

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

Commercial Development of Regional Ports as Logistics Centres



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ABBREVIATIONS

3PL	Third-party logistics
ACIS	Advanced Cargo Information System
AEI	Automatic Equipment Identification
APROC	Asia Pacific Regional Operation Centre
ASYCUDA	Automated System for Customs Data
BOT	build-operate-transfer
CDC	central distribution centre
CFS	container freight station
Distripark	distribution park
ECR	efficient consumer response
ECT	Europe Combined Terminal
EDB	Economic Development Board (Singapore)
EDI	electronic data interchange
ELC	European Logistics Centre
EPZ	export processing zone
ESCAP	Economic and Social Commission for Asia and the Pacific
FAZ	foreign access zone
FTZ	free trade zone
GDP	gross domestic product
HIDC	Holland International Distribution Council
ICD	inland container depot
IT	information technology
JDB	Japan Development Bank
JIT	just-In-time
MNCs	multinational corporations/companies
NFIA	Netherlands Foreign Investment Agency
PSA	Port of Singapore Authority
QR	quick-response
R&D	research and development
PTP	Port of Tanjung Pelepas
RMPM	Rotterdam Municipal Port Management
SBFC	Small Business Finance Corporation (Japan)
SCM	supply chain management
SEZ	special economic zone
SSA	Stevedoring Services of America
TDB	Trade Development Board (Singapore)

TEU	twenty-foot equivalent unit
tpd	tonnes per day
UNCTAD	United Nations Conference on Trade and Development
UN/EDIFACT	United Nations Electronic Data Interchange for Administration, Commerce and Transport
UPS	United Parcel Service
VA	value-added
VAL	value-added logistics
VMI	vender-managed inventory system
WTO	World Trade Organization

I. INTRODUCTION

A. Background and purpose of the proposed study

As trade barriers are dismantled and logistics service requirements and costs increase, multinational companies (MNCs) have been changing the ways they source material, manufacture and distribute products. MNCs are searching for industrial and logistics centres where repackaging, labeling, bar-coding, light assembly and other value-added services to merchandise in transit can be provided. Most advanced ports are vying to attract international business, and logistics centres. The success of a port in this context depends to a great extent on its ability to attract global, regional and local centres for various types of high-value activities. These value-added activities in the port sector play a key role in ensuring the lasting economic growth of a port and its hinterland.

The ESCAP region is unique in its combination of economic and social development. Each country in this region has been developing healthy economic ties not only on a regional basis but also with those of other regions, mainly through maritime transport. The majority of countries have the geographical potential to establish and develop ports that would be viable logistics centres. However, despite the rapid industrialization and modernization of the port sector in this region, the sector has been inefficiently managed, over regulated, and constrained. The region's ports have not put sufficient effort into developing the level of efficient value added services that today's port users demand.

The construction costs of logistics facilities such as ports and warehouses are relatively low at most of the region's ports, in comparison to ports in developed countries. At the same time, they have some serious drawbacks, namely their inability to perform certain logistics functions which shippers and carriers require.

Now more than ever, with the rapidly changing business environment of the shipping industry, a port's success today does not guarantee its success tomorrow. Accordingly, one of the primary concerns of every port authority should be to examine ways of optimizing its competitive advantage. As this research shows, a port can gain a sustainable competitive advantage by attracting greater value-added activities while bringing down operating costs. The overall benefits of having a logistics centre for providing value-added logistics services are evident in the examples of successful logistics centres at the ports of Rotterdam and Singapore, as well as several Japanese ports. These ports regard the logistics centre function to be as vital as the traditional cargo-handling function in promoting the port as a full-fledged logistics hub.

The Port of Rotterdam has been remarkably successful in attracting European Logistics Centres (ELCs) and related economic activities into the port area. In fact, the Netherlands has attracted nearly 60 per cent of all the ELCs of Asian and North American MNCs with operations in Europe. Many of the foreign firms that had established an ELC in a port in the Netherlands later decided to move their European headquarters, customer call centres and R&D centres to the Netherlands. This is one of the important reasons why the Netherlands has been able to sustain a relatively high economic growth rate in spite of the intensely competitive environment in the European market.

The Port of Singapore has also achieved phenomenal success by becoming a transport and logistics centre, and by attracting foreign logistics firms and the manufacturing/assembly plants of multinationals. Transport experts contend that Singapore may not be superior to some of the other countries in the ESCAP region in terms of geo-economical strategic position such as centrality and intermediacy. Instead, Singapore has been mainly because it has built up transport capacity ahead of demand, and because of its business-friendly economic and social environment.

In addition to these premier global ports, there are relatively smaller ports that are developing themselves as regional logistics centres, including Le Havre, Rouen and Barcelona in Europe. Le Havre is pouring substantial investment into logistics parks in the hope of attracting carriers and shippers. In the Port of Rouen, where most of the land set aside for logistics service has already been leased out, the logistics zone has attracted business rapidly by offering shippers savings on their transportation, storage and personnel costs. An even more successful story can be seen in Barcelona, which created a logistics zone in 1992. Forty companies have set up shop at the site, generating 9,000 jobs, and substantial economic activity and revenues.

Although the above-mentioned ports have been very successful in developing and retaining maritime transport hubs, the commercial development of a port as a logistics centre is not limited to only first- and second-tier ports. Indeed, there are many opportunities for small ports to function as logistics centres by making extensive use of their location and land holdings. A number of smaller ports on the west coast of North America have grown by converting land no longer used for marine cargo handling into logistics centres and foreign trade zones. The Port of Astoria, the Port of Longview and Port of Vancouver (in the United States, not in Canada) have drawn in multinationals by developing new logistics centres on land that was formerly used for commercial marine operations. As such, a substantial portion of their revenue now comes from property and facility leasing. The Port of Olympia has also developed a logistics centre and is using it to its advantage. Though decreased ports-of-call mean that fewer than three-dozen ships call each year, business is booming. The port's New Market Distriparks have already attracted 47 businesses by taking advantage of the excellent transport access and intermodal links. Research findings suggest that, while ship calls and cargo handling are still important success factors, they need no longer be the prime focus of small ports overall business strategy.

Recently, there have been many attempts in the ports of the ESCAP region to shift their emphasis from traditional cargo-handling services to value-added logistics services in order to remain competitive in the regional market. Bangkok Port is one of the most recent examples. In the face of fewer ports-of-call, Bangkok Port is seeking out measures to expand the range of logistics services provided in the port area, in order to boost its revenue and survive in today's business environment. Major Chinese ports such as Shanghai and Tianjin are also aiming to establish regional logistics centres by providing in-flow services, storage of material, and other value-added services to meet the anticipated requirements of customers. In particular, Shanghai has embarked on its plan to become an international shipping and logistics centre in East Asia, as part of the new 10th Five-Year Economic and Social Development Plan. To keep pace with the newly emerging logistics business opportunities and become a transshipment and supply chain hub in the region, major Korean container ports such as the ports of Gwangyang and New Busan are also focusing on developing world-

class logistics centres in the port areas. The Government of the Republic of Korea has in this regard enacted *The Act on Designation and Management of Customs-Free Zones for Fostering International Logistics Centres*, and announced an enforcement ordinance in March 2000.

The main purpose of this study undertaken by the ESCAP secretariat is to develop strategies and guidelines that would help ports in the region to become regional or national logistics centres equipped with sophisticated logistics capabilities and innovative forms of logistics systems. In achieving this objective, it would be extremely useful for ports in the ESCAP region to learn from successful examples and best practices of ports as logistics centres, within and outside the region.

In this regard the issues to be addressed should include the following:

- What are the key factors for success?
- What roles have policy makers, the port authorities, and related industries played?
- How were legal and institutional barriers dealt with?
- How have governmental procedures in port operation and management been streamlined?
- How have advanced technologies, including telecommunications and information systems been adopted in order to enhance the efficiency of logistics and transportation systems?

ESCAP has thus conducted case studies of the world's leading ports of Rotterdam and Singapore, both of which have succeeded in transforming themselves into global and regional transport and logistics hubs. In addition to these first-tier ports, we have also examined the experiences and lessons to be learnt from several Japanese port in developing themselves into second-tier logistics centres. During this study, the ESCAP secretariat visited the ports of Tanjung Pelepas, Shanghai, Nagoya, Tokyo, Singapore and Ho Chi Minh. Then, based on the papers presented at the regional seminar on *Commercial Development of Regional Ports as Logistics Centres*, we have attempted to identify legal, institutional, technical and financial bottlenecks or barriers to the ports of the region.

During this study, we have been convinced that VAL services at logistics centres will become a source of growth for regional ports when added to the traditional port functions. The keys to its success, however, depend on a systematic approach based on a long-term perspective, and pursuing win-win strategies, in which both the users and port are able to share the profits of development.

B. Report structure

Chapter II provides the backdrop for an analysis of the commercial development of logistics centres in the ESCAP region, beginning with a description of changes in the environment of the shipping business and how these changes have impacted ports. Special attention has been given to the following issues: (i) Changes in business practices, such as globalization in production and distribution; (ii) Two trends that will significantly affect the future of shipping and port systems in the ESCAP region: steady growth in the size of vessels, and the formation of carrier alliances and mergers; (iii) Advances in technologies that will

impact ports in the ESCAP region, particularly information technology, which is expected to have a revolutionary impact on ports, much like containerization four decades ago. Electronic commerce will also spur demand for shipping and port services by increasing trade in the ESCAP region.

Chapter III reviews the major functions, facilities and operations of a value-added logistics centres, and describes and analyzes the factors that determine the location of logistics centres. Since shippers and logistics service providers select individual ports not only based on their cargo-handling capabilities but also their value-added logistics services, these services become a powerful means of achieving sustainable competitive advantage in the current market.

In order to learn from best practices in the ports sector, chapter IV will analyze case studies of the world's leading ports, such as Rotterdam and Singapore, which have succeeded in transforming themselves into global and regional transport and logistics hubs. In addition to these first-tier ports, the experiences of several Japanese ports in developing themselves into second-tier logistics centres will be examined.

Chapter V lists major developments of logistics facilities in the ESCAP region. It also identifies the opportunities and problems for ports in the ESCAP region.

Based on analyses of the rapidly changing logistics environment and case studies, chapter VI will formulate guidelines for the types of strategic, institutional, and administrative practices required in order to build ports as logistics centres. Since infrastructure capacity is an important element in the development of a logistics centre, the issue of financing is another important issue to be dealt with in this chapter.

II. THE IMPACT OF MAJOR TECHNOLOGICAL ADVANCES AND CHANGES IN THE SHIPPING ENVIRONMENT ON PORT FUNCTIONS AND ACTIVITIES

Ports and shipping have been key factors in the ESCAP region's extraordinary economic growth and development. A port is not just a linkage between land and sea. It can accommodate industrial complexes, cities and warehouses in order to meet the growing demands of customers. In many countries, ports will in the long term play a key role in efforts to achieve harmony among cities, industrial complexes, logistics facilities and gateways to markets.

This chapter will illustrate the breadth and importance of the environmental changes surrounding the developments of ports, which are under extraordinary pressure from:

- Increasingly demanding port users;
- Shifting user requirements for logistics services; and
- Changing infrastructure needs and competitiveness in maritime transport services.

A. Changing business practices: globalization in production and distribution

Most experts expect the global business environment will undergo greater change over the next ten years than it did over the last one hundred. These changes will precipitate a radical shift in the business operations of global firms, especially with regard to the role of logistics. As global firms strive to attain a competitive advantage in the marketplace, new distribution systems will emerge.

Trade liberalization and information technology are continually advancing, national borders are increasingly disappearing and barriers to global trade are falling. As a result, global manufacturing and marketing are becoming increasingly organized. To cope with this operational environment, global firms have been searching for new production and logistics architectures as a way of gaining the advantages that come with standardized global production.

In developing a global operation strategy, however, a number of issues arise which may require careful consideration. First, since world markets are not homogeneous, there is still the need for local variation in many product categories. The growth of global brands and the growing convergence of customer preferences would enable standardized products to be marketed in similar fashion around the world. However, the reality of global operations is that there are significant local differences in customer preferences and product requirements. As such, though certain brands and preferences may be global, individual products may require varying levels of customization in order to meet specific country needs.

Second, as there is a high level of uncertainty involved in coordinating a global operations strategy, the complexity of managing global supply chains may result in higher costs. With the trend towards globalization gaining speed, the complexity of the logistics task is increasing exponentially, influenced by such factors as the increasing range of products, shorter product life cycles, marketplace growth and the number of supply chains.

These facts present two inter-related challenges: providing local markets the variety they seek while still gaining the advantage of standardized global production, and managing the links in the global supply chain, from suppliers all the way through to the end-user. These challenges require careful consideration as to what degree of centralization is appropriate in terms of management, manufacturing and distribution, and how the needs of local markets can be met while achieving economies of scale through standardization.

The advent of globalization has encouraged global companies to concentrate production into fewer locations. Likewise, the globalization of production and marketing through focused factories requires a new global logistics strategy. As a result, global firms have sought to implement their global logistics strategies in two ways: *the use of centralized inventories* and/or *postponement of final assembly*.

Since the end of the 1980s, global firms have been steadily reducing their number of national warehouses, consolidating them into regional distribution centres that serve a much wider geographical area. The centralization of inventories marks the culmination of a succession of logistics strategies based on local distribution systems over the last decade. Experiences in Europe demonstrate that consolidating inventory into fewer locations can substantially reduce total inventory requirements, resulting in enhanced competitiveness. Indeed, the advantage of managing worldwide inventories on a centralized basis is widely recognized, though such centralized systems may lead to higher transport costs, since products inevitably must travel greater distances, and since increased speed of movement is necessary in ensuring short lead times for delivery to the customer.¹ Thus, improving logistics performance requires an information system that can provide complete demand visibility from one end of the pipeline to the other in as close to real time as possible.

Postponement, or delayed configuration, is another logistics strategy that can be effective in achieving the cost-reducing benefit of standardization while maximizing marketing effectiveness through localization. This strategy is based on the principle of designing products using common platforms, components or modules, yet handling final assembly or customization at the final market destination, where consumer requirements [preferences] are best known.² To cater to local differences in customer requirements, high value-added and time-critical products are increasingly being brought to market using the postponed manufacturing method. The final assembly and customization of products takes place at distribution centres, close to the end user. In most cases, regional distribution centres are located near airport or seaports so that changing demands can be met with agility, reliability and flexibility.

¹ Thus, some companies are creating satellite distribution centres that maintain limited inventory in major or outlying markets.

² The postponement strategy offers several advantages. First, inventory can be held at a generic level so that there will be fewer stock-keeping variants and hence less total inventory. Second, because the inventory level is generic, its flexibility is greater, meaning that the same components, modules or platforms can be embodied in a variety of end products. Third, forecasting is easier at the generic level than at the level of the finished item. Finally, the ability to customize products locally means that a higher level of variety may be offered at lower total cost through “mass customization” (Christopher, 1998).

Box II.1. Centralized distribution system of Polaroid

In late 1980s, Polaroid decided to centralize its European inventories by buying more transportation and using fewer warehouses. Consequently, a large number of warehouses were closed. Cost saving from this reorganization resulted with estimated net annual savings of US\$ 6.3 million after subtracting US\$ 0.6 million per year for increased costs resulting from computer system maintenance and increased warehouse personnel at headquarters. The break-down of net cost savings was:

- warehousing personnel US\$ 2.5 million;
- inventory carrying cost US\$ 2.2 million;
- warehouse rental cost US\$ 1.0 million;
- internal transportation between dealers and subsidiaries US\$ 0.5 million; and
- insurance premium US\$ 0.1 million.

Besides the savings that Polaroid could quantify, there were other gains that were not measured. Prior to centralizing inventory, 69 per cent of orders could not be filled at the location that received them. This required significant internal transportation among dealers and subsidiaries to reposition inventory. Polaroid also achieved freight-cost savings based on volume discounts for consolidated (truckload) shipments to centralized warehouses.

Source: ICF Consulting, Economic Effects of Transportation: The Freight Story, 2002.

B. Container ship developments and their impact on ports

To reduce operating costs by achieving economies of scale, carriers have increased their vessel sizes, as shown in table II.1.

