

A Study on Development Strategies for Container Terminals in Korea

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1. Introduction

Korea has achieved remarkable economic growth over the last three decades, largely due to the adoption of export-oriented economic policies. This economic development has resulted in a rapid increase in export and import cargoes and, since the foreign trade of Korea is carried predominantly by sea transport (approximately 99.8 per cent in volume terms), ports play a crucial role in this process.

Although investment in infrastructure development has, until now, allowed Korean ports to keep pace with an ever-growing volume of seaborne cargoes, a number of problems remain. Most fundamentally, port capacity is under pressure and the sector is plagued by managerial and operating inefficiencies. As a consequence, the ports of Korea suffer from serious congestion; a problem which is particularly acute in Pusan, the fifth largest container port in the world. By adding to the logistics costs of Korea's manufactured products, the delays caused by this congestion seriously undermines the competitiveness of such products in world markets and detracts from Korea's potential for further economic development.

In the past, all ports in Korea have been controlled and administered by the Korea Maritime and Port Administration (KMPA) which was a public organisation. In August 1996, the Korean government established a new government organisation, the Ministry of Maritime Policy and Fisheries (MMPF), with a remit to control and manage its seaports and other related

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activities and to improve management efficiency in the maritime area.

As a way of solving problems related to port congestion and other sources of inefficiency, the new MMPF has launched several new terminal development schemes. In this context, this paper will discuss both the extent of congestion in Korean ports, especially at Pusan, the major seaport of the country and the governmental and commercial measures for solving the problems. Most importantly, these include new terminal development schemes aimed at attracting private and foreign finance instead of relying on government funds.

2. The Role of Ports in the Korean Economy

2.1 Economic Growth and Foreign Trade

Following the Korean War, a large infusion of economic aid during the period 1953-1958 enabled the country to reconstruct its damaged production facilities and to achieve a moderate level of economic growth, although with a very high rate of inflation. In the period 1959-1962, the rate of inflation eased, but so did the pace of economic expansion with the annual growth in national output per capita declining to nearly zero in the early 1960s.

A rapid economic expansion began in 1963, supported by a sustained policy of export-led growth (Chung, 1996; Ranis, 1989). This strategy had been adopted in Korea's first Five-Year Economic Development Plan in 1962, replacing a policy of promoting import-substitution. Since that time, the country's gross national product (GNP) has grown phenomenally over the course of six successive Five-Year Economic Development Plans (FYP). Table 1 shows some major economic indicators of Korean economic development over the last three decades.

Table 1. Major Indicators of Korean Economic Growth (1962-1995)

Year	Population ¹	GNP ²	GNP per Capita ³	Exports ⁴	Imports ³	Government Consumption ⁶	Private Consumption ⁶
1962	26.15	356	87	18	55	50	294
1965	28.33	806	105	69	123	75	672
1970	32.24	2,736	243	382	616	265	2,041
1975	35.28	10,065	591	2,855	3,521	1,121	5,323
1980	38.12	36,672	1,589	12,765	13,541	4,268	24,786
1985	40.80	72,850	2,150	27,327	27,089	7,893	44,126
1990	42.87	178,262	5,659	65,016	69,844	18,187	96,388
1995	-	348,284	-	125,058	135,119	36,387	185,899

Notes: (1) Millions (mid-year estimates); (2) Current Prices (Billions of Won); (3) US\$ (in Current Prices); (4) F.O.B. (Billions of Won); (5) C.I.F. (Billions of Won); and (6) Billions of Won

Source: *International Monetary Fund* (1989, 1996), and *Song* (1990)

The rate of growth in real GNP has slowed considerably in recent years. After recovering from a recession in 1989, a real GNP growth rate of 9.1 per cent was attained in 1991. This slowed to 5.0 per cent and 5.6 per cent in 1992 and 1993. Helped by such favourable international factors as stable petroleum prices, a strong Japanese yen and a relatively robust world economy (in particular, the performance of the US economy), Korea's real GNP growth rate recovered in 1994, rising to 8.3 per cent. In that year, Korea's real GNP was 303,773 billion won (US\$ 378 billion), compared with 265,518 billion won (US\$ 331 billion) in 1993. These figures show Korea to be one of the largest economies in the world. Indeed, one measure of its economic progress is that, on 11 October 1996, Korea became a member state of the Organisation for Economic Co-operation and Development (OECD).

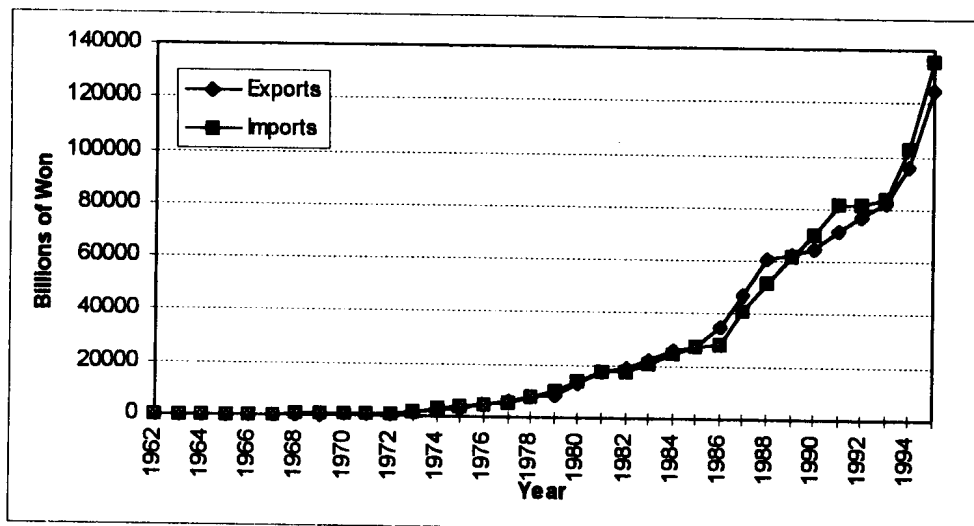
The country has now completed six full five-year planning cycles and in 1992 implemented the Seventh FYP (1992-1996). In an unprecedented move by the newly-elected government, this was replaced in 1993 by the Five-Year Plan for the New Economy (1993-1997). This new FYP envisaged an average annual GNP growth rate of 6.9 per cent and its main aim was to

raise the Korean economy to the ranks of the advanced nations and to lay the economic foundations for an eventual Korean unification. A major objective of the New FYP was to promote private initiatives within the business sector. The plan involved, therefore, fundamental reforms to the national economic structure including government regulations, public financing, the deregulation of financial markets and the introduction of privatisation policies. The government has enacted this plan by eliminating a variety of regulations and removing obstacles to fair competition. In 1993 alone, of the 1,079 business restrictions reviewed, the government decided to ease or abolish 757 of them. Moreover, ad hoc committees continue to review other cases in order to further deregulate business activities.

