port development. Currently, Busan is facing a capacity shortage compared to its throughput, which port efficiency might suffer from. To solve this issue and keep enough capacity, Busan plans in the Busan New Port project to construct 30 berths by 2011. By constructing 30 new berths, the berth

[3] the rate of berth occupation = Cargo handling capacity / Total TEU handled

occupancy rate is expected to be 64.5% in 2020, compared to a theoretical optimum of 65% (Paelinck, 2005). Nevertheless, one has to be cautious. Indeed, the Busan Port Authority assumes the growth rate of throughput to exceed 5.5% in their forecasts (BPA, 2004:78) while it in reality, however, shows a decreasing trend, from 17.1% in 2002 to an old time low of 3% in 2005. The result of capacity expansion combined with lowered throughput growth rates is that in the future overcapacity problems might occur.

Table 3.6 Forcasting throughput and Capacity of Gwangyang Port

(unit: 1,000 TEU)

Section	1999	2000	2001	2002	2003	2004	2005	2006*
Total TEU	417	643	856	1,076	1,182	1,318	1,439	4,850
Growth rate (%)	-	54.2	33.1	25.7	9.9	11.5	9.2	-
Port Capacity	1,200	1,200	1,200	2,014	2,014	2,014	2,014	2,014
More or less	783	557	344	938	832	696	575	-2,836
Rate of Berth Occupation (%)	287.8	186.6	140.2	187.2	170.4	152.8	140.0	41.5

Source: Own presentation refer to Gwangwang port website

*: Forecasting

Another Korean port, Gwangyang, has been by a government-led “two-ports system”. In the two-ports system, government supports the development of both Busan and Gwangyang ports, to achieve the position of hub port in northeast Asia. In this respect, Gwanyang is expected to support Busan. Gwanyang port was opened by this strategy in 1999. Table 3.6 shows the forecasted throughput and capacity of Gwangyang. Gwangyang port was developed excessively under a government policy, while worries

about overcapacity however already rose. Throughput has been increasing, but the growth rate is lower than anticipated, since annual growth rate from 2000 to 2005 was expected to be 38.7% (BPA, 2004:78) but turned out to be 23.9%. The forecasted throughput was 4,850,000 TEU in 2006 but only 1,439,000 is recorded in 2005. It thus seems that the development of Gwangyang port is an “excessive” project that will have a hard time to solve overcapacity problems.

3.3.2 Price competition

Port competitiveness has its existence within port competition and as such leads to price wars to achieve success at the cost of others (Van de Voorde and Winkelmans, 2002b:141). Table 3.7 shows a comparison of terminal use costs among major northeast Asian container ports. Compared to Busan port, Gwangyang and Shanghai offer terminal services at a relatively low cost. The Japanese ports of Kobe and Yokohama, on the other hand, charge almost the double of Busan. Japanese ports thus lost price competitiveness.

In the case of Gwangyang, the terminal use cost is comparatively very low in order to attract shipping lines. Gwangyang has a special reduced tariff that should stimulate shipping lines and shippers to opt for the port. Furthermore, the low price for terminal use is a factor of competitiveness for Gwangyang port. This low pricing is a result of the overcapacity, manifested in a high rate of berth occupation of 140%. Therefore it is possible to cause fiercer price competition in the competitive port environment in the future. According to competitive port development, price competition among ports will

become more severe when overcapacity raises.

Table 3.7 Comparison of terminal use cost among major container ports

Section	Busan	Gwangyang	Shanghai	Kobe	Yokohama
Facility	100	0	36	117	117
Service	100	98	488	514	487
Handling/ Warehousing	100	102	98	297	263
Subtotal	100	85	106	277	249
Container tax	levy	no	no	no	no
Total	100	67	84	219	197

Source: Gwangyang port website based on the research of KMI (2002).