Table II.1. Stages of container ship development

Source:	First generation	Second generation	Third generation	Fourth generation	Fifth generation	Sixth generation	Seventh generation
Length (m)	190	210	210 ~ 290	270 ~ 300	290 ~ 320	305 ~ 310	355 ~ 360
Speed (knots)	16	23	23	24 ~ 24.8	25	25	-
Width (m)	27	27	32	37 ~ 41	39.6 ~ 47.2	38 ~ 40	38 ~ 40
Draft (m)	9	10	11.5	13 ~ 14	13 ~ 14	13.5 ~ 14	15
Loading capacity (TEU)	1,000	2,000	3,000	above 4,000	above 4,900	above 6,000	above 8,000
Deck capacity	1 ~ 2 stacks	2/8 2/10	3/12 3/13	3/ 14 4/ 16	6/ 16	6/ 16	-
Underdeck capacity (high/row)	5 ~ 6 stack	6/ 7 6/ 8	7/ 9 9/ 10	9/ 10 9/ 12	-	10/ 13	-
Period	1960s	1970s	1980s	1984s	1992s	since 1996	since 2000
Ship type	modified ship	Full Container	Panamax	Post-Panamax	Post-Panamax	ultra large ship	ultra large ship

Source: Korea Maritime Institute.

The emergence of large-sized ships has two significant effects on international shipping, since ship size not only determines competitive power in the shipping industry, but also becomes a major criterion in determining the size of a port. Thus, the issue of ship size has important implications for both shipping and ports, and thus for international logistics as a whole. The average size of container ships had increased from 655 TEU in 1970 to 1,750 TEU in 2000. Post-Panamax vessels now claim a 15.5 per cent share of the world fleet, versus just 0.001 per cent in 1990 (Drewry, 2001).

Table II.2 shows the development of the post-Panamax containership fleet. The post-Panamax container vessel with a capacity of 4,000 TEU first appeared in 1988, and the ultra-size post-Panamax vessels over 6,000 TEU capacity came to service at the end of 1996. 7,200 TEU vessels have been ordered and are scheduled for delivery in 2002. The average size of the post-Panamax vessels deployed in maritime services had increased from 4,340 TEU in 1988 to 5,523 TEU in 2000, and will continue to increase to 5,752 TEU by 2003. Now the full 8,000 TEU container vessel is nearly here while the 12,000 TEU vessel, which is the maximum size that can pass the Suez Canal, may appear in a few years. Until recently, 8,000 TEU was regarded as the maximum vessel size using just one engine. With new developments in engine design, including the adding of four cylinders to create 16 cylinder units, however, single engine vessels of up to 10,000 TEU can now be built.

Table II.2. Development of the post-panamax container ship fleet

(As of January 2001)

Fleet built per year				Cumulative fleet		
Year	Number of vessels	Capacity (TEU)	Average vessel size (TEU)	Number of vessels	Capacity (TEU)	Average vessel size (TEU)
1988	5	21,700	4,340	5	21,700	4,340
1991	1	4,427	4,427	6	26,127	4,355
1992	6	26,745	4,458	12	52,872	4,406
1994	3	13,335	4,445	15	66,207	4,414
1995	17	80,873	4,757	32	147,080	4,596
1996	21	116,239	5,535	53	263,319	4,968
1997	20	110,964	5,548	73	374,283	5,127
1998	17	104,777	6,163	90	479,060	5,323
1999	15	90,344	6,023	105	569,404	5,423
2000	32	187,212	5,850	137	756,616	5,523
On order						
2001	64	370,012	5,781	201	1,126,628	5,605
2002	49	296,035	6,042	250	1,422,663	5,691
2003	18	118,856	6,603	268	1,541,519	5,752

Source: Drewry Shipping Consultants Ltd.

Note: January 2001 Fleet and Orderbook.

The demand for bigger vessels is logically clear when we compare the operating costs of 4,000 TEU Panamax vessels with those of 10,000 TEU mega-size post-Panamax vessels.

As shown in table II.3, while the volume of a 10,000 TEU vessel is 2.5 times greater than a 4,000 TEU vessel, its total annual operating cost is only 57 per cent higher.³ This means that using a 10,000 TEU vessel can result in 37 per cent operating cost savings over a 4,000 TEU vessel.

Table II.3. Operating costs of panamax and mega-size post-panamax ships

Cost sector	Panamax (4,000 TEU)	Ultra-size post-panamax (10,000 TEU)
Manning*	850	850
Repair and maintenance	900	1,150
Insurance	800	1,700
Stores and lubes	250	350
Administration	175	175
Fuel**	4,284	7,269
Port charges	2,000	3,000
Total operating costs per annum	9,259	14,494
Total costs per slip per annum	2,315	1,449

Source: Drewry Shipping Consultants Ltd.

Notes: All costs are annualized and expressed in US\$1,000, except for total costs per slip, which are actual figures.

* Based on use of competitive international shipping register.

** Fuel consumption is based on an assumed 22.5 knot service speed, which results in Panamax ships consuming 120 tonnes per day (tpd) at sea and 4 tpd in port, and mega-size post-Panamax ships consuming 180 tpd at sea and 6 tpd in port. Bunker prices are calculated at US\$135 per tonne.

The advent of larger container ships has made large ships the key issue in port development. The demand for bigger ports with greater reach for cranes has grown rapidly, thus creating significant impact on shipping and port requirement. Since the late 1980s, when the new trend of larger container ships became apparent, the number of ports with a 14 metre draft has been growing steadily. The need for automated stevedoring and increased demand for cargo handling in port areas are two reasons for this continuous increase in port size. Growth in ship width and container volume has forced ports to replace their cranes with bigger ones. In addition, due to the growth in the number of containers to be handled per ship, dual hoist cranes are being used in an increasing number of major ports.

The trend toward larger containerships also makes it more difficult to choose between hub port and feeder port strategies. This trend is driven by the continued growth in container shipping and increased deployment of mega-ships on major trade routes. The time-sensitive operating practices of such mega-ships mean that they require full loading capacity so that they can efficiently call at major hub ports with minimal dwelling time.

However, increased port costs and heavier reliance on feeders could erode the operating cost savings because bigger vessels must spend more time at ports, but make fewer calls because of the draft constraints at many ports. For ports to successfully meet the

³ The calculations are based on a basic trans-Pacific service that takes direct calls in South-East Asia, with six ships spending 30 days at sea and 12 days in port. Each ship completes 8.7 voyages per annum.

challenges stemming from bigger vessels, they must invest a great deal in the improvement of terminal facilities and landside intermodal access. In addition, to achieve more feeding to serve regional trades from a hub and also to bring in containers to fill mega vessels, vessels have to be spending more time and money at port and incurring more marketing costs. Furthermore, accommodating mega vessels means that some technical challenges will have to be met. For example, 15,000 TEU vessels would require special berths that would allow them to be worked from both sides. In addition, mega hubs need to increase their depths so as to be able to handle vessels drawing 16.5 metres. Ports without adequate depths will be seriously handicapped. Considering all the possible variables, the economies of scale may not always balance out the added expenses and inconveniences stemming from the deployment of mega vessels. Mega vessels will only work if multiple routes can be aggregated successfully into a single and seamless service structure, and good load factors can be maintained without recourse to higher levels of transshipment activity.

C. Carrier alliances and their impact on ports

Over the last few years we have seen changes in the service patterns of the liner shipping industry, changes that resulted from the introduction of larger vessels and carrier alliances. The average size of vessels employed in Asian container trade has increased from 2,433 TEU in 1992 to 3,562 TEU in 1998. Hub port economics suggest that the use of larger vessels will promote load centreing by reallocating shipping services among existing mainline ports; concentrating more ship calls at the major hub ports and providing better services (e.g. faster transit times); and eliminating or reducing the number of calls at secondary ports where multiple liners formerly called.

A growing proportion of these bigger vessels will be operated mainly as part of carrier alliances, and the alliances will serve to consolidate port operations. This situation is similar to that of the mid-1980s, when carriers first introduced 3rd generation container vessels in liner trades. The reality since then has been that such concentration of traffic never fully materialized, and that hub port economics lost its meaning for a while. There is, however, a crucial difference between then and now. Today, the force driving the concentration process is the carriers themselves, which have the ability to exert substantial influence over ports. This begs the question: Is there a future for hub port economics?

A close look at developments in the Asian shipping system over the last several years reveals that the emergence of mammoth alliances, with 70-100 container vessels of different sizes at their disposal, has enabled the number of service routes in the Asian region to increase from 29 in 1992 to 35 in 1998, allowing wide coverage that reaches every corner of Asia (see table II.4).

Carriers developed itineraries enabling them to take advantage of economies of ship size and fulfill frequency requirements of a trade, linking the main cargo concentrations within the route in question with direct calls, and without too many intervening ports. As a result, the average number of calling ports has decreased from 6.4 in 1992 to 5.5 in 1998, in trans-Pacific trade, and from 8.4 in 1992 to 6.3 in 1998, in Asia-Europe trade. As a consequence of the service reorganization, the maximum frequency of weekly sailings has

increased from 5 in 1992 to 9 in 1998, on trans-Pacific routes, and from 2 in 1992 to 6 in 1998, on Asia-Europe routes.

Table II.4. Service patterns by major carriers

	Trans-Pacific Service			Asia-Europe Service		
	1992	1996	1998	1992	1996	1998
Number of service routes	29	33	35	15	19	23
Average number of calling ports	6.4	5.9	5.5	8.4	6.7	6.3
Maximum frequency in weekly sailings	5	7	9	2	4	6
Number of direct calling ports	15	21	25	12	17	21

Source: Japan Shipping Gazette and Shipping and Trade News.

Note: Pendulum services and round-the-world services are not counted.

The formation of alliances has enabled carriers to offer more direct all-water connections and shorter transit times for most principal trade areas. The expansion of service scope can be found in the increasing number of ports of direct calls. The number of direct port calls has increased from 15 in 1992 to 25 in 1998, in trans-Pacific trade, and from 12 in 1992 to 21 in 1998, in Asia-Europe trade. This analysis shows that deep-sea container carriers still make extensive port coverage in their services, although their strategy makes use of economies of ship size and speed in their respective service routes by making fewer direct calls and reducing the use of multiport itineraries.

In spite of the traffic concentration of long-haul, deep-sea container service in just a few ports served by large fast vessels, as hub port economics proposes, we can identify a simultaneous phenomenon in inter-continental services: the emergence of the pattern of direct calls at second-tier hub ports, which could lead existing major hub ports to play a somewhat less prominent role than expected in the previously mentioned super port scenario. With this dispersed tendency container liners' strategies will rely more on the use of multiple, overlapping service strings and less on a hub-and-spoke system over the major regional transshipment nodes. The main inter-continental operation by carrier alliances will be a blend of services that call only at main hub ports with services that call at 2nd-tier hub ports as well.

Even if we assume that the future network will be extended to cover the 2nd-tier hub ports because of multiple strings on both inter-continental and intra-Asian routes, traditional major hub ports will play strong roles in attracting transshipment cargos.

The container liner industry will continue to become more concentrated through carrier alliances. For ports, this means fewer and larger vessels and fewer customers. There are many factors that determine port choices. The liners will call only at ports that offer marketing advantages, such as the fastest container movement, superior service and the most sophisticated information system. Since information has become as important as cargo delivery itself in today's world of transport, sophisticated information systems will be essential in supporting the new shipping alliances and managing criss-crossing operations.

Carrier alliances will promote more effective utilization of port facilities to the extent that terminal sharing occurs among partners, particularly if one of the partners does not lease

its own terminal. It could also lead to greater demand for larger terminals, especially if asset sharing spreads. Utilization of the overall transportation infrastructure of a port area will also improve when ship calls are more evenly scheduled throughout the week.

The real potential for future cost savings lies in the landside of the shipping operation, the source of an estimated 75 per cent of carriers' total costs. History has proved that investment in shipping operations has never produced enough profit to justify the costs, although greater market shares at sea may have been gained. Intense competition and the rapid diffusion of service and hardware innovation led to the under-utilization of assets and declining revenues. If economic conditions or growing competition continue to limit carriers' cargo volumes, it will make economic sense to expand vessel sharing to include the sharing of other assets, such as container boxes, chassis, inland hubs, marine terminals, and information systems. Coordination in procurement will be considered as well. Given the competitiveness of the shipping industry, if any major alliances include alliances of all assets in the container transport chain, it would likely ignite a me-too rush into further rationalization.

Since today's giant carriers consider it important to gain control of terminals, close cooperation between carriers and terminal operators will lead to cost reductions as well as value-added services required by carriers. Some liners are trying to maximize their control over handling operations and costs by setting up their own terminal facilities.

D. The development of information technology and its impact on ports

Nowadays, time-based competition is intensifying. Any delays to the ship and its cargo are costly to everyone in the supply chain. The creative use of information technology (IT) will create a benefit comparable to that of containerization or the construction of the Suez and Panama canals. Information technology, especially Internet-based systems, is increasingly being employed in all transport services. As shippers become more attuned to sophisticated supply chain management, ports will be faced with both opportunities and threats.

IT has transformed shipowners into valued-added logistics service providers. Electronic commerce will spur demand for shipping services by increasing trade volume in general. Shipbrokers and other intermediaries will have to adapt to such changes, by offering one-stop freight services, including arranging ocean carriages, port handling, storage, insurance and inland transportation. Shipowners and their suppliers also may soon use the Internet for innovative purposes such as bunker auctions, ship inspections using electronically transmitted data and Internet-based classification society records.

Table II.5 provides a summary of the transaction capabilities of the websites of major shipping lines. While capabilities apparently differ considerably between carriers, basic information requirements are catered for by practically all websites. However, in the ESCAP region, the transaction capabilities offered by a number of websites, which are likely to become standard features in the near future, are still not accessible to many traders. This is mainly due to a multitude of factors such as limited information and telecommunication

infrastructure, limited level of e-commerce and Internet culture, and limited skill base for building e-commerce.

The leading area for shipping-related information technology is in ports, particularly in terminal operating systems and intra-port communications. Among other things, data communication systems can handle customs filings, transmittal of manifests, and processing of bills of lading and other documents. The growing power and speed of information processing is reshaping the shipping and port industry.

However, not all ports in the ESCAP region are moving toward this goal with the same speed. Many ports have been relatively slow to adopt IT as a platform for transacting business. In most ports on the ESCAP region, the port websites do not provide information on carrier scheduling, rail scheduling, link to shipping companies, links to truck companies, of links to rail companies. The only information available pertains to maritime transport. Such as port schedules which are static and information on tides, port development plans, port statistics, navigation charts, and promotional content. Among the websites in ports around the world, Singapore stands out as the most advanced and shipper friendly.⁴ It is an electronic gateway that not only supplies a broad range of useful information, but also presents users with a variety of e-commerce offerings.

The application of e-commerce in ports could contribute to the efficiency of international trade. Ports are of crucial importance to many countries in the ESCAP region, as they constitute a critical node in the transport chain linking international transport services with local transport services. With the growing use of IT in cargo booking, tracking, clearance and delivery by major shipping lines, as well as in customs clearance, all ports are required to become efficient interfaces for shipping services in a world closely connected through logistics chains.

The availability of common-user and robust e-commerce-based administrative and commercial services in the ports of the ESCAP region would allow them to connect to the IT networks of administrations, shipping lines and other transport operators. Of course, scalable systems with certain core functions are needed in order to cater to the different needs of a wide range of ports and terminals serving developing countries' trade.⁵ UNCTAD programmes, such as the Advanced Cargo Information System (ACIS) and the Automated System for Customs Data (ASYCUDA), provide major elements of such port community systems (UNCTAD, 2001).

⁴ The Singapore Maritime Portal (www.singaporemaritimeportal.com) comes closet to enabling users to conduct actual business transactions with one or more parties in Singapore transportation community. The site is owned and developed by the Maritime and Port Authority of Singapore, which was formed in 1996 by merging the National Maritime Board, the Maritime Department, and the regulatory departments of the Port of Singapore Authority.

⁵ For a detailed discussion of the IT requirements of ports and terminals see UNCTAD, "Study on the use of information technology in small ports" UNCTAD/SDTE/TLB/1, Geneva, 2001.