With the adoption of an export-oriented industrialisation strategy and the subsequent reform of various trade and economic policy measures, exports from Korea have increased rapidly since 1963. Trade-oriented industrialisation has been the basic growth strategy of Korea since the early 1960s. Consequently, the growth in Korean foreign trade is inseparable from its industrialisation.

When the First FYP was launched, the total value of Korean exports and imports amounted to only 18 billion won (US\$ 138 million) and 55 billion won (US\$ 423 million). By 1995, these figures had increased to 125,058 billion won (US\$ 162 billion) and 135,119 billion won (US\$ 175 billion) respectively. This rapid expansion of exports and imports is closely correlated to Korea's growth strategy. Figure 1 illustrates the ever-increasing value of Korea's exports and imports since the First FYP was launched in 1962.

Figure 1. Growth of Exports and Imports (1962-1995)



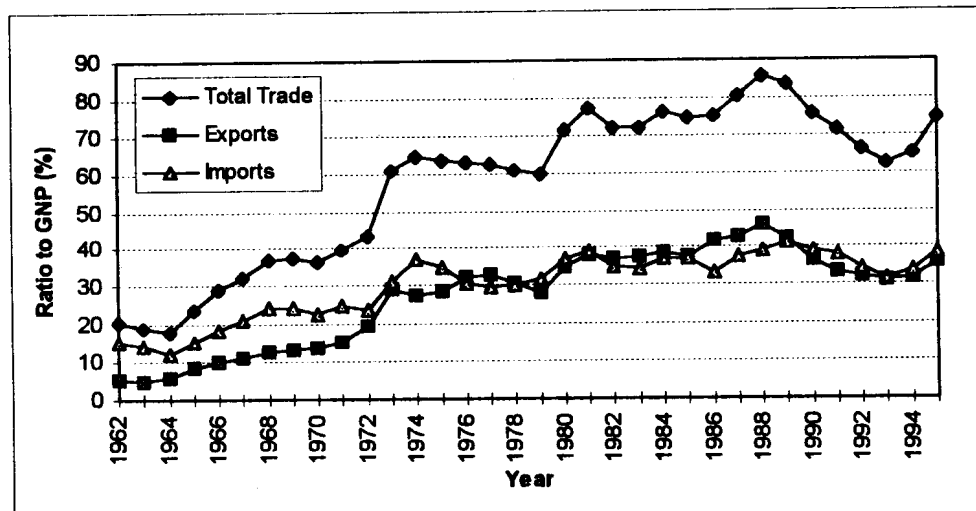
Source: *International Monetary Fund* (1989, 1996)

Chenery and Syrquin (1986) have developed a taxonomy of national economic development strategies as follows:

- Inward-oriented economies;
- Outward- and primary-oriented economies;
- Outward- and industry-oriented economies; and
- Neutral economies.

Clearly, Korea falls into the category of an outward- and industry-oriented economy. As such, Korea's industrialisation and consequent rapid economic growth depends mainly upon the import of raw materials and the export of processed and finished products. By comparing their ratios of foreign trade (exports and imports) to national product at all stages in their economic development, Amsden (1989) shows that the USA, Canada, Japan or any country in Europe, have never had anywhere near as high a dependence upon foreign trade as Korea. Figure 2 shows that this trend towards the greater dependence of Korea's economy on foreign trade (exports and imports) has been increasing continuously to a peak in 1988 of an 85.6 per cent ratio.

Figure 2. Ratio of Total Foreign Trade to GNP



Source: Derived from *International Monetary Fund* (1989, 1996)

2.2 The Importance of Ports to the National Economy

There is a close relationship between ports and the prospects for economic development. The port is not only a determinant of economic development, but a decisive factor in it. The influence of a port on the economy extends beyond its boundaries into the industrial, commercial and business sectors of the nation at regional and national levels (Frankel, 1987). At the same time, ports are also directly affected by economic development

Ports provide direct access to world markets and an excellent opportunity for developing trade with a wide range of countries without the use of costly intermediaries. Nagorski (1972) describes an important role of ports is to provide gates for global trade. Without an efficient port, the cost of living is higher, industrial development more difficult, and the export of mineral ores unprofitable. Thus, the rate of economic progress was drastically curtailed. Western Europe could never have achieved such a spectacular and rapid progress without Hamburg, Bremen, Rotterdam and Antwerp. Except for the very small proportion of freight cargoes that are carried by air, island nations such as Great Britain and Japan must, by necessity, channel their prodigious trade volumes through the sea mode. Under this circumstance,

the major British ports have been veritable bastions of British prosperity for centuries.

Raven (1982, p. 82) describes the economic role of ports in developing countries as follows:

"Because ports play such a catalytic role in economic expansion, we find that many developing countries, where ports are able to function freely and efficiently, have made particularly rapid progress. Typical examples are Hong Kong, Singapore, Korea and Taiwan."

As shown in Table 2, the Korean economy has been heavily and continuously dependent on seaborne international trade with almost 99.8 per cent of imports and exports carried by sea transport. This phenomenon explains not only the important role of Korean ports in national economic growth and development but also the impact that Korea's trade expansion strategy has had on the development of the Korean ports industry.