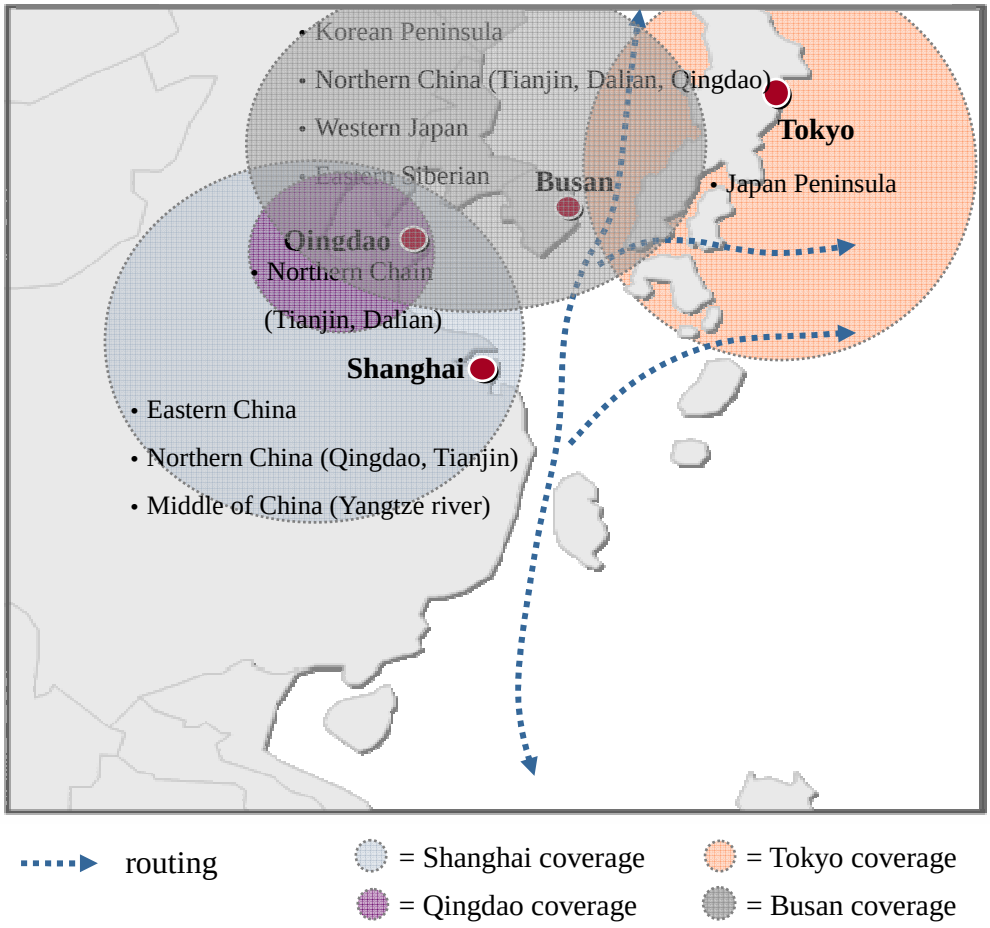
One of the most important requirements for hub ports is the attraction of transshipment cargo. Price is the determining factor for this type of cargo (Chan, 1999:155). Therefore price is a very sensitive factor to attract transshipments, so that its price elasticity is relatively high. Both Shanghai and Busan have incentive systems to attract transshipment cargo. Busan port provides a volume incentive up to a maximum of 50%, according to the amount of cargo or the growth rate compared to the previous year (BPA, website). By attracting transshipment cargo, Busan aims to improve its price competitiveness. However, Shanghai also provides an incentive system by means of a specially reduced price. The rebate is maximally 70% (Korea Shipping Gazette news,

2005). Shanghai's objective is to be a hub port by attracting transshipment cargo through a low price strategy.

3.3.3 Overlapping of hinterland

With the development of port capacity and facilities, hinterland is also under construction. Hinterland development projects are expected to provide land transport connections in a flexible way. They also provide value-added logistics service and are very important function to attract transshipments. Shanghai plans four such hinterland zones, where 64% of the companies are manufacturing and logistics companies (Arthur D Little Ltd., 2003). Hinterland transport network are also set up in Shanghai, while northeast China, Qingdao, Tianjin and Dalian, follow. The size of the hinterland is almost equal to that of Shanghai. In Korea, Busan and Gwangyang expand their hinterlands. They concentrate on the connection of road and rail as well as logistics centers. Figure 3.3 shows the coverage of Busan, Shanghai, Qingdao and Tokyo. Japan has already constructed hinterland systems since the 1960s but these systems are not expected to affect Korea and China. On the other hand, hinterland overlaps will exist among Korea and China. Especially Qingdao in China will be affected by Korea, on top of the pressure from other parts of China. Hinterland overlaps, however, can be a serious loss of money, since the investments made will not necessarily pay off. Since hinterland is also one of the factors that make shipping lines opt for a certain port, hinterland development quickly becomes a structural factor in (increasing) port competition as well.

Figure 3.3 Coverage of Busan, Shanghai, Qingdao and Tokyo



Source: Arthur D Little Ltd., 2003.

Chapter 4. Co-operation as a strategy of Busan Port

Busan port has been trying to keep its leading position in the fierce competitive environment among northeast Asian ports. Before Shanghai started growing considerable, Busan port adopted a strategy of low terminal usage costs. The port, however, suffered from internal and external problems, such as capacity limitations, old facilities and bad hinterland connections. The low-cost strategy of Busan port, nevertheless, attracted a considerable amount of shipping lines, especially since terminal usage costs and inland transport were high in Japan, so that feedering from Korean ports became an economical solution.

The rapid growth and development of Shanghai forced Korean government to start developing Busan port, in order to stay competitive. When the administration of Korea's current president Noh was set up in 2003, port development into hubs in northeast Asia was considered as a federal responsibility. As discussed in Chapter 3, government proposed a two-port system for Busan and Gwangyang, intended to solve Busan's chronic congestion and attract new shipping lines. The two-port system, however, did not appear to be as successful as one expected. Therefore, the Busan New port project is now in progress, which is expected to make the port competitive again.