Table II.5. Ocean carriers' website transaction capabilities

Carrier	Container /Cargo tracking	Voyage/ Schedule locator	Rate/ Tariff quote	Booking	Bill of lading	Customs reports
Maersk	√	√	√	√	√	
Evergreen	√	√	√	√	√	
P&O Nedlloyd	√	√				
MSC						
APL	√	√	√	√	√	√
COSCO	√	√	√			
Zim	√	√				
NYK	√	√			√	√
CMA-CGM			√			
HMM	√	√		√	√	
Yang Ming	√	√	√		√	
OOCL	√	√	√	√	√	
Hapag-Lloyd		√		√		
K-line	√	√	√	√		
MOL	√	√	√	√	√	
Hanjin	√	√		√	√	

Source: D. Wise and J. Brennan, "E-commerce: taking stock" *Containerization International*, November 2000.

With more liberal trade arrangements between countries, world trade is expected to continue its rapid growth, making the world's economies more and more interdependent. It is commonly recognized that ports play a critical role in their countries' trade growth. Therefore, a number of ports have taken steps to improve the quality of their customs services, and to provide basic transport and communications infrastructure in order to reap the benefits of e-commerce.

In most of ports in the ESCAP region, shippers and clients suffer from burdensome and time-consuming customs clearance procedures. As such, there is a need to place priority on reforming the various complex customs systems in the ports of the ESCAP region. Customs administrations are major bureaucracies where it is difficult to change operational and administrative procedures to improve services. Even a developed country like Japan has a restrictive customs law that says that the declaration and clearance process can be accomplished only after the cargo is moved to a bonded area.

For these reasons, steps must be taken now to improve the efficiency of customs activities in the region. It would be desirable for governments in the ESCAP region to take the initiative to achieve Customs Harmonization. This would include simplifying, harmonizing, and automating the procedures and systems required in obtaining customs

clearance for cargo. There is a need to agree on the implementation of a standard, automated pre-arrival clearance system by which importers and customs brokers can submit cargo declarations and receive customs approval electronically.

In addition to customs clearance, shipping companies and their agents must deal with onerous and inconsistent reporting and inspection procedures for notifying port, coast guard, immigration and health authorities and other government organizations regarding a ship's arrival/departure, cargo handling requirements and other vessel services needed. These are all formal requirements related to the ship's port activities. The vessel, crew and cargo manifest information collected by one organization is seldom shared with another organization within the same port, or even within the same organization's offices in other ports. This is a problem, since the reporting of redundant information is labour intensive, costly and inefficient.

Information technology, especially Internet-based systems, can be used effectively to streamline and enhance supply chain processes, enhance cooperation between carriers and their customers by enabling instant communications, and eliminate many burdensome procedures and regulations. Most developed countries have already implemented a variety of strategies and policies to develop their information infrastructures. In many countries port information systems have been transformed into integrated logistics information systems through interconnected efforts with other logistics-related information systems. INTIS at the Port of Rotterdam, ADEMAR+ at the Port of Le Havre, DAKOSY at the Port of Hamburg, SEAGH at the Port of Antwerp, and FCP80 at the Port of Felixstowe, are good examples of IT that facilitates electronic submissions and clearance of shipping information.

However, the most advanced IT of its kind may be the PORTNET at the Port of Singapore. The PORTNET, which was developed in 1984 and then refined and improved upon over many years, is the world's first and still-only nationwide e-commerce network that has the participation of the entire shipping and port community in Singapore.⁶ The PORTNET system facilitates end-to-end information workflow and creates value for port users in many areas, including the on-line booking of resources, e-fulfillment of port services, facilitation of billing services, customs clearance and linkage to government agencies.

E. Financing of port and logistics infrastructure

The rate of growth in container traffic generally outpaces the rate of trade growth, which, in turn, generally surpasses the rate of economic growth. With countries in the ESCAP region expected to experience continuous growth in container shipping volumes, the outlook is very bright for this region's container cargo market and competitive maritime services. However, this expected higher level of demand will place a great deal of stress on the region's port and logistics infrastructure.

To handle the growing volume of containers, the ports must make massive and sustained capital investments. Taking all possible variables into account, it is estimated that, based on current trends, the ESCAP region will need almost 400 additional container berths

⁶ Today, Portnet-On-Windows (the Internet version of PORTNET) provides accurate and timely information to all users of Singapore port.

by 2011. Thus, constructing and equipping a container berth would require new capital investments of approximately US\$27 billion (ESCAP, 2001).

In addition, particular consideration should be given to the additional investments required to replace existing old and deteriorating infrastructure in many of this region's ports. The physical conditions of existing port facilities are several decades old and will be unable to meet the minimum standard that will be required of port services in the future. Furthermore, the life cycle of most existing port facilities will come to an end, thus compounding the burden of cargo handling and traffic movement. Consequently, the future will require not only investment in new port facilities, but also in replacing older ones. Furthermore, considering the huge demand for financial resources for the developments in Chinese port sector, fierce competition will arise for financial resources with those of other countries. These facts will certainly have a great effect on capabilities in infrastructure financing in ESCAP region.

These facts imply that ports and logistics facilities have to put more emphasis on better utilizing existing facilities as well as adding capacity.

Successful privatization of the container handling business in port terminals has already occurred and will continue to grow in the region. This will bring greater operational efficiency, reduced labour costs and less bureaucracy through the invisible power of free enterprise.

As table II.6 shows, the emergence of global terminal management companies, such as Hong Kong's Hutchinson International Port Holdings, Singapore's PSA, Rotterdam's ECT, Britain's P&O, and the United States' Stevedoring Services of America (SSA), is changing the dynamics of the business. Such companies are setting the standard for countries around the world to consider in privatizing their national port structures. As investors, developers and operators, these independent, private stevedore and terminal companies from Asia, Europe and the United States now account for about 40 per cent of the world's container handling with facilities in more than 80 ports around the world (Pisani, 2000).

But efforts to expand transportation infrastructure will be severely limited by financial capacity constraints. First of all, careful planning and sound investment will also be needed to avoid over-capacity and unprofitable operations while assuring continuous growth. However, to overcome the chronic shortage of facilities, new approaches to financing infrastructure have to be adopted. The most significant may be the strengthening of private sector participation in the provision of transportation infrastructure. Already, the range of private sector participation in ports and logistics facilities is very wide, from straight-forward BOT (build-operate-transfer) to the extreme of complete privatization with no government involvement. In order to induce private capital for infrastructure development, countries in the region will have to provide more favorable institutional, regulatory and administrative environments.

Since it is essential for ports and logistics centres to have easy access to inland transport and close inter-connection between them to perform their functions properly, strong assistance by the government will be necessary with regard to land, roads, railways, and

energy. Assistance at the Japanese ports to build ports and logistics centres (free access zones) may serve as a good guideline for the developing ports in the ESCAP region⁷.

Table II.6. Current status of the world's major port operators

(Unit: Million TEU)

Ports/Terminals		Container throughput		Remarks
		1997	1998	
PSA Co.	Singapore (4), China (4), Indonesia (1), Italy (2), India (2) Yemen (1)	15.5	17.0	Expansion of existing terminal
HPH	Hong Kong (3), China (9), U.K. (3), Myanmar (1), Indonesia (1), Bahamas (1), Panama (2)	13.8	15.0	Expansion (Hong Kong/China/Indonesia/Bahamas/Panama)
SSA	USA (11), Thailand (1), Panama/Mexico (1)	4.0	8.0	Expansion and development (USA/Darkar/Chittagong)
P&O Ports	Australia (4), U.K. (2), Italy (3), India (1), Philippines (3), Sri Lanka (1), Thailand (1), Pakistan (1), China (1), Mozambique (1), Argentina (1), Russia (1)	4.5	4.5	Expansion Development (Turkey, India/Sri Lanka)
ECT	Netherlands (2), Germany (1), Italy (2)	4.6	4.6	Expansion (Netherlands/ Germany)
Eurokai	Germany (1), Italy (2), Portugal (1), Brazil (1)	3.0	3.8	Merge with BLG Expansion (Hamburg)
BLG	Germany (1)	1.5	1.5	Lithuania
Marine T.	USA (3)	1.2	1.3	Increase in Foreign investment
Modern T.	Hong Kong (4), China (1)	2.0	3.0	Additional development (Hong kong/China)
Contship	Italy (5)	1.9	2.7	
HHLA	Germany (1), Argentina (1)	2.5	2.5	Additional development (Germany)
Hessenatie	Belgium (2)	1.9	1.9	Expansion
ABP	U.K. (8)	1.8	1.8	New development
ICTSI	Pakistan (2), Philippines (1), Argentina (2), Mexico (2), Saudi Arabia (1)	1.7	1.8	Expansion and development (Argentina/Mexico)

Source: Korea Maritime Institute, July 1999.

⁷ For details, see chapter IV.

III. VALUE-ADDED SERVICES OF LOGISTICS CENTRES IN PORT AREAS

A. Evolution of port function

According to the modern concepts, there are three stages of port development, which are determined by port development policy and strategy, differences in the method of approach, scope of the port's activity and expansion level, and the port's activity integration level.

Table III.1. Evolution of port function

	First generation	Second generation	Third generation
Start period:	Before 1960s	After 1960s	After 1980s
Principal cargo	Conventional cargo	Conventional cargo and bulk cargo	Bulk and unit cargo containerization
The port development position and development strategy	Conservative junction point of the sea and inland transportation	Expansionism transportation and production centre	Industrial principle international trade base chain connecting transportation system
Activity scope	(1) Cargo handling, storage, navigation assistance-pier and	(1) + (2) Cargo type change (distribution processing), ship related industry - enlargement of port regions	(1)+(2) + (1) Cargo information, cargo distribution, logistics activity – Formation of the terminal and distribution centres
Structure formation and specifics	<ul style="list-style-type: none"> - Everybody acts individually in the port - Port and its users maintain informal relations. 	<ul style="list-style-type: none"> - Relations between port and its users become more close - Emergence of the slight correlation among port activities - Negative cooperation relations between port and self-governing community 	<ul style="list-style-type: none"> - Formation of the port cooperation system - Trade and transportation chain concentration in the port - Relations between port and self-governing community become more closer - Extension of the port structure
Character of the productivity	<ul style="list-style-type: none"> - Invention of the cargo distribution - Individual supply of the simple services - Low value added 	<ul style="list-style-type: none"> - Invention of the cargo distribution - Cargo processing - Complex services - Increase of the value added 	<ul style="list-style-type: none"> - The flow of the cargo and information - Distribution of the cargo and information - Combination of the diversified services and distribution - Value added
Core factors	Labour/capital	Capital	Technology and know-how

Note: Modified from UNCTAD, *Port Marketing and the Challenge of the Third Generation Port*, 1992.

(a) First generation port

Until 1960, ports played a simple role as the junction between sea and inland transportation systems. At that time, the main activities in the port region were cargo handling and cargo storage, leaving other activities extremely unrepresented. Such a way of thinking severely influenced related persons in the government and local administration. Also, it even influenced persons related with the port industry, so it was considered that it was enough to develop and invest in only port facilities, as the main functions of the port were cargo handling, storage and navigation assistance. It was for these reasons that important changes in transportation technology were neglected.

(b) The second-generation ports

The second-generation ports are those built between 1960 and 1980, and had a system comprising of government and port authority, so the port service providers could understand each other and cooperate for mutual interests. The activities in these ports were expanded ranging from packaging, labeling to physical distribution. A variety of enterprises have also been founded in ports and hinterlands. Compared to first-generation ports, the second-generation ports have a characteristic that freight forwarders and cargo owners had a tighter relationship. We can say that the second-generation ports had begun to notice the needs of customers, but when it came to keeping a long-term relationship with customers, they took a passive attitude.

(c) The third-generation ports

From 1980, container transportation has been developed quickly, and the new intermodal transport system emerged. The activities of production and transportation have linkage to form an international network. The former services function has been enlarged to include logistics and distribution services. The environment protection facilities are becoming more important, so the ports are developing closer relationships with those in their surrounding neighborhoods. Compared to the past, today's port authorities are focusing on efficiency rather than effectiveness. In the third-generation ports, the needs of customers were analyzed in detail and port marketing has been actively engaged.

B. The changing role of ports: from traditional services to value-added logistics services

These days, the commercial success of a port could stem from a productivity advantage in traditional cargo-handling service, from value-added service, or from a combination of the two. Productivity advantages come mainly from economies of scale and economies of scope, suggesting that the most productive ports will be those that are equipped to handle large cargo volumes and/or significantly reduce unit costs through efficient management.

Shippers and carriers select individual ports not only based on their cargo handling service capabilities, but also on the benefits they are capable of "delivering". Unless a port can deliver benefits that are superior to those provided by its competitors in a functional

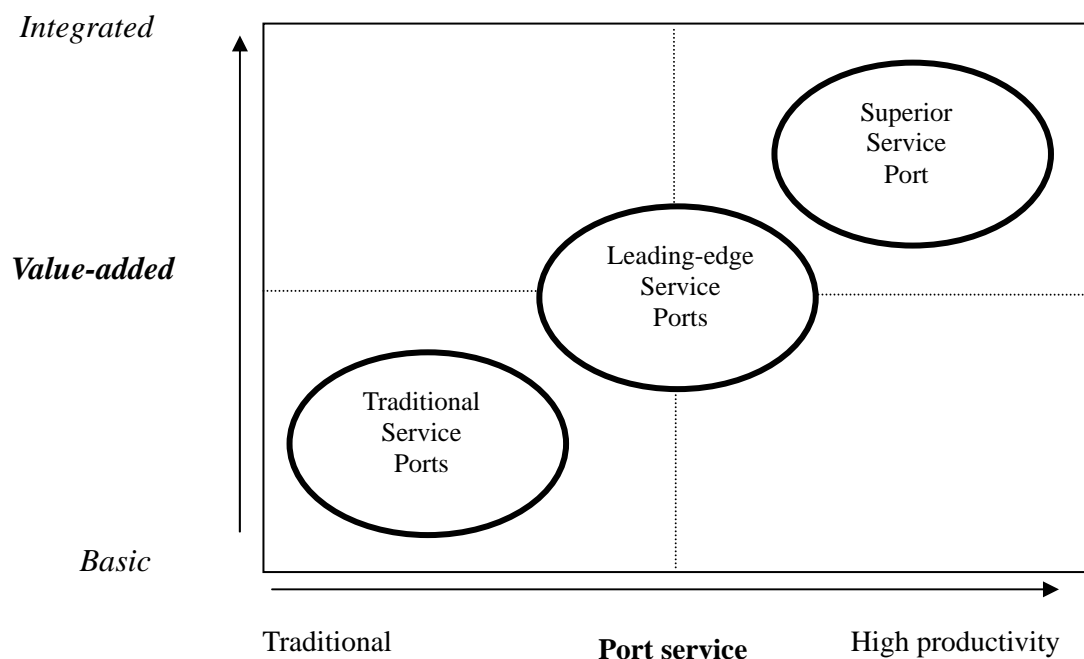
aspect, port customers are likely to select ports based merely on price. This fact raises the question of how a port can achieve value differentiation.

In the 1970s, almost every port provided the same basic package of services to almost every customer. Nowadays, however, it is more difficult for ports to compete on the basis of cargo-handling service. There has been a convergence of technology within cargo-handling service categories. This means that though new technology may sometimes provide a window of opportunity for productivity improvement, in many cases that same technology is also available to competitors. It is no longer possible to compete effectively on the basis of basic, traditional functions. Thus, there is a need for ports to seek out new means of gaining a competitive edge.

The late 1980s saw the emergence of major changes. Customers began to ask ports to provide a greater variety of services. Providing value-added services is a powerful way for ports to build a sustainable competitive advantage. Shippers and port customers are becoming increasingly demanding. Customers now tend to look at value-added logistics services as an integral part of their supply chain. As a result, ports must attempt to satisfy these needs by offering differentiated services. This poses a particular challenge for port management.

Studies show that the most successful ports are those that not only have a productivity advantage in cargo-handling services, but that also offer value-added services. Thus, there are several available options for ports to choose from, as shown in the simple matrix in figure III.1.

Figure III.1. Matrix of competitive advantage



The ports providing traditional services in the bottom left hand corner of the matrix are indistinguishable from their competitors. The only option for such ports is to move to the right side of the matrix, toward productivity-advantage leadership, or to move upwards, towards value-added service leadership. We have found that there continues to be a need for ports that provide the basic, traditional cargo-handling function, and that there continue to be many customers for such services. Perhaps it is for this reason that many ports in developing countries still concentrate on improving their productivity with regard to traditional port functions.