Table 2. Exports and Imports carried by Sea and Air

(Units: Billions tonnage, %)

Year	by Sea		by Air		by Sea		by Air	
	Tonnes	%	Tonnes	%	Tonne-kms	%	Tonne-kms	%
1985	1,330	99.8	3.3	0.2	11,498	99.8	24	0.2
1986	1,538	99.7	3.9	0.3	12,888	99.8	28	0.2
1987	1,780	99.7	4.7	0.3	14,514	99.8	31	0.2
1988	1,985	99.7	5.1	0.3	16,354	99.8	35	0.2
1989	2,039	99.7	7.1	0.3	16,652	99.7	43	0.3
1990	2,198	99.6	7.8	0.3	18,337	99.8	46	0.2
1991	2,630	99.7	7.9	0.3	21,686	99.8	45	0.2
1992	2,856	99.7	8.4	0.3	24,571	99.8	50	0.2
1993	3,169	99.7	9.5	0.3	27,684	99.8	62	0.2
1994	3,534	99.7	11.1	0.3	28,817	99.8	70	0.2

Source: *Korean National Statistical Office* (1996)

Port economic impact analysis is the major tool for assessing the contributions made by ports to the economy of a nation (De Salvo 1994). Moon (1992) analyses the impact of the port industry on the Korean economy and identifies the spreading effects of port investment from a macroeconomic viewpoint. Using a standard input-output model, his analysis

reveals that the Korean port industry was responsible, directly and indirectly, for gross sales within the economy of 375,241 million won (US\$ 618 million⁺), a 202,261 million won (US\$ 333 million⁺) contribution to GNP and for 28,760 jobs.⁵⁰⁾

3. Port Management and Administration

3.1 Korea Maritime and Port Administration

In general, types of port administration differ very widely in terms of patterns of ownership and administrative systems. Thomas (1976) points out that the management of most ports in the world is vested in a port authority. The constitution and objectives of these bodies differ quite considerably from country to country and indeed even within national boundaries. Perhaps the most remarkable feature of the port administration in the major ports of the world are the diverse forms of ownership adopted and the numerous ways in which responsibility for providing facilities and services have been delegated. Goss (1990) classifies the activities of a port authority into two different roles: one is a *comprehensive* role and the other a *landlord* role. The former involves providing all facilities and services with independent operators either prohibited from undertaking work within the port or permitted to perform only minor tasks (e.g. refuse collection). The landlord role, however, limits the activities of the port authority simply to providing and maintaining the basic infrastructure (e.g. breakwaters, quays, roadways) and essential services (e.g. fire service, security, etc.) with independent private or public companies allowed to provide all other facilities and services (e.g. cargo handling, towage, etc.).

In this context, a major turning point for the Korean port industry came in 1976 when the government established the Korea Port Authority (KPA) with the purpose of providing a central authority for port management and development. The KPA was renamed the Korea Maritime and Port

⁺ US\$ equivalents are computed on the basis of 1980 average exchange rates.

Administration (KMPA) in 1977.

Prior to this, the fragmentation of authority and lack of co-ordination between the bodies concerned with port planning and operations caused the development of the ports to proceed in a piecemeal and uncoordinated fashion. It also led to a duplication of effort and facilities due to the competition between ports and between the interested government agencies (Bang, 1984). As a result, the government realised it was necessary to integrate port operations and development in an effort to maximise efficiency and to meet the rapidly increasing demand for port facilities. This is the reason why the KPA, later named KMPA, was launched. Until only very recently, it acted in a comprehensive role having responsibility for and central control of the country's ports in such areas as administration, management and development.

The KMPA was headed by an administrator who was appointed directly by the Korean President, and was divided into eleven departments administering all maritime affairs in the country through ten district authorities or District Maritime and Port Administrations. The main responsibilities of the KMPA were described as follows (KMPA, 1979):

- To control the planning, design, construction and maintenance of all port facilities in the major ports within its jurisdiction;
- To establish an appropriate form and structure of administration, organisation and management complying with government regulations at the port level;
- To achieve efficient port operations;
- To ensure a sound financial system with public accounting methods and a reasonable level of port dues;
- To cooperate in the development of the port cities and related commercial services; and
- To cooperate with other agencies, whether governmental or private, in developing the national economy.

In early 1996, the Korean government announced it would merge three agencies into a new Ministry of Maritime Policy and Fisheries (MMPF) to help the country become a maritime superpower. The ministry was finally launched in August 1996 by merging the Korea Maritime and Port

Administration, the Fisheries Administration, and the Maritime Police Administration. The MMPF has a remit to control and manage Korea's seaports and other related activities and to improve management efficiency in the maritime area. The KMPA now constitutes merely one branch of the new MMPF.