In the past, Busan developed a strategic plan to survive in current environment, characterized by fierce competition. Shanghai's remarkable development recently, however, brings Busan port's survival strategy in danger. This situation causes a new strategy to be considered: co-operation among northeast Asian ports. Although nice in

theory, the plan government proposes to this extent is inconsistent. In this chapter, first we will present the governmental plans as well as their problems in limitations. Consequently, we will discuss port co-operation by horizontal and vertical integration, since this will be the basis of our solution.

4.1 Governmental plans for northeast Asian logistics co-operation

On 2 March 2006, the administrator of the Ministry of Maritime Affairs and Fisheries presented the northeast Asian logistics co-operation system (Seoul economy newspaper, 2006). This plan involves that three northeast Asian countries, Korea, China and Japan, connect their logistics systems flawlessly across the border, instead of limiting to the domestic port. This plan results from the earlier-mentioned rapid growth of Shanghai. While Busan's throughput growth is small, that of Shanghai is considerable, so that Busan faces a crisis in its competition with Shanghai. Winning in zero-sum game, where either Busan or Shanghai will emerge victorious, is hard for Busan. Therefore one looked for a new, innovative solution to solve the problem. So far, port development focused on hardware, but now it is the most urgent time to focus on software. As a result, government expects that co-operation in a positive sum game (win-win) can be a solution. Furthermore, domestic transport connections are also presented for the new logistics network of northeast Asia.

4.1.1 Co-operation among northeast Asian countries

Table 4.1 shows the major agenda of the northeast Asian logistics co-operation. Starting

point is the short-term goal to increase work efficiency and exchange of logistics human resources. In the middle term, after investment is planned, collaborative activities are intended. For this plan, a supporting institution will be set up (Jeil economy newspaper, 2006), which will help developing international logistics. The same institution will also try to attract global companies and support overseas ventures.

Table 4.1 Major agenda for northeast Asian logistics co-operation

Term	Major agenda
Short (06'-08')	Logistics standardization, Utilization of custom system, Construction of collaborative information network, Exchange of logistics human resources, etc.
Middle (08'-10')	Logistics infrastructure through collaborative investment and application, Support of overseas ventures, etc.
Long (11'-)	Support Asian brand and global logistics company, Contract of northeast Asian logistics co-operation, etc.

Source: Seoul economy newspaper from the Ministry of Maritime Affairs and Fisheries, 2006.

This plan is expected to cause some problems, however. Co-operation between countries, for instance, is not easy to establish and while the plan is aimed at getting more benefits from other countries, each country has individual interests. Co-operation is not unilateral but mutual. Constant discussion is needed to keep a continuous 'cooperative interchange' among countries. Co-operation can only be accomplished when one has mutual benefits are possible. Hence the importance to find these mutual benefits. Feasible details of the plans are needed as well, or it will be just a blank effort.

4.1.2 Domestic logistics chain improvement

Busan New port is constructing road and rail transportation systems to connect the hinterland. Air transport plays an important role in the transport network as well. Kimhae airport is located near Busan port, but it is not suitable as an international airport for logistics. For air transport legs of domestic logistics chains, the development of a new airport is considered (Busanilbo, 2006). Plans are made to construct, by 2015, a new international airport with multimodal connections. The location is expected to be within a one-hour radius of Busan and Gwangyang port. Transport connection systems and hinterland as well as airport facilities are considered. The main aim is to improve integration between airport and hinterland.

4.2 Horizontal integration

In horizontal co-operation, one can distinguish among area (intra- or inter-port) and actor (operator or authority). Based on this, there are three levels of cooperating horizontally, namely intra-port co-operation at operator level, inter-port co-operation at operator level and inter-port co-operation at port authority level. Each level has to be considered separately and as specific as possible.

4.2.1 Intra-port co-operation at operator level

Within the privatized port, competition among terminal operators can be fierce. In intra-port co-operation at operator level, co-operation between terminals of the same operator

seems to be easy. Usually terminal operators cooperate through joint ventures (Song, 2002:105) since it reduces risk.

Table 4.2 Terminal operators in Busan port and Gwangyang port

City	Zone	Terminal operator
Busan	Jaseongdae	Hutchison Busan Container Terminal (HBCT)
	Shinseondae	Busan East Container Terminal Co., Ltd (PECT)
	Uam	Uam Terminal Co., Ltd
	Gamman	Hutchison Gamman Container Terminal (HGCT) Global Enterprise Co., Ltd. Hanjin Shipping Co., Ltd. Korea Express Co., Ltd.
	Singamman	Dongbu Busan Container Terminal Co., Ltd
	Gamcheon	Hanjin Shipping Co., Ltd.
	Busan New Port	DP world (25%) Hanjin Shipping Co., Ltd. (10.22%) Hyundai Merchant Marine. Ltd. (9.28%)
Gwangyang	Korea Express Co., Ltd.	
	Global Enterprise Co., Ltd.	
	Dongbu Container Terminal Co., Ltd.	
	Hutchison Gwangyang Container Terminal (HGCT)	
	Korea International Terminal (KIT): Hutchison Port Holdings(HPH), Hyundai Merchant Marine. Ltd., Hanjin Shipping Co., Ltd.	