However, it is clear that, in the future, there will be fewer ports that prosper only in this area. Rather, we will see the dominance of superior service leaders that possess both a productivity advantage and a value-added service advantage. In between traditional service ports and superior service ports are the leading-edge service ports. These are the ports that are on their way to becoming superior service ports.

A number of ports have responded to this trend by focusing on value-added services as a means of gaining a competitive edge. In this content, value-added service refers to the process of developing relationships with customers through the provision of an augmented offer, which may encompass many aspects of value-added activities, as we will see later in this chapter.

Ports can experience synergistic benefits from the logistics centres to provide value-added services. It is advantageous for a port to also be a logistics centre, since the logistics centre can attract cargo that can be shipped through the port. There is a positive correlation between cargo flows at the logistics centre and the number of ships calling at the port. In other words, the cargo attracts the ships, and the ships attract the cargo. The port benefits by generating increased revenue and creating jobs. The port can profit not only from the logistics centre itself, but also from the increased flow of cargo through the port. Thus, an ideal port should provide a diverse range of services that are highly integrated. As such, there is a need to seriously consider the increasing importance of ports in logistics management.

C. Logistics efficiency and economic impact

Logistics is a procedure to optimize all activities to ensure the delivery of cargo through a transport chain from one end to the other. The comparative efficiency of a country's trade logistics chain is of vital importance in enhancing competitiveness of its industry and commerce. In this regard, international differences in trade logistics efficiency determine in large extent the efficiency and sustainability of the economies. In developed countries such as the U.S. and Japan, logistics costs are about 10 per cent of GDP.⁸ For some less developed economies, these costs exceed 30 per cent. Moreover, these differences among countries appear to be widening.

According to the European Logistics Association the logistics costs in relation to annual turn over can amount to more than 30 per cent in the food industry, 27 per cent in the metal industry, 23 per cent in the chemical industry, 15 per cent in the automotive sector

⁸ For detailed explanation and methodologies of calculating national costs in the U.S., Japan, and Republic of Korea are provided in Appendix 1.

(Juhel, 1999). The per centages may differ from country to country and industry by industry, but many of the critical cost factors are influenced by public policy.

The logistics chain consists of activities that facilitate the movement of goods from supply to demand. As many such activities require the use of ports, port authorities have taken a particular interest in the various port activities involved in logistics.

Logistics costs are not limited to costs consumed in carrying out logistics activities. Rather, they should be understood as all costs input into a given logistics system for the provision of logistics service.

As can be seen in figure III.2, raising the level of logistics service from (S_1) to (S_2) requires an increase in logistics costs, from (C_1) to (C_2).

However, as shown in figure III.3, when the overall efficiency of the logistics system is increased from logistics system (A) to logistics system (B), a higher level of service can be provided ($S_1^A \rightarrow S_1^B$) at the same cost level (C_1^A), or the same level of service (S_1^A) can be provided at a lower cost ($C_1^A \rightarrow C_1^B$).

In general, logistics systems improve not by lowering logistics costs, but rather by achieving better service level (c^*, s^*), at a lower cost level, by shifting the costs-service curve itself ($A \rightarrow B$).

Figure III.2. The Relationship between Logistics Costs and Logistics Service

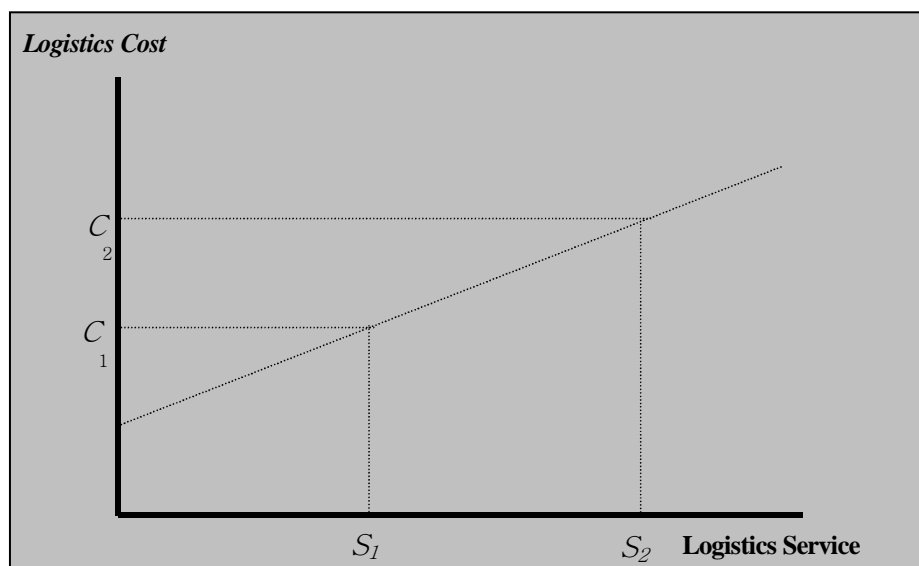
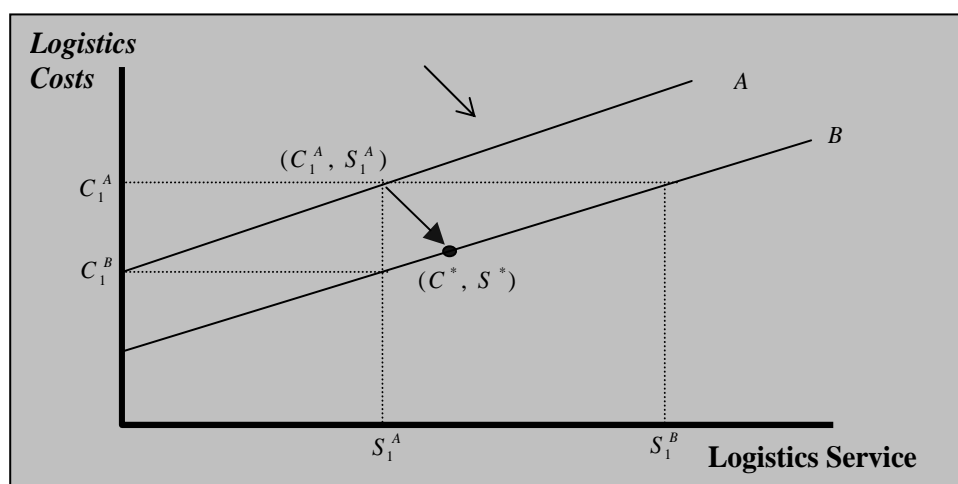


Figure III.3. The Direction of Improvement in Logistics Systems

For Singapore, the leading regional and international logistics hub in Southeast Asia, the logistics industry providing value-added service is a strategic business sector. The logistics industry contributed an estimated 7 per cent to Singapore's GDP in 2000, and employed 5.1 per cent of the workforce⁹. Logistics centres are also the backbone of international trade and logistics, which are the key drivers of Singapore's economy.

The port of Rotterdam has been phenomenally successful in attracting European Logistics Centres (ELCs) and related economic activities into the port area. Although logistics centres have not been considered in the traditional internationalisation model, they certainly should be considered an important step in the overall internationalisation process. When analysing the amount of foreign direct investment in the period 1960-1993, Jagersma (1994) concluded that most ELCs could be placed between the phases 'location of trade offices' and 'location of production centres' in the development model. He also concluded that on average one ELC resulted in 3 extra indirect foreign investment projects in the Netherlands (of more than US\$ 5 million). This result shows that logistics centres in ports of the ESCAP region will help hosting economy's overall internationalisation patterns and strategies of global companies.

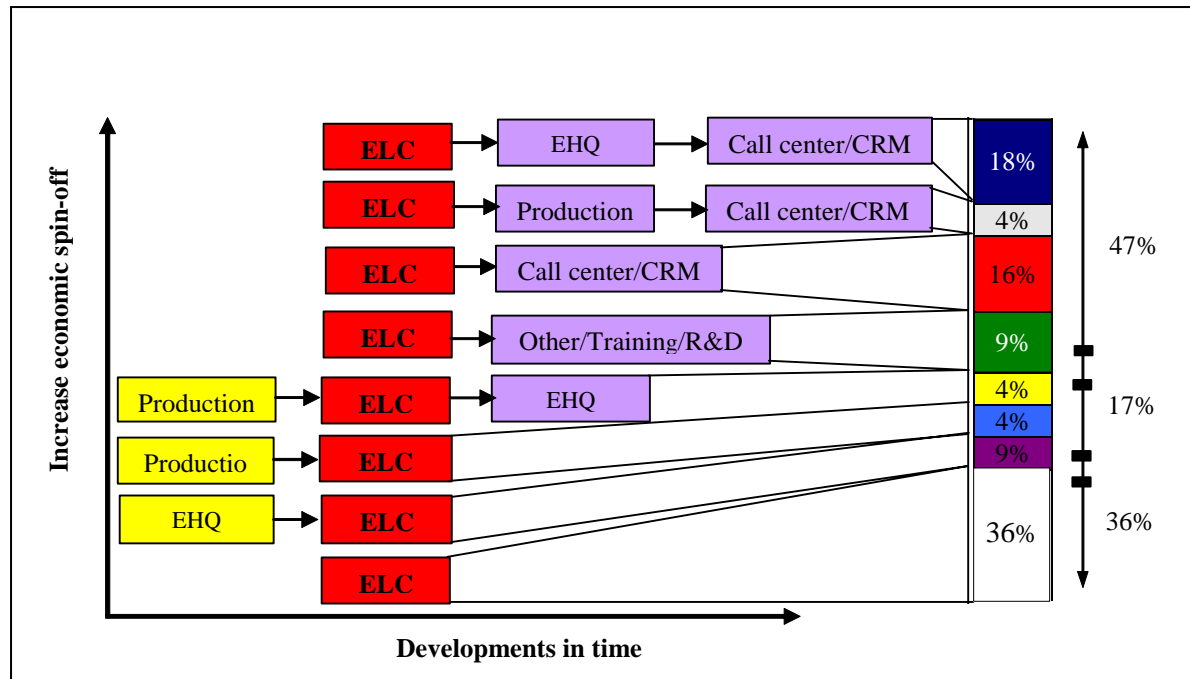
ELCs are often forerunners for the establishment of other international activities in The Netherlands, such as head offices, shared service centres and call centres. Many of the foreign firms that had established an ELC in a port of the Netherlands later decided to move their European headquarters, customer call centres, and training and R&D centres there. According to the survey by the Holland International Distribution Council (2001), this has been the case with 51 per cent of the ELCs set up in the Netherlands. See figure III.4, which gives an insight into the spin-offs from ELC developments in terms of other international business functions in the Netherlands.

The reverse is far less frequent-only 17 per cent of ELCs were created following the establishment of other international activities by the companies concerned. This is one of the important reasons why the logistics centres have been a major contributor to the high

⁹ Data was provided by Trade Development Board, Singapore in a study visit in 2001.

economic growth rate of the Netherlands amidst the intense competitiveness of the European market.

Figure III.4. Developments in ELC's international activities



Source: HIDC, The Netherlands: Excellence in integrating supply chain capabilities, 2001.

D. Functions of logistics centres

The advanced ports around the world have continuously emphasized the function of logistics centres mainly due to the high degree of global production and the need for value-added logistics (VAL) services. These trends in international logistics strongly suggest that the trend toward VAL in the ESCAP region is likely to continue into the future. Some ports are already modifying the warehousing function to include the VAL functions when they develop new ports or reshaping existing ports.

Logistics centres can be classified into three different categories or generations. It is based on the scope and extension of logistics activities as in table III.2. Logistics firm in logistics centre behind a port area are able to perform basic value-added service and carry out other value-added logistics services at the same time. That is, logistics centres provide not only traditional activities such as storage, but also value-added logistics services such as labeling, assembly, semi-manufacturing and customizing. Logistics centres combine logistics and industrial activities effectively in major port areas to create country specific and/or customer specific variations or generic products.

When logistics centres are grouped together in a common dedicated area, it is sometimes called a Distripark (distribution park). Therefore, a Distripark is a large-scale, advanced, value-added logistics complex with comprehensive facilities for distribution

operations at a single location, which is connected directly to container terminals and multimodal transport facilities for transit shipment, employing the latest information and telecommunication technology. Rotterdam in the Netherlands, Bremen in Germany, and Singapore are examples of this kind of arrangement. Container ports are generally a preferred choice to set up Distriparks, since they are already closely located to various inland transport facilities and a highly skilled workforce.

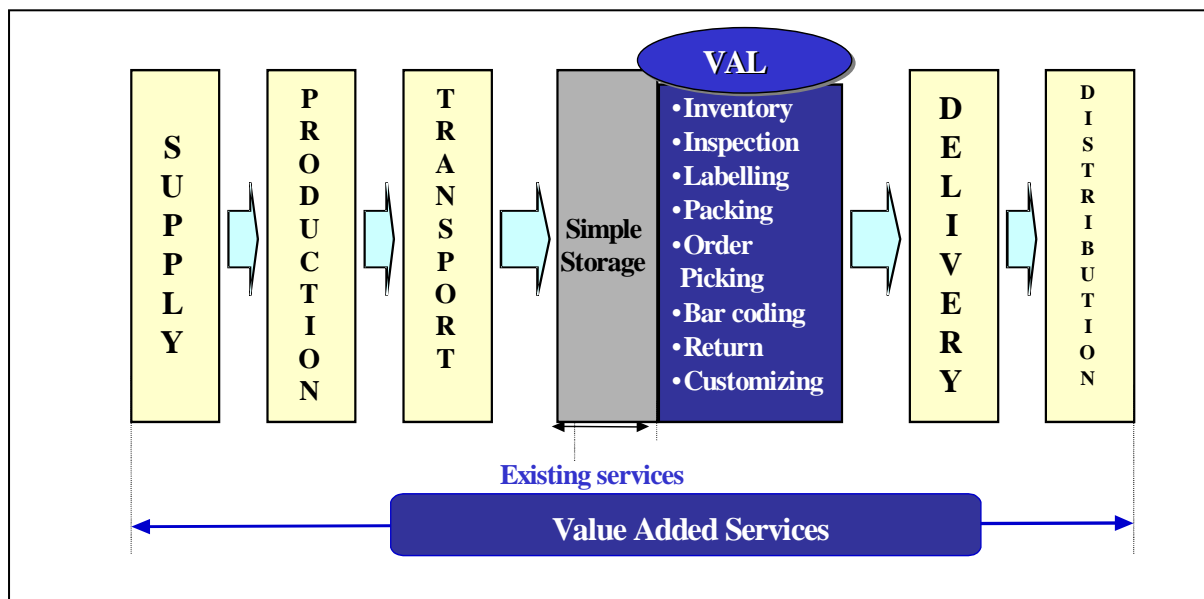
Table III.2. Logistics centres evolution

1960s-1970s	1980s-early 1990s	Mid 1990s –present
		Materials management Distribution Services (national/global)
	Bonding	Import clearance Bonding Inbound transportation
Receiving	Receiving	Receiving
	Cross-docking	Cross Docking
Storage	Storage	Storage Inventory management and control Shipment scheduling
Order processing Reporting Picking	Order processing EDI Reporting Picking	Orders processing EDI Reporting Picking
Order assembly (Re)packaging	Order assembly (Re)packaging Stretch-shrink- wrapping	(Product)subassembly Order assembly (Re)packaging Stretch-shrink-wrapping
Palletizing/unitizing Label/mark/stencil	Palletizing/unitizing Label/mark/stencil	Palletizing/unitizing Label/mark/stencil
Shipping Documentation	Shipping Documentation Outbound transportation	Shipping Documentation Outbound transportation Export documentation FTZ operation JIT/ECR/QR services Freight rate negotiation Carriers/route selection Freight claims handling Freight audit/payment Safety audits/reviews Regulatory compliance review Performance measurement Returns from customers Customer invoicing

Source: Ernst F. Boltan, Managing time and space in the modern warehousing, Amacom, 1997, p. 19.

Both logistics companies and shippers agree that value added services in logistics centres are important in supply chain management, and this tendency is expected to continue in the future. Figure III.5 shows that value-added logistics (VAL) services encompass far more roles and functions than the existing services. In many cases, these services overlap or include third-party services, such as inventory management, inspection, labeling, packing, bar coding, order picking and reverse logistics etc. The pressures of VAL services in the logistics chain have increased the demands of logistics centre behind port areas.