3.2 Korea Container Terminal Authority

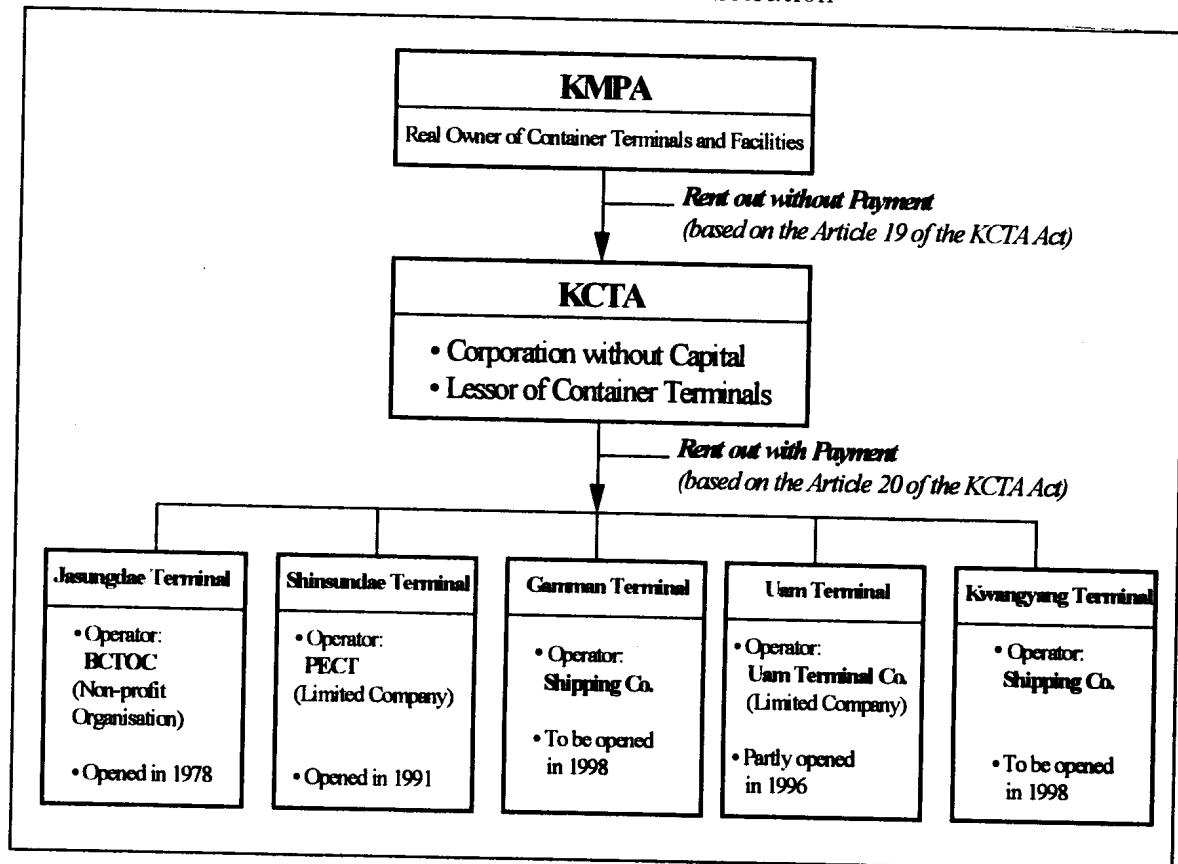
As far as the administration of container terminals in Korea is concerned, the Korea Container Terminal Authority (KCTA) has played a central role. All of the container terminals in Korea are controlled, managed, operated, and supervised by the KCTA, as a public organisation, which was set up in 1990. Before the KCTA was established, the development and operation of ports in Korea was entirely dependent upon government funds. This system caused problems because of the inflexibility of the budget and the bureaucratic procedures for obtaining the funds necessary for port development and maintenance, thus resulting in a situation where the required financing had neither been provided in sufficient quantity nor at the right time.

In order to avoid these shortcomings in financing, the government launched the KCTA Act in December 1989 and, finally, established the KCTA on the basis of the Act. One of the main aims for creating the KCTA was that profits accruing from operation, management, and development of a container terminal should be reinvested into the development and maintenance of that container terminal, and that financial sources should be diversified to efficiently develop and operate the terminal. The objectives of the KCTA can be described as timely development, effective operation and management of the container terminals in Korea; promotion of a smooth flow of container cargo traffic; and promoting national economic development. The duties can be defined as development of new container terminals, their management and operation; establishment and management of inland container depots and approach roads to container terminals; and the carrying on of terminal stevedoring services. In order to carry out these tasks the KCTA can, if necessary, engage in such business as purchasing and selling land and any properties on it; investment in other businesses;

borrowing money from commercial banks including foreign loans; issuing Container Terminal Development Bonds; and charging fees for using container terminal facilities.

The KCTA currently controls and supervises the Jasungdae, Shinsundae and Uam terminals in Pusan together with the Kwangyang terminal. These are all are leased without payment from the government (i.e. the KMPA). The KCTA rents these terminals to each terminal operator in return for payment: the Jasungdae terminal to the Busan Container Terminal Operation Corporation (BCTOC), the Shinsundae terminal to the Pusan East Container Terminal Company (PECT), and the other three terminals to private companies, mainly shipping and transportation companies.

Figure 3. Korea's Container Terminal Administration



Source: Derived from the KCTA Act

As can be seen in Figure 3, the Jasingdae container terminal is operated by the BCTOC, which was founded in March 1978 as a non-profit making public organisation and was the first organisation to introduce the container terminal concept to Korea. On the other hand, a limited company (the PECT) is operating the Shinsundae container terminal, the construction of which was finished in June 1991. In setting up the PECT, total capital injected was 18 billion won, which had risen to 47 billion won as of 1995 after continuously increasing the capital base. The KCTA holds 25 per cent of the total shares, thus having control over the PECT, and 11 stevedoring companies own the remaining 75 per cent (Korea Maritime Institute, 1996)

Figure 3 shows that there are three different entities controlling the container terminals in Korea; the terminal operators, i.e. BCTOC, PECT, and other private companies, are subject to the supervision of the KCTA, and again the KCTA is under the KMPA. This hierarchy gives much power to the KMPA acting on behalf of the government, indicating that the government has heavily influenced the processes of management, operation, and development of the container terminals in Korea.

4. Insufficient Capacity, New Terminal Development Plans and the Private Sector

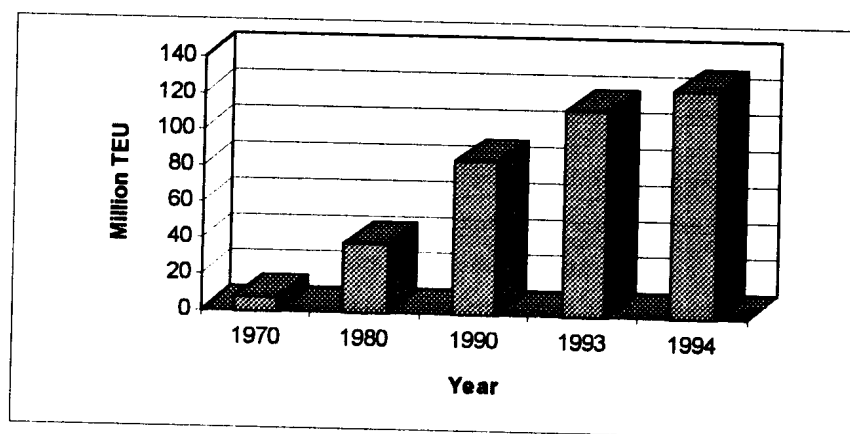
4.1 Container Traffic in Korea

When talking about the characteristics of a port wishing to serve the transportation needs of the future, Vogel (1994) has suggested that this really amounts to the container terminal of the future. His argument suggests that the container terminal will play a considerably more crucial role in international trade in the future.