Source: collected from BPA, Busan New Port and Gwangyang port website

Busan port can be divided in 6 zones, illustrated in Table 4.2. Hutchison Port Holdings (HPH) invests in two terminals, each in a separate zones. Global terminal operator HPH invested in the Jaseongdae zone first. Consequently, HPH invested in the Gamman zone. The co-operation between Jaseongdae and Gamman, then, can be accomplished easily. Similarly, Hanjin shipping has dedicated terminals in Gamcheon and Gamman.

Competition among terminal operators within Busan port is in fact not fierce, because Busan Port Authority is taking charge of general port management in the whole port, except in Busan New port. Busan New port is operated by limited company, which raises concerns as to competition within the new port. Since it has a stake of 10.22% in Busan New port, Hanjin has all the advantages to cooperate with Busan New port. As we know, because of the fact that Busan port has a significant risk of losing cargo to competitors such as Shanghai, the Busan New port project was founded. As a result, in order to have the project succeeded, a close co-operation among terminal operators within Busan port is highly recommended. A close relationship and connection between Busan port and Busan New port is also of utmost importance.

4.2.2 Inter-port co-operation at operator level

In Asian ports, competition for the status of hub port exists for already quite some time. However, nowadays, regional competition within specific areas is accelerating. Han (2002:13) states in this respect that competition between ports is changing from a “wide sphere” to a “narrow sphere”. Even within a country port competition exists. Since government supports ports, it is relatively easy for domestic ports to cooperate. As was

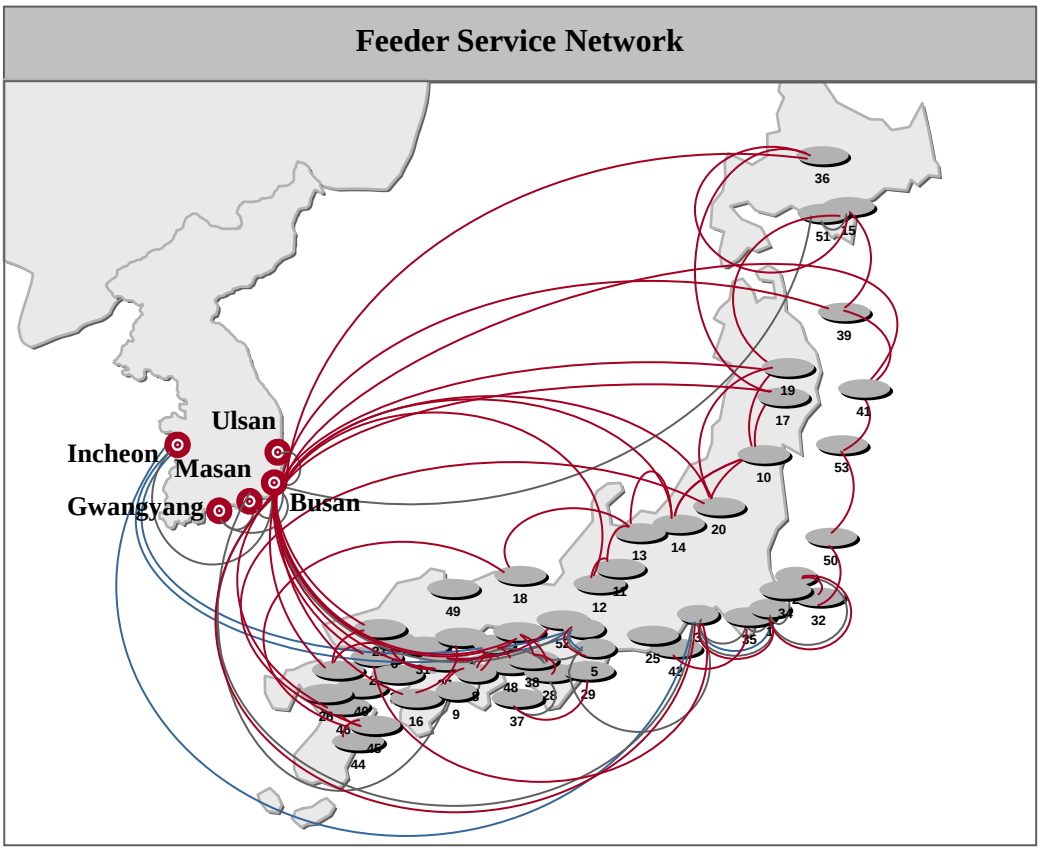
mentioned before, in Korea government supports a two-port system. Because most terminal operators active in Busan port invested in Gwangyang as well (Table 4.1), co-operation at operator level can be conducted easily. Recently (7 April 2006), Gwangyang established a co-operation pact for close interchange and the development with the Chinese port of Ningbo (Gwangyang port website). Therefore, Gwangyang – which already cooperates with Busan – could serve as a bridge between Busan and Ningbo.