Figure III.5. VAL service of logistics centres in port area



The main VAL activities are:

- Receiving goods, breaking shipments, preparing for shipment, returning empty packaging
- Simple storage, distribution, order picking
- Countrylizing and customizing, adding parts and manuals
- Assembly, repair, reverse logistics
- Quality control, testing of products
- Installing and instruction
- Product training on customer's premises

Assembly: "Assembly" is often cited as the semi-manufacturing function of logistics centres behind port areas. With a decrease in the travelling frequency between factory and warehouse, the shipper's interest in assembly activities seems poised to increase considerably. Supporting this trend, a new type of logistics centre, called a "manufacturing type warehouse," is emerging throughout the world to provide assembly facilities for customers dispatching cargo.

Packaging: Logistics centres have been introducing packaging functions as well.

Localizing and Customizing: In international logistics, shippers are placing greater emphasis not only on the quality of goods but also on customer needs and country requirements. Recognizing this new shipper's demand for customizing some shippers have resorted to providing these services by offering unique offers.

Installation and instruction: Recently, installation and instruction services have emerged as important functions in logistics centres. Shippers have either independently or jointly designated some space in the logistics centres for installing goods at the warehouse, which they have received from the suppliers. Some logistics centres have also become involved in education and instruction and turned themselves into similar customer service centres for end users.

Quality control and testing of products: Recently, logistics centres have been providing quality control and product testing services in addition to assembly services. Quality control and product testing services are expected to prosper both globally and domestically.

Product training on customer's premises: Increasingly, customers are demanding that logistics centres provide product-training services on their own premises. This trend is particularly noticeable in the case of electronics companies. Customers are using logistics centres to offer more flexible service offerings and reduce the cost of personnel training.¹⁰

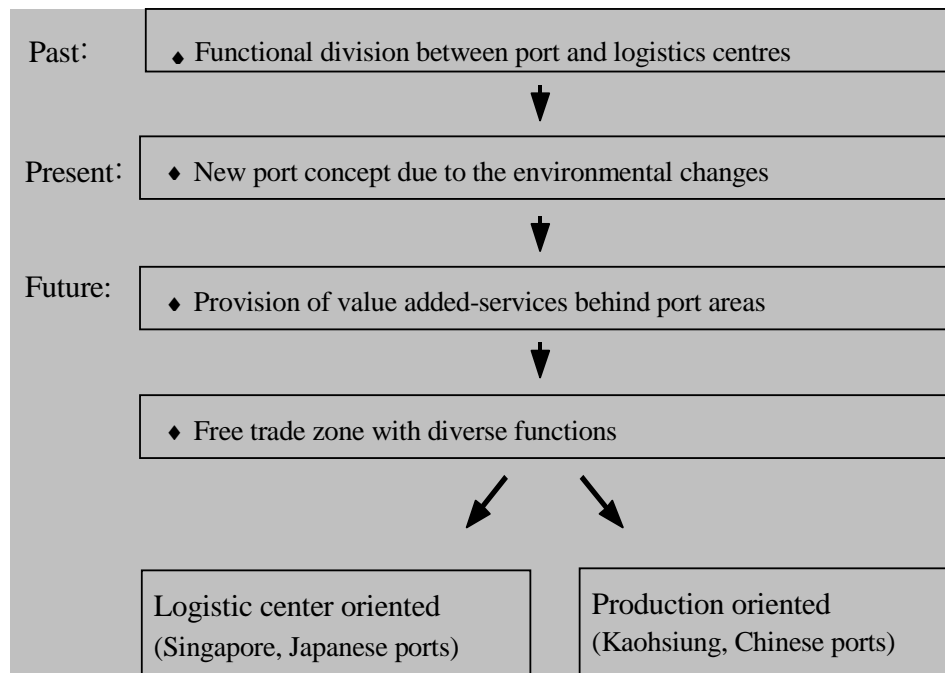
Bonded exhibition: To increase the distribution function, especially for bonded products, port authorities should examine the possibility of building exhibition facilities. It should be said, however, that the exhibition should be arranged systematically so as to avoid their being confused with warehouse facilities.

Different types of logistics centres have been constructed in many ports in the ESCAP region for each purpose (See figure III.6).

The Port of Singapore is often cited as a role model for a large-scale logistics centres within the ESCAP region. With an increase in trade volume and ever increasing transshipment cargoes, the role and functions of logistics centres seem to be inclined toward pure logistics functions such as storage, assembly, labelling, exhibition, etc. Large-scale logistics centres allowing limited manufacturing functions in addition to pure logistics are being operated in Singapore to provide satisfaction for customers. They are typically equipped with large scale warehouses, storage facilities, and assembly and processing services. Recently, Korean ports have been introducing this type of logistics centres as well.

Meanwhile, many ports in China and Kaohsiung Port of in Taiwan province of China have allowed production and manufacturing functions in Free Trade Zone areas near to ports. Recognizing the new emphasis on technologies and trade expansion, some FTZs have resorted to targeting attempted to attract leading-edge technologies and foreign investment by offering manufacturing, trade, logistics and distribution.

¹⁰ An example of product training services provided by a logistics centre is Ryder's training services for Xerox.

Figure III.6. Development phases of logistics centres in port area

In Japan, the use of value-added service facilities in port areas has been on the rapid increase, featuring a prominent and prevalent port development pattern. Beginning in the late 1970's, when the Port Island 1 was developed in the Port of Kobe, the development of logistics centres spread widely in other countries of the ESCAP region. Since the mid 1980s, China have constructed logistics centres behind port areas due to the increasing demands for international logistics sites, which conventional ports had difficulties coping with.

Although the level of services provided and the size of logistics centres may differ somewhat among ports in the ESCAP region, there are recent signs that this trend is gaining more and more momentum. For example, the development of logistics centres in Port of Tanjung Pelepas, Port of Kaohsiung in Taiwan province of China, and the Subic Bay Freeport in Philippine has already gained great attention from the parties concerned.

Table III.3 compares major logistics activities performed at port logistics centres in selected economies of the ESCAP region.

Table III.3. Comparison of the activities at logistics centres in the ESCAP region

Economies		Major functions	
Singapore		Storage, processing, assembly, classifications, consolidation, transshipment, labeling, packaging, inspection, etc. Manufacturing is partially allowed.	
China	China	Manufacturing, storage, processing, assembly, consolidation, packaging, labeling, exhibition, sampling. Export and import, intermediate trade, finance, and logistics.	
	Hong Kong, China	As a free port, all functions are allowed, including manufacturing, storage, processing, assembly, classification, exhibition, sampling, and transshipment.	
	Taiwan Province of China	Export Processing Area	Manufacturing, processing, assembly, packaging, and labeling.
		Science Industrial Area	Research and Development, manufacturing support, and education for high-tech products.
		Special Area	Trade, warehousing, and transport for building international logistics centre in Asia-Pacific region.
Japan	Foreign Access Zone		Storage, classification, inspection, testing, processing, assembly, labeling, packaging, and exhibition of imported goods.
	Free Trade Zone		Manufacturing, assembly, processing, storage, inspection, testing, transformation, packaging, labeling, export, and exhibition.
Korea		Material handling, storage, exhibition, distribution, processing, repair, and other international logistics activities.	

Source: Korea Maritime Institute.

E. Factors influencing the site selection of logistics centres

As the trends of globalization and trade liberalization have progressed, the cross-border movement of capital and technologies has increased substantially, on both a global and regional basis. To cope with this trend, nations and sub-national entities, primarily cities, are accelerating their efforts to attract foreign capital and technology. However, global firms base location decisions on a multitude of critical factors.

Traditional location criteria have emphasized cost-based variables such as economies of scale, transportation cost, and factor cost advantages. Nowadays, however, regional infrastructure and local skills are given a great deal more weight than in the past. Non-economic variables such as social and institutional characteristics are also considered important in selecting the best location.

A recent survey focusing on the identification of location determinants for high-tech manufacturers asserts that a global hub for high-tech and logistics activities should satisfy the following factors (requoted from O'Brien (2001)):

- A community desire to have a comprehensive hub development strategy
- Existence of comparative cost advantages

- A favourable fiscal environment
- Existing high-tech manufacturing industry base
- One-stop-shop local marketing organization that proactively promotes the location, supported by appropriate literature and materials
- Appropriate incentive packages for foreign investors
- Supporting infrastructure at all terminal facilities
- Supporting human resources development programmes
- Pool of high-tech research and development institutes

A comprehensive list of the basic criteria and policy issues in the selection of sites for logistics centres can be found in table III.4. The key criteria in selecting logistics centres are: IT port infrastructure, land prices, skills of labourers, wage levels, information technology aspects, quality of supporting cities, and whether or not the port's hosting country has flexible institutional schemes. In practice, since such factors are considered as basic requirements for logistics centres, companies weigh these criteria when planning the construction of logistics centres. See Box III.1.

Box III.1. Location factor of a distribution centre of Hershey Foods Corporation

Hershey Foods Corporation, a leading global manufacturer of quality chocolate and non-chocolate confectionery and chocolate-related grocery products, employs distribution network consisted of a mix of large distribution centres, smaller regional distribution centres and overflow warehouse. Recently, Hershey successfully and fully implemented a new mega distribution centre. In selecting the best location that was enough handle a 1.2 million square feet warehouse and that could accommodate potential future expansion of 300,000 square feet of warehousing space plus a 250,000 square feet light manufacturing operation, Hershey considered the following as important factors:

- Transportation infrastructure that could support a high volume of inbound and outbound freight;
- Labour availability, because the fully staffed distribution centre would employ more than 600 employees;
- Land cost;
- Taxes;
- Distance from the logical centre point of distribution; and
- Existence of wetlands or other environmental restrictions.

Source: Ken Miesemer, *Starting up a World-Class DC*, WREC, 2001.

More than 6,700 foreign global companies have operations located in the Netherlands. The Netherlands has been very successful in attracting business headquarters, distribution centres, and call centres of foreign global companies. In fact, among the estimated total 955 European Logistics Centres (ELCs), more than half of all American and Asian ELCs are located in the Netherlands.

As host to the majority of ELCs in Europe, the Netherlands may provide useful lessons for countries in the ESCAP region to learn from. In order to find the major factors that global companies considered when choosing to locate in the Netherlands, we investigated 67 companies appearing in the publications of the Netherlands Foreign Investment Agency. The companies were broken down into three groups: companies which operate ELCs (20), companies operating European headquarters (27), and companies operating call centres (20).

The most common attributes for these companies are listed in table III.5. The difference appears to not be statistically significant among the three response groups.

Table III.4. Factors influencing the site selection of logistics centres

Factors	Main features
Port infrastructure	<ul style="list-style-type: none"> • Adequacy of port facilities • Spaciousness of port area • Availability of feeder vessels
Land/Land prices	<ul style="list-style-type: none"> • Availability of land • Affordability of land prices • Low rental fees for land
Labour	<ul style="list-style-type: none"> • Availability of English speaking port workers • Availability of specialized technicians • Availability of trained or nor-trained technical labours • Labour costs in distribution center
Technology/Information	<ul style="list-style-type: none"> • Level of port information service • Supply of information infrastructure
Market factors	<ul style="list-style-type: none"> • Distance between port and hinterlands • Distance between port and major cities
Related industries	<ul style="list-style-type: none"> • Ease of access to parts and raw materials • Distance between port and industrial complex
Back-up city	<ul style="list-style-type: none"> • Existence of large consumer city behind port areas • Quality of workers in DC
Institutional factors	<ul style="list-style-type: none"> • Incentive programmes offered by host country • Simplicity, ease and efficiency of administrative procedures needed in operating distribution centres • Financial assistance in constructing distribution centres • Free trade system and related law provided by the host countries
Connecting transport System	<ul style="list-style-type: none"> • Airport access to provide speedy linkage between the distribution centre and major markets • Effective land transport system • Establishment of feeder service (hub and spoke system)

Source: Korea Maritime Institute.

For the companies operating logistics centres, the most frequently cited features are:

- Central and strategic location in relation to the European market
- Highly skilled and productive labour force with exceptional work ethic
- Developed logistics and transport infrastructure, and excellent connections to foreign market
- Language skills in a variety of languages
- Strong professionalism of the logistics industry

In addition, factors such as “friendly international business environment” and “support from central and local authorities” also play a major role in this group’s location decisions.

Table III.5. Factors affecting business location in the Netherlands

Factors	DC	HQ	CC
Clustering of related and supporting industries	2	6	5
Central and strategic location	6	16	7
Superior international business environment	5	12	6
Efficient and professional logistics industry	5	1	-
Highly productive labour with work ethic	7	14	8
Multilingual work force	6	15	17
Flexible regulation and favorable tax incentives	3	4	1
Flexible labour system	4	3	4
Assistance by government dept. operating in a business manner	5	6	3
Superb infrastructure well-connected to foreign markets	6	5	1
Sophisticated telecommunications infrastructure	2	4	8
Convenient access to ports, airports, railways and roadways	3	9	-
Total	20	27	20

Source: Il-Soo Jun, *A New Paradigm for a National Development Strategy: Building a Logistics Centre in Northeast Asia*, Korea Transport Institute, 2001.

Note: DC, HQ and CC represent distribution centre, headquarter, and calling centre respectively.

The Netherlands is an attractive country for other business functions as well as ELCs. Integration of business functions like Customer Relationship Management, logistics and service is the key to success when it comes to achieving excellent supply chain performance. Many companies choose the Netherlands as their European base for these functions because of the business integration skills of the Dutch, combined with the country’s excellent information and communication technology infrastructure. In addition, the importance of the Dutch logistics sector results in industry knowledge flowing into the Netherlands from abroad as foreign companies rely the Netherlands as a basis to realize their European expansion. Examples include the EHQ of North Americas logistics service providers and logistics software suppliers.

For companies operating European Headquarters (EHQ), “central and strategic location” was the most frequently cited factor. In addition, “multilingual capability of workforce” and “highly productive labour” also appeared to be major criteria. Other key factors contributing to this group’s decision to locate in Netherlands were proximity to hubs such as the Port of Rotterdam and the Schiphol Airport, as well as ease of access to highways.

F. The establishment of free trade zones to strengthen logistics centres in port areas

Nowadays the increasing number of logistics centres and free trade zones (FTZs) in ports around the world explains the important role of ports in terms of their logistics function. New port functions, encompassing logistics centres and FTZ have been having a profound effect on the port industry in the ESCAP region, as major ports rush to utilize these new logistics systems.

In order to lead global logistics within their respective regions, logistics centres such as those in Netherlands, Singapore and Hong Kong have consistently expanded their logistics facilities such as ports and airports. Using such facilities as a base, they have actively established free trade zones as part of their efforts to consolidate and centralize logistics management. These countries, each of which is a major regional logistics centre, have become favorite locations for global firms.

Free trade zones are generally defined as secured areas adjacent to ports in which goods can be stored for prolonged periods without Customs duties, excise tax or inventory tax being paid on the goods.¹¹ FTZs allow the goods owner Customs entry at its discretion, and complete access to the FTZ at all times. Customs Service appraisal and classification of the goods can be done either at entry to the FTZ, or at open exit into the market, whichever the manufacturer prefers. Duty is paid only when the goods are released into the territory. There is no limit on storage time. At no additional Customs expense, a FTZ operator may store, sell, exhibit, break up, repack, assemble, distribute, sort, grade, clean, mix with foreign or domestic goods, destroy, label and manufacture within the FTZ.

The main advantages of a FTZ are usually obtained from:

- Employment generation, direct and indirect¹²;
- Foreign exchange earnings, as an added value is usually of export goods;
- Increase in export competitiveness;
- Increase in utilization of domestic resources, services, and capital for export generation;
- Increase in potential for technology transfer;
- Increase in foreign capital investment;
- Training of domestic labour in new skills;

¹¹ Goods can be manufactured in the FTZ, with waste left behind. Duty is paid only on the saleable product imported after final assembly at the FTZ. Other charges are saved because the goods owner may discard sub-standard goods without having to pay duty on them. The same applies for shrinkage, evaporation, seepage, damage, accountable loss, etc.

¹² Total employment generated usually exceeds direct employment by a factor of 4.

- Transfer of management know-how;
- Development of marketing/sales opportunities for free zone and domestically manufactured products;
- Increase in entrepot/transshipment trade; and
- Increased banking business.