Containerisation was introduced to international shipping in the late 1960s as an attempt to cut the costs of maritime transport by reducing cargo

handling costs, the vessel's time in port and has allowed economies of scale to be reaped. It has increased efficiency, service speeds and offered goods greater protection from loss and damage than they would otherwise have received. In consequence, it has increasingly gained favour in the carriage of international trade and has become one of the most important means of transport. Figure 4 illustrates the increasing volume of container traffic handled in world ports. In 1994, the recorded global total was 125 million TEU; an increase of 11 million TEU (10.4 per cent) over the 1993 figure. This rate of growth is in line with the average annual increase of 10 per cent experienced over the last decade and slightly above the 9 per cent figure for the last five years. (Containerisation International Yearbook, 1996). Container volume has increased by 18 fold from approximately 7 million TEU in 1970 to 125 million TEU in 1994. In the context of container ship and terminal development, the container terminal looks set, therefore, to continue to play a significant role in international trade in the future.

Figure 4. Development of World Container Traffic

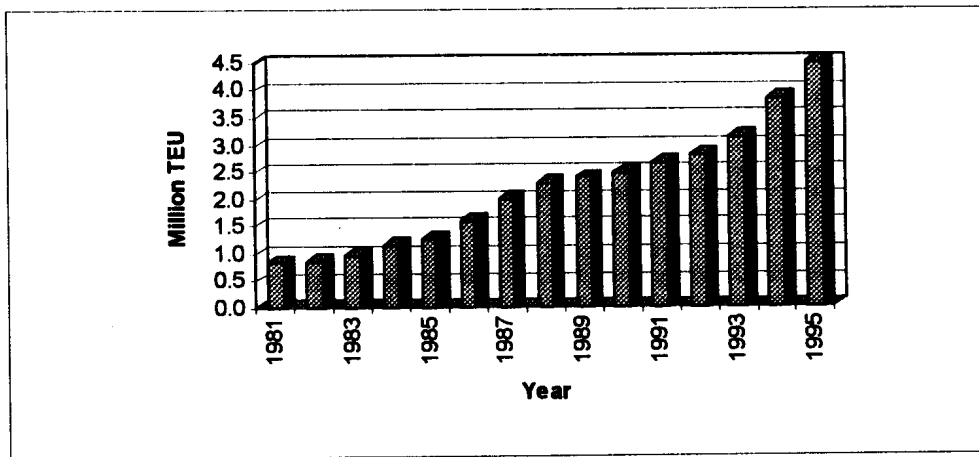


Source: *Containerisation International Yearbook* (various years)

In parallel with the growth in world container traffic, the volume of containers handled in Korea has also risen sharply since the 1970s as a result of the country's rapid economic growth and development. This is illustrated in Figure 5. The latest rise has been fuelled by the rapidly developing trade between Korea and China and gives a clear signal that the Korean import and export economy, after a dip in the early 1990s, is back

on course. Furthermore, the volume of container traffic is expected to increase in the future. A recent report by the Korea Maritime and Port Administration (KMPA, 1992a) shows that container volume in Korea is expected to rise to 6.5 million TEU by 2001 and then to 11.5 million TEU by 2011.

Figure 5. Growth of Container Traffic in Korea



Source: KMPA (1996)

One of the main problems the Korean port industry faces, however, is that almost all container traffic has been handled through the port of Pusan, the principal port of Korea, the fifth largest container port after Hong Kong, Singapore, Kaohsiung and Rotterdam (Cargo Systems, 1996). As can be seen in Table 3, between 90 and 95 per cent of total container volume is handled through Pusan almost every year. The proportion of Korea's total container volume handled by Pusan reached its peak in 1993 at 95.7 per cent. In 1995 it handled 4.1 million TEU accounting for 92 per cent of the total container traffic of 4.5 million TEU. In contrast, the port of Inchon handled 0.3 million TEU accounting for only 6.6 per cent, and the ports of Ulsan and Masan together handled a mere 1.4 per cent of Korea's total container volume.

Table 3. Container Traffic through Korean Ports

Year	Pusan		Inchon		Others*		Total	
	TEU(000)	(%)	TEU(000)	(%)	TEU(000)	(%)	TEU(000)	(%)
1983	884	91.8	79	8.2	-	0.0	963	100
1984	1,054	91.3	100	8.7	1	0.1	1,155	100
1985	1,155	91.7	104	8.3	-	0.0	1,259	100
1986	1,491	93.1	101	6.3	10	0.6	1,602	100
1987	1,887	94.5	108	5.4	1	0.1	1,996	100
1988	2,135	93.4	150	6.6	2	0.1	2,287	100
1989	2,257	94.9	116	4.9	6	0.3	2,379	100
1990	2,348	95.1	112	4.5	9	0.4	2,469	100
1991	2,518	95.5	119	4.5	-	0.0	2,637	100
1992	2,673	95.5	118	4.2	8	0.3	2,799	100
1993	2,998	95.7	113	3.6	21	0.7	3,132	100
1994	3,575	93.2	227	5.9	34	0.9	3,836	100
1995	4,130	92.0	296	6.6	62	1.4	4,488	100

Note: * Others includes the Ulsan and Masan ports.

Source: KMPA (1993, 1996)

Park (1995, p. 11) gives the following explanation why a high volume of container traffic has concentrated on the port of Pusan:

"Despite the fact that the port of Inchon has 1,160 metres of container berths and about 40 per cent of the containerised cargoes originates in and is destined for the *Kyungin* area (the province of *Kyunggi* and the capital city), which is the major area of industrial and population concentration in Korea, the port has not acted as a load centre. The reason for this is that it is one shipday away from the main container trunk line and has restricted passage through a lock to enter the port owing to its big tidal difference. As a result, the containers have been concentrated on the port of Pusan."