In port co-operation, it is important to look for a good target port first. In the competition with China, it can be stated that Shanghai is at a rapid pace and has a favorable competitive position in northeast Asia. If one wants port co-operation to succed, complementary benefits between both ports are indispensable. Shanghai and Busan, however, are both large scale ports, with the same goal: to be a hub port in northeast Asia. Therefore, co-operation between Shanghai and Busan would be difficult. Nevertheless, within China port competition is also fierce. Shanghai competes with northern Chinese ports, such as Qingdao, Ningbo and Tianjin. Therefore, cooperating with the competitor's competitor (applying the rules of the logic this should be your friend) could be a strategy to prefer. Moreover, 50.5% of investments in North-Chinese hinterland are conducted by Korean companies. Korea processed transshipment cargoes with destination northern China, from 200,000 TEUs in 2001 to 680,000 TEUs a year later (Han and Woo, 2004:93). Inter-port co-operation at operator level is thus expected to lead to the development of feeder services between Korea and China.

In the competition with Japan, some effective co-operation with Japanese local ports

could also be established. Some of the biggest weaknesses in Japanese logistics are the high land transport and port user costs. Table 3.4 in Chapter 3 showed that it is more cost effective when Japanese ports use feeder services. Currently there are some 53 feeder service between Korea and Japan (Figure 4.1 and Appendix 3). It is thus important for Busan port to keep its feeder network to attract transshipment of Japan. In order to keep the feeder services, long-term co-operation between Busan and Japanese ports is indispensable.

Figure 4.1 Feeder service between Korea and Japan



Source: Arthur D Little Ltd., 2003 (Appendix 3)

There are two types of feeder operators, common user operators and dedicated feeder operators (Chan, 1999:155). Chan (1999) emphasized that feeder operators look for hub

operators on the basis of the magnitude of their container handling charges, since transshipment cargo is price elastic. Therefore feeder operators easily switch to another hub port. In Busan, transshipment cargo accounts for 43.7% of total throughput, which makes the port significantly influenced by that type of cargo. Keeping transshipment is thus of the utmost importance and will also contribute to the competitive position of the port. In order to keep transshipment, co-operation on the basis of price and service has to be concluded with the respective feeder operators.

4.2.3 Inter-port co-operation at port authority level

One of the management goals of the Busan port authority is the construction of an overseas cooperating system in 2005 (Busan Port Authority website). In the 1990s, Busan port established sisterly relationships with six ports, namely Seattle (USA), New York/New Jersey (USA), Osaka (Japan), Southampton (U.K), Rotterdam (Netherlands) and Shanghai (China). Increasing the interchange of information and technology was the main purpose. In reality, however, such interchange never took place, since the organization responsible for this, the Ministry of Maritime Affairs and Fisheries, was only introduced in 1996, resulting from the former Korea Maritime and Port Administration.

With the Port of Rotterdam, however, on 5 September 2005 the Busan port authority concluded a memorandum of understanding (MOU), in order to enhance co-operation between the two ports (Busanilbo newspaper, 2005). A similar MOU is planned for co-operation with the port of Los Angeles in July 2006 (Busanilbo newspaper, 2006). Table

4.3 shows the details of both agreement. Major purposes here were the sharing of port information and the interchange of human resource.

Table 4.3 Details of agreement

Section	Details
Busan port - Rotterdam port	• Sharing information of port operation, management and hinterland • Active interchange of human resource • Economic activities and relation improvement • Mutual co-operation between both countries
Busan port - Los Angeles port	• Sharing information of port operational know-how • Active interchange of human resource • Dealing with problems of port environment and security • For marketing

Source: Own representation.

In northeast Asia governments conduct port development. The role of the port authority, therefore, is important and co-operation among northeast Asia is needed at the port authority level. Within specific areas, the port environment has similar characteristics, so that regional co-operation is expected to lead to a large extent to synergetic effects. In the competitive environment, sharing information on port operations and management can improve customer service as well as port efficiency. To the extent allowed by competition policies, agreements on tariffs, furthermore, could block severe price competition and increase profits. In order to keep sustainable co-operation, active and close interchange between countries is indispensable.

4.3 Vertical integration and supply chain management

Competitive advantage goes beyond port boundaries and port networking is considered as one of the important factors (Haezendonck and Notteboom, 2002:68). The integration of logistics chains determines the success of a port (Van de Voorde and Winkelmans, 2002a:7).