Although most FTZs in the world have more or less the same objectives, for examples, attracting foreign investments, promoting industrialization, creating job opportunities for local labour, and gaining access to foreign knowledge and technology, the economic benefits of free zones to host countries vary with the form of FTZs.

It is common to achieve a value added of 50 to 80 per cent of which about 70 per cent is retained by the host country. In other words, a free port activity with a value of imports of \$10 million will usually contribute \$3.5 to 5.6 million to the economy of the host country (Frankel, 1982). The Korea Maritime Institute predicted that FTZ designation at Busan and Gwangyang ports would create as much as US\$1.3 billion in added-value revenue and above 15,000 jobs by 2011 (see table III.6).

Free trade zones have made substantial contributions to the development of modern export-oriented industries in countries like Singapore, Republic of Korea, Taiwan Province of China, Malaysia, Philippine, Sri Lanka, and Hong Kong. They are credited with accelerating the industrialization of newly industrialized countries. In general, employment generation and new foreign exchange earnings were achieved.

Different forms of FTZs are developed in response to particular government's objectives and policies. Several types of FTZs are usually distinguished, as shown in table III.7.

Table III.6. Economic contributions of FTZs in the Republic of Korea

	Busan	Gwangyang
Free trade area (thousand square metres)	5,785	4,430
Port zone (thousand square metres)	4,463	1,917
Adjacent port area (thousand square metres)	1,322	2,512
Employment generation (jobs)	5,280	10,000
VA creation (million US dollars)	470	900

Source: Korea Maritime Institute.

Free Ports

Free ports are free zones that cover a larger physical area, typically an entire port city. Free ports often combine the characteristics of free trade zones (FTZ), industrial free zones (IFZ), and enterprise zones (EZ). Perhaps the most famous have been the city-states of Hong Kong and Singapore.

Commercial Free Zones

Commercial free zones also developed out of the trading activities of port cities, but with more limitations and controls than a free port. The main objective of a commercial free zone is the promotion of trade, and most commercial free trade zones function as adjacent to ports, airports, or other international transportation hubs.

The physical facilities of commercial free zones are generally simple warehouses and economic activity is trading-oriented. A leading example of this kind is the Jebel Ali Free Zone in Dubai.

Enterprise Zones

In these zones various incentives such as reduced taxes, regulations, and low-cost financing of investments, land, and the like are offered to expand employment, export, and import substitution.

Export Processing Zones

EPZs, also called industrial free zones are a relatively recent free trade zone innovation. While sharing the same fundamental characteristics of the free trade concept, EPZs are explicitly designed to facilitate production of goods and services for export market, rather than simple transshipment activities.

Industrial Free Zones

Area or industrial estates outside customs barrier adjacent or near a port, which offer duty free movement of goods, in and out of zone, as well as fiscal, regulatory, and tax incentives. Usually used to encourage establishment of export industries by domestic and foreign investors.

Special Economic Zones

China introduced the Special Economic Zone (SEZ) concept in 1979 as part of its “open door policy” which consciously used the SEZs as proving grounds for market – oriented economic reforms. Although patterned after the EPZ and free port concepts, SEZs feature several important differences, first, they cover a much larger territory than any EPZ and most free ports, from 15 square kilometres to 23,000 square kilometres, secondly, they allow a broad range of economic activities, and thirdly, they offer differential incentives among the various projects. Lastly, strict controls are placed on sales of SEZ goods into the Chinese custom territory, even upon full payment of import duties and taxes.

Hybrid Models

Several countries have allowed for the creation of hybrid zones, which combine features of two or more of the types listed above. The most common combines an industrial EPZ model with a commercial free zone.

There are currently 845 free trade zones that offer comprehensive logistics and production capabilities (UNCTAD, 1999). Selected export processing zones in selected economies in ESCAP region are listed in table III.8. Particular attention should be paid to China which began expanding its logistics facilities through large-scale foreign capital inducement and developed a free trade, adopting a free trade zone system to ensure the free trade of global firms. In case of China, a large number of special economic zones (SEZs) had been established since 1970s and foreign investment incentives were granted to 'coastal cities' to stimulate economic growth and trade development. For example, special economic zones had been established in Fujian and Guangdong provinces in the late 1970s and in the cities of Shenzhen, Zhuhai, Shantou by the end of 1980s (see table III.9). China has transformed many port areas into modern FTZs, and existing ports have equipped themselves with large FTZ areas, providing customers with one-stop shopping services that guarantee both industrial activities and logistics activities in the same place.

In addition, economies in the ESCAP region such as Japan, Singapore, Hong Kong, and Chinese Taipei have already established free trade zones in ports and developed several logistics centres in the FTZs in order to provide value added service and strengthen logistics function of the ports. For example, Yokohama Port Cargo Centre in the Port of Yokohama, Distriparks in the Port of Singapore, ATL Logistics Centre in Hong Kong and several distribution centres in Kaohsiung port were developed for the purpose of strengthening logistics function of the port.

Table III.7. Types of free trade zones

	Freeport	Special Economic Zone	Industrial Free Zone/EPZ	Information Processing Zone	Financial Services Zone	Commercial Free Zone	Enterprise Zone
Physical Characteristics	Entire city or jurisdiction	Entire province, region or municipality	Industrial Park	Part of city or "zone within a zone"	Entire city or "zone within a zone"	Warehouse area, often adjacent to port or airport	Part of city or entire city
Economic Objectives	Development of trading centre and diversified economic base	Deregulation; private sector investment in restricted area	Development of export Industry	Development of information processing centre	Development of off-shore banking, insurance, securities hub	Facilitation of trade and imports	Development of SMEs in depressed areas
Duty Free Goods Allowed	All goods for use in trade, industry or consumption	Selective basis	Capital equipment and production inputs	Capital equipment	Varies	All goods for storage and re-export or import	No
Typical Activities	Trade, services, industry, banking, etc.	All types of industry and services	Light industry and manufacturing	Data processing; software development; computer graphics	Financial services	Warehousing, break-bulk, packaging, distribution	All
Additional Incentives	Simple business start-up; minimal tax and regulatory restraints	Reduced business taxes; liberalized labour codes; reduced foreign exchange controls	Profits tax abatement and regulatory relief; exemption from foreign exchange controls	Demonopolization and deregulation of telecoms; access to market-priced INTELSAT services	Tax relief; strict confidentiality; deregulation of currency exchange and capital movements	Exemption from import quotas	Zoning relief; simplified business registration; local tax abatement; reduction of licensing requirements
Domestic Sales	Unrestricted within freeport; outside freeport, upon payment of Full duty	Highly restricted	Limited to small portion of production		Limited to small portion of production	Unlimited, upon payment of full duty	
Other Features	Additional incentives and streamlined procedures	Developed by Socialist countries	May be extended to single-factory sites				
Examples	Hong Kong, Singapore, Bahamas Freeport, Batam, Labuan, Macao	China (Southern Provinces, including Hainan and Shenzhen)	Ireland, Taiwan, Malaysia, Dominican Republic, Mauritius		Labuan	Jebel Ali, Colon, Miami	

Source: Subic Bay Metropolitan Authority.

Note: Single-point free zones are omitted from the table because they can include industrial, warehousing, information processing, or service-sector operations.

Table III.8. Selected free trade zones in the ESCAP region

Economy	Zone features		Economic performance			Industrial organization	
	Number and type of zones	Main types of incentive	Total estimated employment	Main investor countries	Main sectors	Labour laws	Workers' organization
Bangladesh	2 public EPZ; 3 public and 1 private EPZ under construction	10-year tax holiday, duty-free imports and exports	2.2 million ^a	Republic of Korea, Bangladesh, Japan, Hong Kong (China)	Garments, leather, shoes, electronics	EPZs –exempt from Industrial Relations Ordinance	EPZ-trade unions and strikes prohibited
China	6 SEZs, 34 ETDZ	Duty-free imports and exports, tax rebates	18 million in foreign-invested firms	Hong Kong (China), Taiwan Province of China, Japan, United States		All labour laws apply	Single trade union (ACFTU)
Fiji	1 Tax Free Zone	Tax exempt	15 000	Fiji, Australia, Singapore	Garments, food		
Hong Kong, China	Entire territory: Free Port	None		United Kingdom, China, United States	Electronics	Labour laws apply	Trade unions active
India	7 EPZs	5-year tax holiday, duty-free imports				Labour laws apply, EPZs are “public utilities” in terms of Industrial Disputes Act	
Indonesia	26 EPZs	12-year tax holiday, duty-free imports and exports		Japan, United Kingdom, Singapore		Labour laws apply	Trade unions active
Islamic Republic of Iran	14 SEZs, Free-Trade-Industrial Zones	15-year tax holiday, duty-free imports and exports				Labour laws apply	
Malaysia	15 Free Industrial Zones			Japan, Singapore, United States		Labour laws apply with some except. for pioneer industries	Restrictions in electronics and pioneer industries
Nepal	1 EPZ	Export industries are tax and duty free			Garments		
Pakistan	4 EPZ; 9 new zones planned	15-year tax holiday, duty-free imports and exports				Not all provisions of labour laws apply	
Philippines	110 EPZs approved, of which 56 active	4 to 8-year tax holiday, duty-free imports and exports	609 000 ^b	Japan, Philippines, United States	Electrical machinery	Labour laws apply	Trade unions present
Singapore				Singapore, Japan, United States	Electronics, chemical	Labour laws apply	Trade unions present
Sri Lanka	6 EPZs	10 to 20-year holiday for new, large export projects or thrust industries	Estimates range between 90 000	Republic of Korea, Hong Kong (China)	Apparel, services, rubber	Labour laws apply	No trade unions present, zones have employee councils
Thailand	3 Investment Zones, 5 EPZs and several specialized EPZs	3-year tax holiday, duty-free imports and exports		Japan, European Community, United States	Electrical appliances	Labour laws apply	Trade unions present
Viet Nam	EPZs	4-year tax holiday, duty-free imports and exports					

Source: UNCTAD.

Table III.9. Major FTZs in China

FTZ	Areas (square kilometres)	Location
Sanghai FTZ	3.28	Waigaoqiao, Pudong, Shanghai
Tianjin FTZ	5.0	Near Tianjin FTZ
Dailian FTZ	1.25	Located at Eastern part of the Dailian Economic and Technology Development Area
Shatoujiao FTZ	0.3	Shatoujiao City
Futon FTZ	1.35	Hanging Port
Guangzhou FTZ	1.4	Eastern part of Guangzhou Economic and Technology Development Area
Zhangjiagang FTZ	4.1	Eastern part of Zhangjiagang Port
Haikou FTZ	1.93	Jinpan Processing Area in Haikou
Qingdao FTZ	2.5	Western coast of Jiaozhou
Ningbo FTZ	2.3	Northern part of Beilin Port
Fuzhou FTZ	1.8	Mawei Economy and Technology Development Area
Xiangyu FTZ	2.36	Xiangyu Economic Special Zone
Shinto FTZ	2.3	Shantou Economic Special Zone
Total Areas	29.9	

Source: Korea Maritime Institute.

IV. CASES OF THE LEADING PORTS IN DEVELOPING LOGISTICS CENTRES

A. Port of Rotterdam as an European logistics centre

The development of the Netherlands as a logistics centre for international firms was due to its historical strengths, its specialization in trade, and the existence of excellent infrastructure. Since the Middle Ages, the Netherlands has strongly depended on trade and transport related activities in order to overcome its own lack of natural resources and local industry.

From the beginnings of containerization in the early 1960s, the Port of Rotterdam grasped the opportunities this new transportation system offered, investing heavily in handling facilities and equipment for efficient transshipment of containers to inland modes of transport. Another strategic advantage for the Port of Rotterdam has been its ability to accommodate the largest bulk ships, which has enabled large container vessels to call upon the Port of Rotterdam without any difficulties. This superior maritime infrastructure enabled not only the establishment of transshipment points and storage facilities but also the emergence of a chemical cluster around the Port of Rotterdam.

Because of its basic logistics infrastructure and liberalization of transport services and logistics trends, the Port of Rotterdam can be classified as a logistics super hub. The European Logistics Centres (ELCs), though located throughout the Netherlands, are some of the best examples in the world of logistics activities that are linked to a port.

ELC is a major trend in European logistics, not only for multinationals but also for medium-sized enterprises, many of which are setting up their logistics centres in the European market. Nowadays, most of these firms adopt centralization of Europe-wide distribution that brings many logistical and other advantages to the firms involved, including reduction of logistics costs, increased sales, improved control, better product availability, enhanced competitive position, faster market response, as well as savings on workforce and infrastructure investment.

A very specific characteristic related to the ELC is that the goods stored in these ELCs are seen as transit goods from the perspective of customs authorities. Since transit goods are those that have not yet been imported to the Netherlands or Europe, neither imports tariffs nor customs procedures are needed. The possibility of easy re-export of these transit goods by container is an important reason for the spatial nearness of ELCs to ports. In many places the distribution centres have clustered in Distriparks. Distriparks are the Port of Rotterdam's response to the growing demands on shippers and transport service providers for just-in-time distribution at lower cost.

The Municipal Port Management of Rotterdam encouraged the formation of Distriparks in order to consolidate cargo flows to the port and create port-related employment. Cargo destined for the Rotterdam Distriparks comes in mainly by container. Therefore, the proximity of a container terminal is an advantage for a distribution centre in Rotterdam. The concept of the Rotterdam Distriparks is just-in-time delivery at lower cost. To fulfill this mission, the parks:

- Have facilities for distribution operations
- Are located close to cargo terminals so that the empty container, after stripping, can be taken back into the system. Moreover, transport from terminal to warehouse is cheap
- Are located close to various hinterland transport facilities
- Provide value added services
- Have the latest in communication technology
- Have a highly skilled workforce
- Have Customs on site

Three distriparks have been established in the Port of Rotterdam as shown in table IV.1 and figure IV.1. A Distripark is a large-scale, advanced, value-added logistics complex with comprehensive facilities for distribution operations at a single location, which is connected directly to container terminals and multimodal transport facilities for transit shipment, employing the latest in information and telecommunication technology. Distriparks provide space for warehousing and forwarding facilities, including the storage and transshipment of cargo and the stuffing and stripping of containers. They also provide a comprehensive range of value-added services to fulfill highly heterogeneous customer demand. These value-added services include assembly, labeling, testing/examination, packaging and repackaging, sorting and invoicing.

The Port of Rotterdam and the Europe Combined Terminals jointly developed the Delta 2000-8 Plan, the objective of which is to construct eight Distriparks in the Delta terminal at the Port of Rotterdam by the end of 2000. Delta 2000-8 is the most advanced logistics concept ever developed in the Port of Rotterdam.

A major advantage of the Distripark concept is that the distribution centre is located very close to the cargo terminal, making transport between these two places fast and cheap. In addition, from the distribution centre the client may choose among a variety of transport modes, depending on time pressures, costs and destinations.

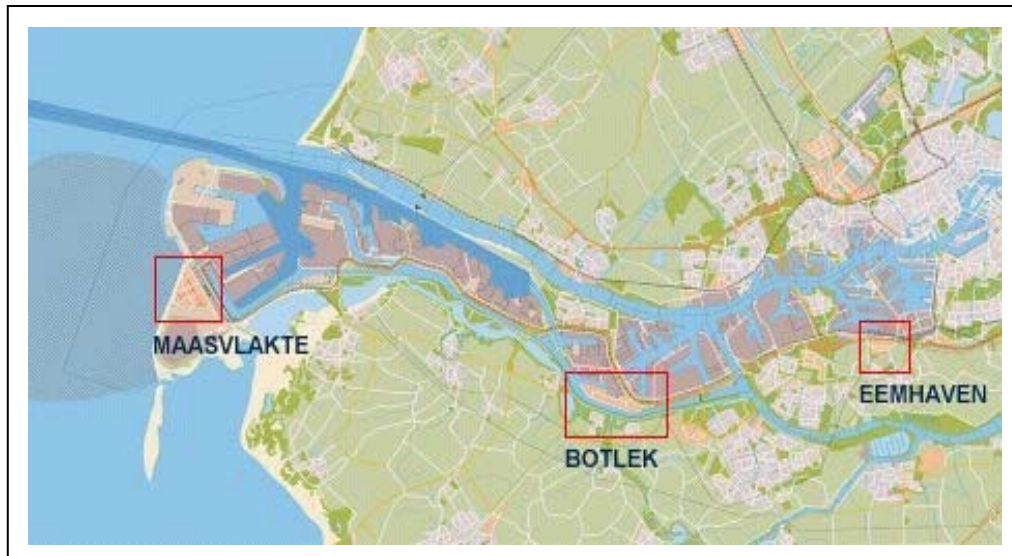
Table IV.1. Distriparks in Rotterdam

Distriparks	Starting Date of Operations	Land (m²)	Remarks
Eemhaven Distripark	1989	237,000	Close to the home terminal of ECT
Botlek Distripark	1990	165,000	Close to the Botlek Port area Handles many chemical products
Maasvalkte Distripark	1 st phase: 1998 2 nd phase: under construction	848,000 1,017,000	Close to the ECT Delta terminal Most companies are constructing their warehouses
Total		2,267,000	

In Rotterdam, there are hundreds of companies specialized in storage and distribution activities, providing logistics services all over Europe and other continents. The first EDCs emerged in the Port of Rotterdam, most of them in the older port basins, next to the existing container terminals in the Eemhaven Region. Construction of the Botlek Distriparks followed. See figure IV.1.