Moreover, a recent report gives several reasons for congestion at Pusan (Port Development International, 1995). First, the country's industrial

production grew at an average of 13.7 per cent per annum over the last few years and trade with China increased remarkably (in 1994, imports from China were up by 39 per cent on 1993 to US\$ 5.4 billion, exports were up by US\$ 2 billion, a 20.4 per cent increase on 1993). Second, apart from the sheer volume of traffic using the port, the consolidation of the operations of Hanjin Shipping Co., Ltd. at Pusan's Jasungdae container terminal has led to delays to the services of other lines.

4.2 Insufficient Port Capacity and Congestion

There are at the moment four container terminals in Korea: Jasungdae, Shinsundae, Inchon Pier 4 and Uam (Phase One) terminals. Table 4 shows Korean container terminal facilities and characteristics as of November 1996.

Table 4. Characteristics and Facilities of Container Terminals in Korea (1996)

	Jasungdae Terminal	Shinsundae Terminal	Inchon Pier4	Uam Terminal
Cargo Handling Capacity*	900,000 TEU	960,000 TEU	250,000 TEU	300,000 TEU
Berth Capacity	4 ships x 50,000 dwt	3 ships x 50,000 dwt	1 ship x 50,000 dwt	1ship x 20,000 dwt 2ships x 5,000 dwt
Operator(s)	BCTOC	PECT	Hanjin Co. Korea Express Co.	UTC (Uam Terminal Co.)
Operation Starting Year	September 1978	June 1991	December 1973	September 1996**

Note: * annual capacity; and ** partly operated

Source: Korea Container Terminal Authority (1996)

Table 5. Container Terminal Capacity and Shortages in the Port of Pusan
(Units: Thousand TEU)

	1989	1990	1991	1992	1993	1994
Demand	2,159	2,273	2,447	2,595	2,807	3,231
Terminal Capacity						
- Jasungdae Terminal	900	900	900	900	900	900
- Shinsundae Terminal	-	-	960	960	960	960
- Conventional Berths	360	360	360	360	360	360
Total Supply	1,260	1,260	2,220	2,220	2,220	2,220
Shortage	-899	-1,013	-277	-375	-587	-1,011

Note: Transshipment cargoes excluded.

Source: KMPA (1989, 1992b)

Due to the concentration of container traffic in the port of Pusan, the lack of cargo handling capacity makes matters even more serious. According to two recent studies (KMPA, 1989; KMPA, 1992b), insufficient terminal capacity will become worse in the future. Table 5 shows the seriousness of the problem. The result has been that Pusan has been asked to handle more than it can cope with at times. For instance, there was considerable congestion at Pusan in early 1995, prompting the Far East Freight Conference to impose a port congestion surcharge (Fairplay, 1995).

UNCTAD (1985, p. 1) points out the importance of port development to an export-oriented economy, like Korea, as follows:

"The paramount importance of a far-sighted port development policy does not appear to have been fully appreciated in the past by many governments. As a result, ports have often been unable to keep up with the rate of expansion of a country's overseas and coastal trade."

This argument could be applied to the Korean port industry. In spite of the considerable amount invested in port development by the Korean government, sufficient capacity has neither been planned nor constructed in time. This logic becomes even more convincing when one considers that the total cargo handling capacity, in particular at the country's main port of Pusan, has lagged chronically behind demand. Moon (1992) points out four

consequences of inadequate port development that are, to some considerable extent, interlinked: port congestion, poor port performance, a negative impact on the nation's economy, and a negative influence on port users. Of these, port congestion most seriously affects the country's overall economy, because almost all commodities for export and import are carried through its seaports, in particular, its container terminals.

Beth (1985, p. 365) defines the concept of port congestion as follows:

"The points of view of shippers (time needed for goods to clear the port) and shipowners (time needed to transfer the cargo between ship and shore) are different. For the former, congestion occurs when the lowest capacity subsystem is over-utilised. But only when the effects of this bottleneck affect the movements of cargo between ships and quays, or when these movements themselves constitute the bottleneck, do carriers also encounter congestion. It is commonly agreed to focus on the point of view of the shipowners. Port congestion in this case means ships being delayed in port, i.e. time in port is longer than scheduled. The delay may occur either at berth or before berth or before berthing. The kind of delay will depend on the kind of causes."

Port costs constitute a significant proportion of total distribution costs and thus, ultimately, have an important impact on the value of commodities entering international trade. In order to obtain, therefore, increased benefits from international trade, ports and terminals should be operated as efficiently as possible. By adding to the logistics costs of Korea's manufactured products, however, the delay caused by this congestion seriously undermines their competitiveness in the world market and detracts from the potential for Korea's further economic development. Chung (1995) estimates that congestion costs at the port of Pusan totalled 29.3 billion won (US\$ 36.5 million) in 1994. In 1995, the situation became even worse, resulting in costs of more than 70 billion won (US\$ 90.8 million). Moreover, during the first quarter of 1995, some 15.7 per cent of all vessels arriving at the port of Pusan had to wait more than 12 hours for a berth. Delays varied according to the terminals used, with ships having to wait an average of 29 hours for access to the Shinsundae terminal and 54 hours for the Jasungdae terminal (Containerisation International, 1996).

4.3 New Terminal Development Plans

Korea, neatly positioned between Japan and China, should be the ideal place to tranship the growing volume of container traffic emanating from the northern and central parts of China; a country emerging as one of the fastest growing economies in the world. The country continues to lose out, however, for want of sufficient port facilities. Although the existing port infrastructure is far from undeveloped, it has been hard pressed in recent years just to keep pace with the growing export and import traffic generated within the country itself.

In order to modernise and expand the country's port facilities as a means of solving the serious congestion at the port of Pusan and of meeting the expected increase in container throughput into the next century, the KMPA has launched a 15-year port development programme that could boost cargo handling capacity by more than 500 million tonnes per year. The KMPA has stated that the need for extra handling space was essential as trade with China was flourishing and new routes were being planned that would substantially increase the number of container shipments between the two countries (Lloyd's List, 1995). The plan hopes to result in large-scale local port development that is funded and managed by both foreign and domestic companies. The programme comprises the following new projects that are either under construction or being considered.