Nowadays, customers' requirements are high. Therefore ultimate goal of Supply Chain Management (SCM) is to reduce total costs and to provide quick and safe services. Seaborne transport, however, is considered as only one element of the whole chain. With the increased importance for SCM, then, integration among the different transport modes – seaborne, air, road and rail transport – is needed. Furthermore, activities ranging from production to consumption, including transportation, warehousing, materials handling, information and value-added services have to be integrated to meet customers' requirements.

Ports play in this whole a role of creating added value as a logistics node and link. Flexible connection between transport modes will thus become more important. Flexible connection between logistics activities is also needed. It will increase port competitiveness and allow to realize synergies.

To integrate the logistics chain, in general, investments are going on. For example, shipping lines expand their scope to container terminals, which is especially manifested in the management of dedicated terminals to improve efficiency. In Korea Hanjin

Shipping and Hyundai, both leading shipping lines, have been investing in the container terminal business, in dedicated terminals or in terminal shares. In a similar way, terminal operators and shipping lines widen their businesses to land transportation. By doing so, they tend to affect the whole logistics chain in order to increase market power. This trend shows that vertical integration is a critical factor and that co-operation among logistics chains is necessary as well.

Conclusions

This study analyzed port competition in northeast Asia and suggested co-operation between ports as the way to follow. Korea's Busan port is competing considerably with other northeast Asian ports. Co-operation, therefore, is regarded as the solution and strategy in order to survive in the competitive market place and to maintain a sustainable port environment. The strategy is expected to minimize risk and maximize efficiency by contracting a positive-sum game (win-win). For parties with complementary and interdependent relationships, the strategy will especially prove to be successful.

The main reason that co-operation is indispensable in northeast Asia is the anticipation of a number of problems. As a result of port competition, overcapacity, fierce price competition and overlapping hinterlands are anticipated future problems. In northeast Asia as a whole, overcapacity problems will emerge, because China and Korea both construct berths excessively. Therefore, it will be useful to attract cargo by promoting all the northeast Asian ports together. Collaborative marketing efforts will reduce cost and at the same time increase synergetic effects. Fierce price competition, however, leads to a reduction of the benefits. Nevertheless, by agreeing on tariffs, these benefits could be stabilized. Furthermore, overlaps in the hinterlands cause excessive competition and duplicated investments. The overlapping hinterland areas have to be defined and divided by agreement, so as to avoid duplicated investments. Agreements dealing with flexible connections between two regions are also indispensable.

Port competition consists of three levels, namely intra-port competition at operator level, inter-port competition at operator level and inter-port competition at port authority level. Because of its different characteristics, each level has to be dealt with separately. In the intra-port competition at operator level, close relationships and connections are needed between Busan port and Busan New port. In the inter-port competition at operator level, the co-operation between Busan and Gwangyang can be achieved. Port co-operation between big ports is expected to be difficult. Finding a complementary partner there, indeed, proves to be not easy, since both big ports have the same objectives. According to the research, ports in northeast China as well as feeder ports in Japan can be target ports to cooperate with Busan. Within the same area (northeast Asia), they seem to have a lot of characteristics in common and need shared information. In the inter-port competition at port authority level, co-operation is expected to solve some severe problems. In this way, this thesis conducted the analysis for each of the three levels separately. Co-operation among value chains is also insisted upon, because of the ever increasing importance of connections among supply chains. A close co-operation between supply chains, therefore, is needed.

This study insists upon the need for horizontal and vertical co-operation in Busan port. The positive effects were discussed in detail, but concerning the limitations some further research might be valuable. After having discovered all limitations, last but not least, plans for improvement should be introduced.

References

Arthur D Little Ltd., 2003, The strategies for attracting global logistics company, the Ministry of Maritime Affairs and Fisheries

Blauwens, G., De Baere, P. and Van de Voode, E., 2002, Transport Economis, Antwerp, Uitgeverij De Boeck, 475 pages

Bowersox, D., Closs, D., Cooper, M., 2002, Supply chain logistics management, New York, McGraw-Hill/Irwin, 656 pages

Busan New Port Co. Ltd., Online Available at: http://www.pncport.com/eng_index.jsp [15 April 2006]

Busan Port Authority, 2004, Port of Busan Container Statistics, Korea, 85 pages

Busan Port Authority, Online Available at: http://www.busanpa.com/service?id=eng_index [15 April 2006]

Carbone, V., 2003, The changing role of ports in supply-chain management: an empirical analysis, *In: Maritime Policy & Management*, Vol. 30, No. 4, P. 305-320

Chan, T., 1999, How will feeder operators view the creation of secondary hubs: Will it give rise to co-operation or competition? *In: Proceedings of the 21st world ports*

conference, the International Association of Ports and Harbors (IAPH), Port Klang, 15-21 May, 289pages