In the 1980s, the container-flows started to grow substantially, and Maasvlakte, a large port basin developed in the late 1960s but still empty because of the stagnation, was devoted to the container trade. In 1984, the Europe Combined Terminal (ECT), the major container-operator in the Port of Rotterdam, developed a completely new terminal in Maasvlakte, capable of accommodating the largest container-vessels and providing the most advanced technologies. See figure IV.2.

Figure IV.1. Port of Rotterdam's major distriparks: Eemhaven, Botlek and Maasvlakte



Source: Port of Rotterdam.

Figure IV.2. Locations of Distripark Maasvlakte and the ECT container terminal



Source: Port of Rotterdam.

Box IV.1. Distripark Maasvlakte

Distripark Maasvlakte, a logistics centre on the western edge of the port area, is an excellent example of transport infrastructure management by the City of Rotterdam and the Port of Rotterdam Municipality.

Distripark Maasvlakte was completed in 1997. With a logistical park of 125 hectares, it was designed for companies seeking to centralize their distribution activities in order to gain greater control over their European distribution activities.

The Port of Rotterdam designed Distripark Maasvlakte for:

- Companies wishing to set up their own European Distribution Centre;
- Mega-carriers wishing to further penetrate the logistics chain;
- Mega-distributors wishing to set up a maritime hub for their European operations;
- Other (global) logistics service providers; and
- European exporters wishing to create a maritime export hub.

A unique characteristic of the Distripark Maasvlakte is its location close to the ECT container terminals, giving it a special connection with these terminals through a dedicated internal track (see figure IV.2). When a container is transported from an ECT terminal towards the ELC on the Distripark, the containers are not imported into the European economy. This results in time and cost savings, since expensive customs handling is no longer necessary. Distripark Maasvlakte offers immediate access to multimodal facilities for transport by rail, coastal shipping, inland shipping and truck. ELC investment on Distripark Maasvlakte is growing fast. In the period 1997-2000 five companies had invested, or were in the process of investing, in Distripark Maasvlakte.

In 1992, the growth of the container volume became the spearhead of a new port policy: *Havenplan 2010*. The goal of this plan was to stimulate employment and create added value in the Port of Rotterdam. It also stated that the port should be developed as a main port, because of the large indirect effects related to the port. This new growth was to be achieved through the following:

- New space for large scale container-terminals: Further development of the Maasvlakte and its extension further into the North Sea, a project known as Second Maasvlakte.
- New infrastructure, in the port and to and from the port.
- New dedicated distriparks in the port aimed at adding value to the cargo transhipped through the port by value-adding logistic activities. The goal is to open the containers in the Port of Rotterdam-region, instead of merely transshipping them as fast as possible towards the hinterland.
- Strengthening industrial functions in the port, since the massive port industry ties good-flows to the port.

Consequently, the majority of investment in the main port has been in “hard” infrastructure: a railway-link, space for distriparks, and internal port infrastructure.

The Port of Rotterdam operates as a landlord port. This means that Rotterdam Municipal Port Management (RMPM) provides the infrastructure such as quays, basins and land. This infrastructure is leased out to private companies against a flat rate lease (generally long term), and is hence not related to cargo throughput at the terminal. The private company has to invest in all superstructures, such as pavement, rail tracks, cranes, sheds, equipment, etc. In addition, all employees, including stevedoring labour, fall under the responsibility of the private company.

The situation is similar when it comes to the building of Distriparks. The infrastructure (land) is provided by the RMPM, and plots are leased out to private companies, which, in turn, must invest in their own buildings and employ the people they need.

Though these parks are not free zones, each company within them can be considered as a free zone, or a “free point,” in and of itself. In the Netherlands there are approximately 1,500 of these free points. The Distriparks can offer freer facilities than a free port. When a company fulfils certain conditions with respect to security, and when it has established an online computer connection meeting certain standards with Customs, it may obtain a license from Customs permitting it to carry out certain basic Customs formalities on itself. Such a system makes the goods flow faster and more efficient.

B. Port of Singapore as an Asian logistics centre

Taking advantage of the growing trend for MNCs to establish central logistics centres (CLCs) in Asia, Singapore has emerged as the logistics leader in Asia, similar to the Netherlands’ position in Europe.

Singapore has all the necessary infrastructure support. It has world-class seaports and airports, excellent infrastructure, an efficient telecommunication network, a pro-business environment, intensive use of information technology, wide-ranging logistics capabilities, as well as a skilled and professional workforce. The combination of these factors has helped Singapore to become a modern hub of international trade and a base of operations for a large number of multinational and regional companies. Over 5,000 MNCs have chosen Singapore as their Southeast Asian logistics/distribution hub. The logistics companies in Singapore, which number over 6,000, provide comprehensive services to the MNCs, including transport, forwarding, warehousing, and distribution. Most of them are located in distriparks.

When manufacturing began to shift from higher-cost countries like Japan to Southeast Asian countries in the 1980s, the Government of Singapore embarked on an active campaign to develop the city-state into a transshipment hub for products originating in Singapore, Malaysia, Indonesia, and Thailand. It also began to actively encourage MNCs and a number of international logistics service providers to locate in Singapore, and to establish their regional or global distribution centres in Singapore through various incentive schemes such as pioneer status, tax exemptions, and so on.

National Semi-Conductors set up a single worldwide distribution centre in Singapore by using FedEx as the third party logistics service provider.¹³ Lucent Technologies opened its Asia/Pacific Logistics Centre in Singapore in 1998, outsourcing its operations to AEI Warehousing and Distribution of Singapore. Fritz Logistics manages Texas Instrument's Asian Distribution Centre in Singapore. UPS Worldwide Logistics established their regional headquarters in Singapore to design, implement, and manage supply chain solutions for Compaq, Hewlett Packard, IBM, etc. Emery and DHL selected Singapore as its Asia-Pacific headquarters.

Some government agencies in Singapore have been charged with building the nation into a logistics hub and leveraging the existing base of CDCs located in Singapore to provide integrated logistics support for MNCs operating in Asia. Singapore's role as an international warehousing and distribution centre was promoted intensively by Singapore's two key drivers: the Economic Development Board and the Trade Development Board. In the mid-1980s, these government agencies established a vision to develop Singapore into Asia's leading integrated logistics hub by the year 2010.

The Port of Singapore Authority (PSA) has also played an instrumental role by working closely with these government agencies in promoting the growth of the logistics hub in Singapore. As the operator of the world's largest container terminal, PSA has offered a wide range of ship- and port-related services by developing centralized warehousing and distribution, which mostly offer value-added logistics services. PSA manages four major distriparks totaling 600,000 square metres of warehouse area within the Singapore distribute.

Since the 1970s, PSA has provided much needed warehousing space in the Alexandra Distripark, Pasir Panjang Distripark and Tanjong Pagar Distripark. These three distriparks are located near the container and cargo terminals and Jurong industrial hub, enabling them to facilitate the shipment of cargoes. The also serve as home to many established multinational distribution centre operators, manufacturers, traders, forwarders and others, providing them with reliable, accessible and well-managed distribution centre operations that are synchronized with their supply chain operations.

In July 1987, the London Metal Exchange designated Singapore as its first official delivery port outside of Europe. This action helped to stimulate metal trading in Singapore and led to the establishment of several warehouse operations for metals in Singapore. Additionally, a number of international companies have set up warehousing and distribution operations. In 1988, Nedlloyd Districentre established an operation in the Jurong area. In 1989, Singapore-based CWT Distribution Pte Ltd. opened its distribution centre, CWT Distripark, the region's most advanced distribution centre at the time.

In 1993, PSA completed the Keppel Distripark (KD) within the FTZ to serve as a premier cargo consolidation hub and meet other major logistics needs. A wide range of customer-friendly and value-added services such as KD Net and the seamless transfer of cargo to and from the container terminals are also provided, expediting the consolidation of transshipment cargo out of Singapore to the region (Port of Singapore, 1999).

¹³ Recently, in August 2000, National Semiconductor awarded UPS Logistics a five-year US\$150 million contract to manage National Semiconductor's global supply chain (Fang, 2000). Together, they have opened a new global DC in Singapore dedicated to National Semiconductor operations. The combined operations will enable UPS to manage the movement of National chips from manufacturing plants in Malaysia and Singapore to the new global DC and then on to customers around the world.

But the potential of warehousing and distribution was spotted much earlier. Singapore's FTZ Advisory Committee considered Singapore as being ideal for storage and the subsequent distribution of goods to the rest of Southeast Asia, because of its strategic location and liberal trading environment. The setting up of free trade zones to facilitate entrepot trade in dutiable and quota-restricted goods also contributed to the success of Singapore as a warehousing and distribution centre.

Currently, Singapore has seven FTZs, six for seaborne cargo and one for air cargo: Keppel Wharves, Tanjong Pagar Terminal, Jurong Port, Sembawang Wharves, Pasir Panjang Wharves, Keppel Distripark and Changi Airport.

Within the FTZs, PSA Corporation Ltd. provides more than 2 million square metres of covered and open storage space, and a wide range of facilities and services for the storage and re-export of dutiable and controlled goods.

Box IV.2. Keppel Distripark

Keppel Distripark is an ultra-modern cargo distribution complex that provides extensive warehousing facilities. It is connected to PSA's world-class container terminals via flyway that allows cargo to be speedily delivered to and from the port. It is located on a 23-hectare site along Singapore's Southern Seafront within the FTZ. Consequently, all cargoes brought into it are tax exempt. Its location is within easy reach of the three container terminals and the Jurong Industrial Estate.



There are 41 warehousing modules in KD totaling 113,000 square metres, including four blocks of storage space, a five-story office block, and open storage yards. KD has a 14 metre-high ceiling to support high rack automated storage and retrieval systems. The distripark provides not only conventional warehousing services such as storage and regional redistribution of cargo, but also value-added services such as bar-coding, fumigation, sampling, surveying, topping-up of cargo, quality assurance and control, pick-and-pack, and repackaging-and-relabeling of goods to be carried out, without the requirement for customs formalities. Nowadays, it is a home for many major shipping lines, international freight forwarders, and domestic IT firms.

It uses modern technology and a highly integrated computer system, called KDNet, to control the processes and procedures involved in the shipment and delivery of these cargoes. KDNet is manned twenty-four hours a day, seven days a week, and provides the customers with on-line tracking of the container movement from the various points of their operations.

The FTZs at ports facilitate entrepot trade and promote the handling of transshipment cargo. Goods can be stored within the zones without any customs documentation until they are released in the market. They can also be processed and re-exported with minimum customs formalities. The FTZs offer free 72-hour storage for the import/export of conventional and containerized cargo, and 14-day free storage for transshipment/re-export cargo. If the goods are kept in the FTZ, they are not treated as imports; tax is not charged until the goods leave the FTZ for sale in Singapore, while re-exported goods from the FTZ are exempt from all taxes.

Box IV.3. Alexandra Distripark

Alexandra Distripark is the largest complex of its kind in Singapore, comprising three 11-storey blocks of factories-cum-warehouses and two 10-storey blocks of dedicated warehouse and office space. With 210,000 square metres of warehouse space, it has attracted 300 customers who wish to consolidate their warehouse, office and factory requirements. A high-floor loading deck that allows for the multiple stacking of heavy goods, a high ceiling that increases the efficiency of space usage, good vertical transfer via several banks of lifts, and ample parking facilities for container vehicles and lorries, are some of the typical benefits that this Distripark offers.



Box IV.4. Pasir Panjang Distripark

Pasir Panjang Distripark, located next to the main conventional terminal and new container terminal, comprises nine single-storey warehouses, and has a total warehouse area of 144,000 square metres. Its single-storey warehouse offers tenants exclusivity in operations. It is ideal for those dealing in odd-size cargo or cargo with a very fast turnover. The warehouse is supported with an ample open storage yard for heavy machinery storage and heavy lift operations. Also located in the distripark is the new three-storey Pasir Panjang Districentre, which is specially designed for high value goods that require good security, clean environment and facilities for a quick turnover. All in all, Pasir Panjang Distripark provides some 250,000 square metres of warehousing and office space.



Box IV.5. Tanjong Pagar Distripark

Tanjong Pagar Distripark consists of two five-storey blocks providing 65,000 square metres of warehousing and office space. It is in an excellent location, adjoining the container terminals, yet on the fringe of the central business district. It is popular among companies providing regular services to retail outlets and offices in the city. Operationally, it is well-conceived and well-designed. The ground floor has 135 dock-levelers for container operations, while a dedicated platform is provided for lorry operations. Two banks of four- and six-tonne lifts serve the upper floors.

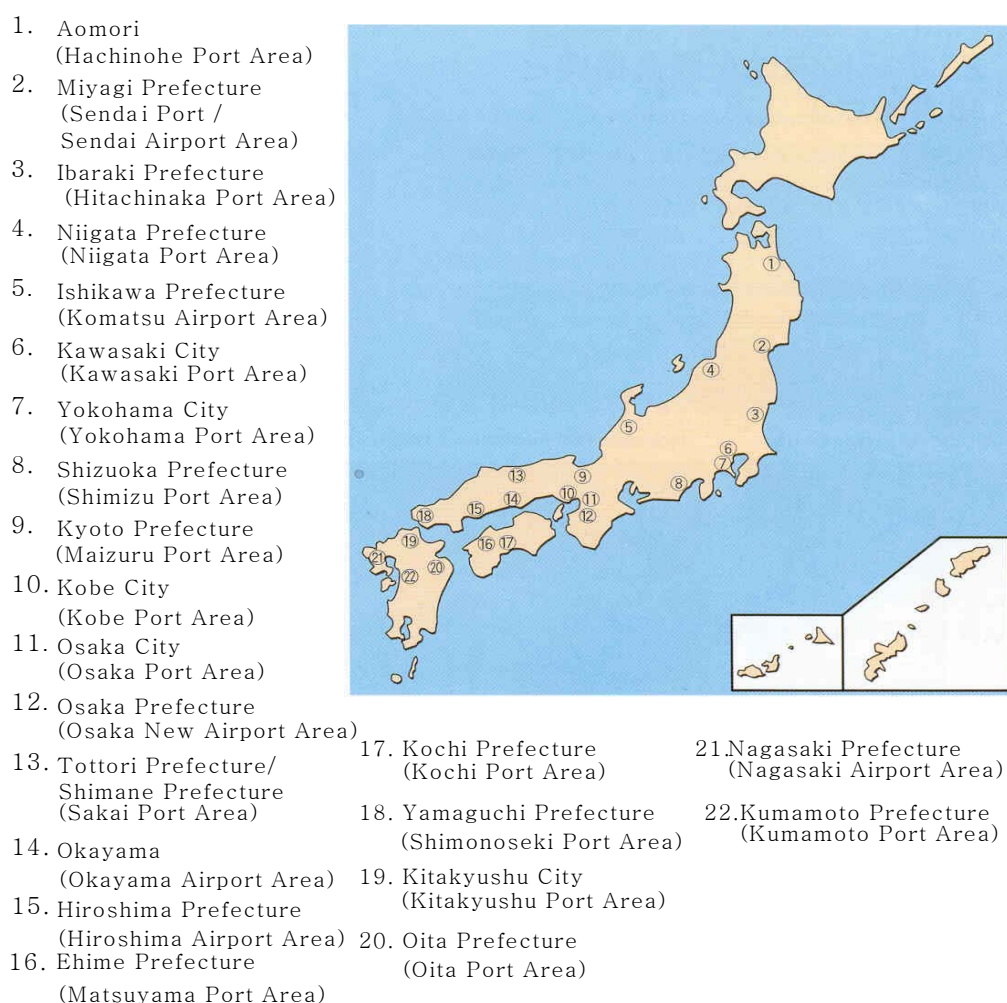


C. Foreign Access Zones in Japanese ports

The concept of Foreign Access Zones

At the request of foreign governments to improve the business climate for foreign-affiliated companies in Japan, the Japanese Government made a significant push to expand foreign investment and to increase import levels. As part of its trade-promotion efforts, the Japanese Government enacted a special law in July 1992 called the *Law on Extraordinary Measures for the Promotion of Imports and Facilitation of Inward Investment*. The stated purpose of the law was to enhance access to the Japanese market for foreign products and to encourage more foreign companies to export to and/or invest in Japan. The law permitted the establishment of a nationwide network of foreign access zones (FAZs), which numbered 22 locations as of September 2000. See figure IV.3.