- Gamman Container Terminal (The Fourth Phase Development at Pusan)

As the existing container terminals are working to capacity, much attention has been paid to Pusan's fourth phase development. To release the enormous burden on the port of Pusan, the fourth phase development plan was launched near the existing Shinsundae terminal. The planned facilities include a new 1,400 metre quay capable of accommodating four post-Panamax containerships with a total handling capacity of 1.2 million TEU per year. It is expected to cost US\$ 500 million and 30 per cent of this total has been funded by private companies. The rest will be funded by the government, which will raise the money through bond issues which shipping

companies, such as Hyundai Merchant Marine, Hanjin and Cho Yang Shipping Companies, are expected to subscribe to. The terminal is expected to be in operation by 1998. Table 6 shows the forecast cargo handling capacity at the port of Pusan after the opening of the fourth Phase terminal, a position which will add greatly to solving the current congestion problem.

- Uam Container Terminal

Even after the completion of the Gamman Container Terminal by 1998, there will still be a long-term shortage of container handling capacity. The development plan for additional container terminal capacity at Pusan includes the Uam terminal. The plans consist of four phases and are expected to be complete by 1999. In the middle of 1996, the Phase One terminal began partial operation. The terminal is managed and operated by the newly established Uam Terminal Company Ltd. (UTC), whose shares are jointly held by two transportation companies: Korea Container Terminal Company and Dongsung Silup Company. The former company holds 60 per cent of the shares and the latter 40 per cent.

Table 6. Forecast of Terminal Capacity and Demand at the Port of Pusan
(Units: Thousand TEU)

Year	1996	2001	2005	2011
Estimated Demand	2,945	3,195	3,768	4,473
Estimated Terminal Capacity				
Jasungdae Container Terminal	900	900	900	900
Shinsundae Container Terminal	960	960	960	960
Conventional Berths	360	-	-	-
4th Container Terminal	660	1,200	1,200	1,200
Multipurpose Berths	-	560	1,166	1,460
Estimated Total Supply	2,820	3,620	4,220	4,520
Shortage	-125	425	452	47

Source: *Lim, J. S. et al.* (1993)

- Kwangyang Container Terminal

As a way of encouraging a two-port system in Korea and thus of dispersing the container traffic currently concentrated in the port of Pusan, the government is keen to see the development of a new container terminal at Kwangyang in the south-west of the country. The development project consists of Phase One and Two as well as further development plans. Four berths on 1,400 metres of quay are now being constructed under Phase One of the plan. Each berth is capable of accommodating a 50,000 dwt container ship with 350 metres of quay per berth and 14.5 metres of water depth. They are expected to be in operation in 1998, and have a designed handling capacity of 960,000 TEU per year, and a terminal area of 840,000 m² with 600 metres of depth from the apron. The terminal will also have a container railway yard for transporting containers from the terminal to the hinterland. Phase Two is planned to be completed between 1996 and 2001, creating six berths. Four 50,000 dwt and two 20,000 dwt container ships can berth alongside simultaneously when it is completed. The construction of the rest of the ten berths planned will be carried out in the future. Table 7 shows the overall cargo handling capacity in Korea after the completion of the Kwangyang terminal.

Table 7. Forecast of Terminal Capacity and Demand in Korea

(Units: Thousand TEU)

Year	1996	2001	2005	2011
Estimated Demand	4,615	6,484	8,590	11,461
Estimated Terminal Capacity				
- Pusan Port	2,820	3,620	4,220	4,520
- Kwangyang Port	960	2,400	3,600	4,800
- Other Ports	450	600	600	700
Estimated Total Supply	4,230	6,620	8,420	10,020
Shortage	-385	136	-170	-1,441

Source: Lim, J. S. et al. (1993)

- Gaduk Island Container Terminal

As can be seen in Table 7, even when the new facilities at Pusan and Kwangyang are completed, the expected long-term demand for container port facilities in Korea will not be met. For this reason, there are plans to develop the Gaduk Island terminal off the southern tip of the country into a major port facility with container berths. After setting up a master plan and carrying out a feasibility study in early 1996, the project is currently underway. Plans are for a 25-berth port to form part of a larger redevelopment project to be completed in 2011, and designed to have a mix of general cargo and container wharves, with an annual capacity of approximately 4.6 million TEU (90 million tonnes). The main infrastructure work will be carried out by the government and includes a breakwater, railway systems, container depots and marshalling yards. It is expected, however, that there will be a major involvement from the private sector. The KCTA has already appointed Samsung Enterprise, Hana Engineering and Tongil Engineering to undertake technical and civil engineering work.

All of the above development plans should be finished around 2011, at which time the port of Pusan should have sufficient capacity for handling an ever-growing container traffic. As a consequence, it is hoped that the congestion will become a thing of the past.

4.4 Private Sector Participation

Under the New FYP, the government has released ambitious plans for expanding social overhead capital in order to build up an efficient overall transport system throughout the country. The ultimate objective is to promote the efficient distribution of export and import goods in an effort to accelerate economic growth. Port development was one element of this plan. Given the enormity of the capital requirement, a major problem hindering the process of Korean port development was recognised to be the question of how such projects should be financed. The government has regarded the participation of the private sector as an important method of reducing its financial burden in all spheres of activity and has encouraged private sector

participation in numerous investment projects in all sectors. The port industry is no exception.

The KCTA issues Container Terminal Development Bonds in accordance with the provision of Article 25 of the KCTA Act in order to partly provide funds required to develop and modernise port facilities. The participants selected for taking part in this financing scheme purchase the bonds in accordance with specific procedures. As at the end of 1996, the total value of bonds either issued or about to be issued is 200 billion won (US\$ 258 million), with the KCTA expecting to issue a further 50 billion won of bonds each year (US\$ 65 million).