Coeck, C., 2006, Port sector is extremely important to Fleish economy, *In: De Lloyd*, 29 March, P. 11

Copenhagen Malmö Port, Online available at: http://www.cmport.com/CMP/uk/uk_docs.nsf [15 April 2006]

De LIoyd, 2006, Expansion of Asian ports raises concern of overcapacity, 8 March, p. 7

Fossey, J., March 2006, Musical chairs, *In: Containerisation International*, p. 66-67

Gwangyang port, Comparison of terminal use cost among major container ports, Online available at: http://www.portgy.com/menu01/m0502.asp [15 April 2006]

Gwangyang port, Port facility and operation, Online Available at: http://www.portgy.com/menu01/m0201.asp [15 April 2006]

Haezendonck, E. and Notteboom, T., 2002, *Port Competitiveness – The competitive advantage of seaports*, Antwerp, Editions De Boeck Ltd, First edition, 155 pages

Han, C. and Woo, J., 2004, The effects on Korean transshipment by reason of the port development of northern China, Seoul, 135 pages

Han, C., 2002, Changes in competitive position of Asian ports and port strategies of China and Japan, Korea Maritime Institute, 38 pages

Heaver, T., Meersman, H. and Van de Voorde, E., 2001, Co-operation and competition in international container transport: strategies for ports, *In: Maritime Policy & Management*, Vol. 28, No. 3, P. 293-305

Jung, T., 2002, Marketing Strategies for Busan Container Terminals, Korea Maritime University, thesis for master degree

Kang, B., 2005, Conclusion of MOU between Busan port and Rotterdam port for increasing interchange, *In: Busanilbo newspaper*, 6 September, Online available at: http://news.naver.com/news/read.php?mode=LSD&office_id=082&article_id=0000060652&section_id=102&menu_id=102 [18 April 2006]

Kang, B., 2006, Propulsion of sisterly relationship between Busan port and Los Angeles port, *In: Busanilbo newspaper*, 18 April, Online available at: http://www.busanilbo.com/news2000/html/2006/0418/020020060418.1018111013.html [18 April 2006]

Kim, Y., 2006, Promotion of northeast Asia logistics hub, *In: Jeil economy newspaper*, 3 March, p.23

Korea Shipping Gazette news, 2005, The open of Yangshan port on November and the influence on attracting transshipment of Korean ports, 27 October

Korea Shipping Gazette news, 2005, The significance of the construction of Yangshan port, 21 November

Kumar, S., Hoffmann, J., 2002, *Handbook of Maritime Economics and Business - GLOBALISATION: THE MARITIME NEXUS*, London, LLP Professional Publishing, First edition, 1000 pages

Lee, C., 1998, *Port Logistics System*, Busan, Hyosung, First edition, 560 pages

Lee, D., 2006, New airport is needed in southern part, *In: Busanilbo newspaper*, 3 March, p.1

Lim, J. and Lee, J., 2005, The effects on competition of northeast Asian ports by opening Yangshan port, Seoul, Yongjin publish, 151 pages

Lim, J., et.al., 2004, *The changing global logistics environment and counterplot*, Korea Maritime Institute, KMI research paper, 380 pages

Lloyd's shipping economist, March 2006, LARGE CONTAINERSHIPS: The end of the dream, p. 15-18

Mintiens, G.., 2006, Gewicht DP World is moeilijk in te schatten, *In: De Lloyd*, 27 March, P. 48

Musso, E., 2005, *Ports: competition and competitiveness*, materials for advanced maritime economics in ITMMA, University of Antwerp

Oh, H., 2006, The cooperation with China and Japan, *In: Seoul economy newspaper*, 3 March, p. 3

Paelinck, H. and Paelinck, J., 2005, Queueing problems and optimal design of container ports, materials for advanced maritime economics in ITMMA, University of Antwerp

Robinson, R., 2002, Ports as elements in value-driven chain systems: the new paradigm, *In: Maritime Policy & Management*, Vol. 29, No. 3, P. 241-255

Sim, K., 2001, Port alliances for survival, *In: Analysis moments of Korea Maritime Institute*, 29 January, No. 1002, 14 pages

Song, D., 2002, Regional container port competition and co-operation: the case of Hong Kong and South China, *In: Journal of Transport Geography*, p.99-110

Song, D., 2003, Port co-opetition in concept and practice, *In: Maritime Policy & Management*, Vol. 30, No.1, P. 29-44

Stopford, M., 1997, *Maritime Economics*, London, Routlegde, Second edition, 562 pages

Tozer, D., 2003, Ultra-large container ships: the green ships of the future?, *Lloyd's Register news*, On-line available at:
http://www.lr.org/news/downloads/ulcs_article.pdf [15 April 2006]

UNCTAD, 1990, Development and improvement of ports co-operation among ports in developing countries, 14 pages

UNCTAD, 2001-2005, *Review of Maritime Transport 2001-2005*, Geneva: United Nations

Van de Voorde, E. and Winkelmans, W., 2002a, *Port Competitiveness - A general introduction to port competition and management*, Antwerp, Editions De Boeck Ltd, First edition, 155 pages

Van de Voorde, E. and Winkelmans, W., 2002b, *Port Competitiveness - Conclusions and policy implications*, Antwerp, Editions De Boeck Ltd, First edition, 155 pages

Vermeylen, S., 2005, SWOT strategy formulation, materials for strategic management tools in ITMMA, University of Antwerp

Winkelmans, W., 2005a, Port competitiveness and port competition Two-of-a kind?, materials for advanced port economics in ITMMA, University of Antwerp

Winkelmans, W., 2005b, Responding to market change: The way forward for port

competition?, materials for advanced port economics in ITMMA, University of Antwerp

WTO, 2005, World Trade Report 2005

Yoon, B., 200, An Empirical Study on the Distribution Park Strategy for Northeast Asia Logistics Hub, Maritime University, thesis for doctor’s degree

Appendix 1 Containerships of 3,300 TEU plus by date of build (in service and on order at 1 January 2006)

Section	3,300 - 4,299TEU panamax		4,300 TEU + panamax		4,300 - 7,299TEU post-px.		7,300 TEU + post-px.		Cumulative Total
1980-1984	12	100.0%	0	0.0%	0	0.0%	0	0.0%	12
1985-1989	31	73.8%	6	14.3%	5	11.9%	0	0.0%	42
1990-1994	72	75.0%	14	14.6%	10	10.4%	0	0.0%	96
1995-1999	106	47.7%	29	13.1%	77	34.7%	10	4.5%	222
2000	5	9.4%	15	28.3%	29	54.7%	4	7.5%	53
2001	15	18.3%	3	3.7%	62	75.6%	2	2.4%	82
2002	19	22.9%	20	24.1%	38	45.8%	6	7.2%	83
2003	13	19.1%	17	25.0%	31	45.6%	7	10.3%	68
2004	7	8.1%	30	34.9%	29	33.7%	20	23.3%	86
2005	28	23.9%	30	25.6%	22	18.8%	37	31.6%	117
2006	38	25.5%	22	14.8%	33	22.1%	56	37.6%	149

Source: Lloyd's shipping economist (March 2006) from LSE/Boxfile Containership Database.

Appendix 2 The increasing pattern of northeast Asian throughput

Port	2000	2001	2002	2003	2004	2005
Hong Kong	18.1	17.8	19.14	20.82	21.93	22.43
Shanghai	5.61	6.33	8.81	11.37	14.56	18.08
Shenzhen	3.99	5.08	7.61	10.7	13.65	16.2
Busan	7.54	8.07	9.45	10.37	11.43	11.84
Qingdao	2.12	2.64	3.41	4.24	5.14	6.31
Ningbo	-	-	-	2.77	4.01	5.19
Tianjin	-	-	-	3.01	3.81	4.8
Guangzhou	-	-	-	-	3.31	4.68
Tokyo	2.96	2.77	2.71	3.28	3.58	3.76
Xiamen	-	-	-	-	2.87	3.34
Yokohama	-	-	-	-	2.58	2.9
Dalian	-	-	-	-	2.21	2.65

Source: Review of Maritime Transport 2001-2005, UNCTAD.

Appendix 3 Feeder service network between Korea and Japan

NO	Port	NO	Port	NO	Port
1.	YOKOHAMA	19.	AKITA	37.	KOCHI
2.	TOKYO	20.	NAOETSU	38.	TAKAMATSU
3.	NAGOYA	21.	SHIMONOSEKI	39.	HACHINOHE
4.	KOBE	22.	NAGANOSEKI	40.	KASHIMA
5.	OSAKA	23.	HOSOSHIMA	41.	ONAHAMA
6.	MOJI	24.	HAKATA	42.	TOYOHASHI
7.	HIROSHIMA	25.	YOKKICHI	43.	IWAKUNI
8.	IMABARI	26.	IMARI	44.	YATSUSHIRO
9.	MATFUYAMA	27.	TOKUYAMA	45.	KUMAMOTO
10.	NIIGATA	28.	TOKUSHIMA	46.	NAGASAKI
11.	TSURUGA	29.	WAKAYAMA	47.	ABURATSU
12.	MAIZURU	30.	FUKUYAMA	48.	IYOMISHIMA
13.	KANAZAWA	31.	UBE	49.	HAMADA
14.	TOYAMASHINKO	32.	CHIBA	50.	HITACHINAKA
15.	TOMAKOMAI	33.	MIZUSHIMA	51.	MURORAN
16.	OITA	34.	KAWASAKI	52.	HIMEJII
17.	SAKATA	35.	SHIMIZU	53.	SENDAI
18.	SAKAIMINATO	36.	ISHIKARI		

Source: Arthur D Little Ltd., 2003.