To encourage private participation in this funding scheme for the development of container terminals, the KCTA gives exclusive use rights of the terminal to selected participants. The period of exclusive use is ten years and may be renewed if agreed on between the KCTA and the participants prior to the expiration of the period. This exclusivity of use has currently been agreed on two berths: one from the Kwangyang first phase development terminal and the other from the Pusan fourth phase development terminal.

As the government implements its plan to bring private capital into both existing and future port facilities, new policies are opening up Korean ports to competition. In addition, a degree of privatisation is sought whereby the costs and returns to port operation can be shared between government and private sectors.

Port privatisation may exclusively refer to the actual transfer of ownership of assets from the public to the private sector or the actual application of private capital to fund investments in port facilities, equipment and systems (De Monie, 1996). This can manifest itself as either full ownership where a port or port facility is completely in private hands or part ownership where part of a port or port facility is owned by the public sector and part by the private sector. Again, De Monie (1996) specifically divides privatisation of port facilities into the following three types:

- the management of the port in accordance with the landlord concept;
- the total transfer of ownership of both the infra- and superstructures and of the equipment; and
- the concept of the division of port activities.

In the first option, the owner of the port's operational infrastructure offers fixed-term concessions or leases to private companies, for operating specialised or multipurpose facilities on a common user, preferential or single user basis, with supplementary private funding to complete public investment. The proposed arrangements generally incite the lessee to at least invest in terminal superstructures, and/or handling equipment and/or information systems hardware.

In the second approach, the transfer of ownership from the public to the private sector is complete. It is irreversible when it is achieved by the outright sale of a port or terminal after competitive bidding or reversible if private companies are granted the right to buy land, build and operate specialised facilities for a finite period of time (e.g. constructing a container terminal, operating it for 20 years and then transferring the ownership to the public port authority).

Finally, the third option is based on the creation of mixed public and private enterprises to jointly invest in, manage and operate ports or terminals. Such new entities are normally created for an indefinite period of time under an equity sharing formula.

In terms of these three types, the Korean situation can be described as a mixture of the first and third options. Korean shipping lines themselves are setting up dedicated facilities and thereby for the first time engaging in competition with the two existing container terminals at Pusan. Hanjin Shipping Co., the biggest container liner company in Korea, for example, is planning a dedicated terminal at Gamchun close to Pusan. A container yard and berthing for ships of up to 3,000 TEU will be built as part of its global strategy to develop its logistics and intermodal operations.

At the new Kwangyang terminal, Cho Yang Shipping Co., the third largest Korean liner shipping company, has set up a task force to evaluate the potential of building a private berth of 210,000m² on a greenfield site with a 350 metre quay which, once the terminal is in operation in 1998, will be capable of handling 300,000 TEU annually. Cho Yang considers that a dedicated terminal will be cheaper than using public berths and will improve their ships' ability to keep to schedule. The company is also planning a terminal of similar capacity in Pusan, on a greenfield site occupying

148,750m².

At present, Hanjin uses the Jasungdae terminal operated by the BCTOC. The Director of BCTOC's operations department commented that finding replacement business when Hanjin moves away will be a new experience. Currently, existing container berths in Korea are all common user ones and publicly controlled. After 1998, Korean port operators will have to worry about the competition, and they are working towards that (Fairplay, 1996).

Today, most Korean containerised cargoes pass through port facilities which are leased by the KCTA to public and private terminal operators. The KCTA finances and maintains the basic infrastructure such as the berths, wharves, land and access road development. The KCTA enters into long-term leases with public (e.g. BCTOC) and private (e.g. PECT) operators who then customise the terminal to meet their needs. Often the KCTA provides financing for these private investments. This phenomenon can be considered a joint venture in the port industry (Port Development International, 1993).

The primary advantage of this relationship is the symbiosis which exists between the public authority and its tenants or operators (Ascher, 1992). The terminal operators benefit from the authority's ability to make large investments in infrastructure, while the authority gains from the operators' natural quest for efficiencies that result in greater profit.

What is important is that both the private and the public sectors serve as benchmarks for one another. Each must seek to maximise efficiency in order to maintain comparable prices and services. In this light, one of the key elements to creating such a mutually beneficial relationship is competition. It is this which is essential to a lean, efficient and healthy port or terminal.

5. Conclusion

In 1960, Korea was a poor developing country with a small manufacturing sector and heavily dependent upon foreign aid. It had seemingly few prospects for increasing and sustaining economic growth. Over the last three decades, however, Korea has achieved what is widely acclaimed as the

economic miracle of the Han River. Since Korea embarked on an economic development plan in 1962, its economy has grown at one of the fastest rates in the world. As a result, Korea has successfully transformed itself from a largely agrarian based economy in the 1960s to a fully industrialised one today, and is currently ranked as one of the largest trading nations in the world.

Korea's national economic development strategy has been founded on a massive expansion in foreign trade. The activities of the port sector has contributed greatly to the undoubted success of this strategy. Whether this contribution is sustainable in the future, however, depends upon the sector's ability to attract the finance necessary, both from public and private sources, for future investment in improving and supplementing the existing port capacity which is already under great strain, particularly in the handling of container cargoes.

Forecasts of the future demand for Korean port capacity revolve around high growth rates in the Southeast Asian 'tiger' economies and, especially, the expected expansion of China's foreign trade. The magnitude of any future shortages in the supply of port capacity and the value of investment required to soak up this excess demand depend, therefore, upon the accuracy of these forecasts. From the Korean perspective, what is crucial is that any inadequacy in Korean port development policy is likely to lead to the sector being unable to meet this expanding demand and that, in consequence, economic development will be stymied.

The Korean government has identified the need to promote greater private finance as an important source for the future expansion of port facilities. The question remains whether government policies are sufficiently liberalising to attract this sort of capital. The early signs of private sector participation look promising. It is too early to tell, however, whether this newly deregulated environment will allow private sector operators to maximise efficiency gains to the benefit of both private profits and Korea's further economic development. The role of the newly established MMPF is crucial to monitoring the success achieved in this, establishing investment priorities and expanding the opportunities and incentives for further injections of private finance into the sector.

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