Figure IV.3. Approved foreign access zones in Japan

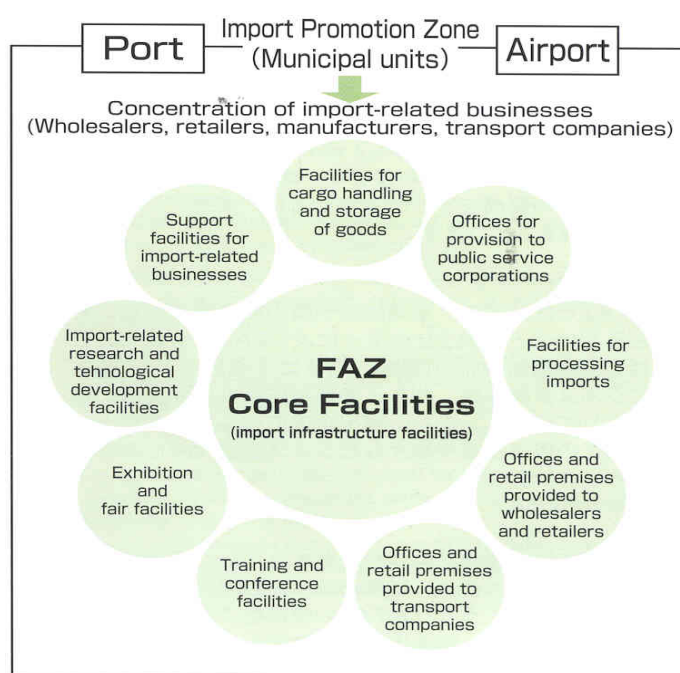


Source: Japan External Trade Organization (JETRO), *Foreign Access Zone*, Sept. 2000.

Of the 22 FAZs, 16 are located in port areas, 1 is in a port/airport area, and 5 are in airport areas. As can be seen in figure IV.4, in general, FAZs serve a dual function: promoting the development of import-related infrastructure, and strategically concentrating import-related companies into certain locations. FAZs all across Japan generate their own plans to maximize respective local advantages for the expansion of business opportunities between Japan and other countries.

The facilities of each FAZ are run primarily by quasi-public, or “third-sector,” corporations, which are established through joint investment by local public bodies and private companies. Their roles are to effectively manage the establishment and operation of principal infrastructure in each FAZ, such as facilities for warehousing, sorting, processing, and wholesaling, as well as facilities for business promotion and other import-related activities, to extend support to domestic and foreign companies operating within a FAZ. However, the scope of operation and other particulars of each third sector corporation differ. FAZ provides a variety of incentives in the development of logistics facilities as below.

Figure IV.4. The concept of foreign access zone



Source: JETRO, Foreign Access Zone, September 2000.

Low-cost distribution

Since FAZs are located near seaports and/or airports close to regional markets, they offer the unique advantage of enabling foreign products to be freighted by air or sea directly to any of 22 regional markets in Japan. This helps companies to minimize shipping costs by reducing their reliance on Japan’s often-expensive domestic transportation.

Efficient handling of imported freight

FAZs combine their own logistical-support facilities with additional privately run facilities to handle foreign products with efficiency in every stage of importing, from customs clearance to product sorting, processing and distribution. Importing is especially easy in those FAZs offering full-service bonding for product storage, processing, transportation and exhibition. FAZ facilities include:

- Facilities for cargo handling and storage of goods
- Facilities for processing imports
- Exhibition and fair facilities
- Offices and retail premises for wholesalers and retailers
- Offices and premises for transport companies
- Offices for provision of public service corporation
- Research and technological development facilities
- Training and conference facilities
- Support facilities for import-related business

Business support

FAZs help resident companies expand their import businesses by providing access to space, equipment and other facilities they need to carry out promotional activities, such as exhibitions, fairs and conventions. FAZs also provide furnished offices for fixed periods and at reasonable rates to foreign firms seeking to establish a foothold in Japan.

Financial and tax incentives

Host regions offer a variety of incentives, including preferential taxation, loan guarantees, credit insurance, low-interest financing and bonded services.

Preferential taxation

An area within an FAZ can be officially designated as a special district for preferential taxation, allowing private companies including manufacturers, wholesalers, retailers and shippers to benefit from special tax measures such as: reduced real estate acquisition and property taxes; special depreciation on facilities; and exemptions from special landholding taxes. The Kobe, Ehime, and Kitakyushu FAZs have special districts offering preferential taxation.

Loan guarantees

A loan guarantee system established under the Industrial Structure Improvement Fund is available to import businesses operating in special districts within FAZs. The system provides businesses with loans for acquiring facilities and working capital.

Credit insurance

Small and medium-sized import firms operating in special districts within FAZs can qualify for credit insurance with preferential terms, including increased amounts of insurance and reduced premiums.

Low-interest financing

FAZ investors can apply for low-interest financing with relaxed lending requirements through the Japan Development Bank (JDB) and Small Business Finance Corporation (SBFC). JDB provides low-interest financing for acquisition of equipment or facilities by foreign firms setting up in Japan or Japanese businesses that are expanding their imports. SBFC helps to promote imports by providing loans that can be used for working capital or the purchase of equipment by small- and medium-sized retailers and wholesalers. Moreover, SBFC has raised its ceiling on extra-low-interest loan amounts available to import-related wholesalers and retailers either based in a FAZ or dealing directly with an FAZ-resident company.

Bonded services

FAZ uses an integrated bonded area system loosely corresponding to free trade zones (FTZs) in other countries, where foreign cargo can be bonded for unloading, sorting, storage and distribution. However, to be designated as an integrated bonded area, a couple of conditions must be met: (i) in each case the land and facilities must be contained in one area; and (ii) facilities must be used for processing, exhibiting and storage. Because of this narrow definition, only four FAZs offer full-service bonded areas: the FAZs in Yokohama, Ehime, Osaka, and Kawasaki.

Box IV.6. Yokohama port cargo centre

Yokohama Port Cargo Centre was opened in August 1996 and has been a symbol of the Port of Yokohama. As a central facility of the Yokohama FAZ, it is one of the largest synthetic logistics centre in Japan with total floor space of 320,000 square metres and extending 634 metres in length. It is able to handle the cargo of 4.25 million



tons annually. It has the latest facilities to meet an increasing variety of logistics activities such as cargo sorting, storage, processing, disposal, distribution, and shipping. In particular, a system that combines a ramp with driveways leading to each floor allows container trailers up to 45 feet long to reach each floor. The entire facility is designated as a comprehensive bonded area and includes an office building where the information management for logistics is performed. The centre is expected to further strengthen international logistics function as well as to active economy of Yokohama.

V. PROBLEMS IN DEVELOPING LOGISTICS CENTRES FOR PORTS IN THE ESCAP REGION

A. Major logistics developments of in the ESCAP region

Bangladesh

Bangladesh's international trade is carried out mainly through its two principal maritime ports, Chittagong and Mongla. Although, the volume of cargo through the two ports was just over 17.5 million tons in 2001, it is forecasted to double over the next 10 years.

It is expected that at the end of 2006 or 2007, the Chittagong Port Authority is likely to handle about 24 million tons of cargo including about 1 million TEUs of containers. As the volume of cargo at the port increase manifold, major expansion of handling facilities is required to meet the projected demand between 2000-2007.

The Bangladesh government has given a go-ahead to the biggest United States container port operator, Stevedoring Services of America, to set up an international container terminal near the Chittagong port at a cost of about US\$ 500 million. This build-own-operate project would also have an inland container terminal near Dhaka. This terminal is expected to handle 600,000 containers annually.

Presently one FTZ is developed in Chittagong and one in Dhaka. Four other similar zones are also being developed in other areas within the country. In addition, it is recommended to develop one special economic zone (SEZ) in the left bank of river Karnafully near the Chittagong port to attract foreign investors.

A Korean Export Processing Zone (EPZ) on the left bank of river Karnafully is already underway. The government is also contemplating the set-up of an exclusive Japanese Special Economic Zone (SEZ) in Bangladesh near Chittagong Port.

Cambodia

Cambodia has two ports. One is a river port in the capital of Phnom Penh and the other is located in Sihanoukville which is about 240 kilometres from Phnom Penh.

In order to cope with the rapid increase of the containerized cargo handled by the ports, work commenced started in 2002 to construct a new container terminal of 240 metres in length, (-) 9.0 metres in draft and equipped with two quay cranes, wharf and yard container handling equipment and a stacking yard of 65,000 square metres. The new container terminal will be operational by early 2004.

China

China has 50 seaports (with annual throughput of more than 1 million tons) and 60 river ports (with annual throughput of more than 0.5 million tons).

The total throughput is 2.4 billion tons, in which the container throughput is 27.5 million TEUs.¹⁴ Seven seaports have more than 100 million tons throughput. The port of Shanghai, with 221 million tons in total and 6.3 million TEUs of containers, became the second largest port in the world in terms of total volume, just after the port of Rotterdam, and fifth in terms of container throughput in the world.

The 1990s have witnessed a huge surge in China's port infrastructure construction with several Chinese ports registering as the fastest growing in the world. During the period of the 9th Five Year Port Development Plan (1996-2000), over 200 berths for containers, coal and petroleum were built alongside Chinese coastal areas to increase the cargo handling capacity to over a billion tons.

At Yantian Port, under phase II development, three container berths with a total area of 580,000 square metres, length of 950 metres and depth of (-) 15.5 metres and a designed annual handling capacity of 1.2 million TEUs were completed in 1999. At Dayaowan Container Terminal at Dalian, two container berths were completed in 1998.

In the Port of Shanghai, the Wai Gaoqiao Container Terminal was upgraded with an additional three berths of 900 metres in 2000 and two more berths of container terminals were added at the end of 2001. The Shanghai port area will also benefit from the US\$ 350 million dredging project that is now underway at the mouth of the Yangtze river to deepen the channel from (-) 7.0 metres to (-) 8.5 metres. By 2010, it is planned to have dredged to a navigable depth of (-) 12.5 metres.

As a part of the programme to build Shanghai Shipping Centre, Shanghai started a huge project-Yangshan Terminal development. Since the Huangpu river is quite shallow in depth, it is very difficult for Shanghai to find adequate space to build new terminals to meet its booming container traffic and larger vessels. Therefore, Shanghai planned to use Yangshan islands, which are two islands, 30 kilometres away from south Shanghai. In long term, the plan is to build a bridge for connections. The first phase of the project will be to build five terminals with a capacity of 2 million TEUs.

In China, the first FTZ was established in Tianjin in the 1980s. Now there are FTZs in the majority of ports, which helps to stimulate port development and the regional economy. Many logistics centres have been built around port areas. Some port cities and port authorities such as Tianjin, Qingdao, Shanghai, and Shenzhen have big plans for logistics parks. Such logistics parks are not only for break-bulk cargoes, but also for bulk, such as coal logistics in Tianjin and Qinghuangdao. Even some river ports, such as Nanjin, Wuhu, Congqing are also planning to build logistics parks to improve their competitiveness.

Shanghai Waigaoqiao Free Trade Zone is situated in Waigaoqiao district, at the northeast end of Pudong New Area of Shanghai. By the end of 1998, a total land area of 38.5 square kilometres had been developed, and a total of 19.5 square kilometres has been leased. It is the first and biggest comprehensive zone for economic and foreign-trade-oriented activities in China with a planned area of 10 square kilometres.¹⁵ By the end of 1998, over

¹⁴ All the figures here are for mainland China, not including Chinese Taipei and Hong Kong.

¹⁵ Pudong is symbolizing Shanghai's future and promise. It is not just an industrial area. It is a multi-functional area expanding up to 100 square kilometres by the end of the year 2000. Since the beginning of the development

3580 projects have been approved with a total investment exceeding US\$ 4.3 billion. Among them, 53 have been set up by Fortune 500 enterprises. The four pillar sectors of the zone are: export processing, bonded storage and distribution, international trade, and exhibition of bonded commodities.

With the improvement of the port facilities in the FTZ Waigaoqiao, the volume of international trade reached US\$ 1.5 billion in 1998, and the monthly average volume of the circular flow of stored freight in the warehousing industry had reached 300,000 tons per month. By the end of 1998, 2.9 million square metres of building floor space had been completed and 441,700 square metres of building floor space had been leased-out and/or sold-off.

India

The total capacity at the major Indian ports is expected to be 470 million tons at the end of Tenth Five Year Plan (March, 2007) against the envisaged traffic of about 415 million tons (about 88 per cent capacity utilization), it plans proceed as expected, this would signify a great relief to the existing overburdened ports.

The growth of container traffic has been fourfold over the last ten years, increasing from 0.7 million TEUs in 1990-91 to 2.9 million TEUs in 2001-02. It is forecast to be 5.1 million TEUs by March 2007.

At Chennai Port in India, work is underway on proposed extensions including a 290 metre berth, a 30,000 square metre parking yard and one container freight station (CFS) with additional equipment for two shore container gantries and two rubber-tyred yard gantries.

The Jawaharlal Nehru Port is implementing a major expansion plan of extending the container berths on a private investment basis for a capacity addition of 7.2 million tons per annum.

Korea, Republic of

At the Port of Busan, the New Gammon Container Terminal with four dedicated berths to accommodate 6,000 TEUs container ships was opened in 1997 and added 1.2 million TEU port throughput capacity. Three new additional container berths were completed at the end of 2001.

The completion of a huge Inland Container Depot (ICD) at Yangsan City near the Port of Busan, operational since April 2000 with an annual handling capacity of 1.4 million TEUs, will not only lessen the urban traffic congestion in Busan City but will bring improvement of container cargo flow through its integrated logistics functions.

New Busan port, a large new container terminal about 25 kilometres to the west of the existing Busan Port, is under construction with the participation of the private sector. This

and opening up of Pudong New Area, local economy has kept growing at a fast speed and in a healthy way. By the end of 1998, 88 world famous MNCs had made investment in 149 projects in Pudong. Among them, 21 have set up regional headquarters in the Pudong New Area.

project (total project cost US\$ 4 billion) will be completed in the year 2011 with the first phase (10 container berths) scheduled to commence operation in 2007.

The Phase I Container Terminal of Gwangyang Port (four berths of 1400 metres) was completed and started operation in 1998. The Korean Government plans to develop the 2nd Phase of Gwangyang Port (eight berths, US\$ 326 million) as a principal container port like Busan as a regional transshipment centre with four berths to be operational by 2002 and four more by 2004. Hutchinson Port Holdings together with two Korean partners, Hyundai Merchant Marine and Hanjin Shipping will operate this new container terminal.

The Korean government has recognized that the logistics function of ports is key gaining competitive advantages over competing ports in Northeast Asia. This led to the introduction of *The Act on Designation and Management of Customs-Free Zones for Fostering International Logistics Centres* in December 1999, which activates the establishment of customs-free zones (CFZs) in ports such as the Ports of Busan, Kwangyang, and Incheon. The main aim of establishing CFZs is to develop major Korean container ports as logistics centres in Northeast Asia can be summarized as follows:

- to promote the flow of international cargos;
- to attract foreign investment; and
- to activate the mutual growth of the port and port city.

In order to achieve these objectives various commercial activities are to be allowed in the CFZs, including loading, unloading, transportation, storage, exhibition, repair, sale or processing of goods, brokerage of international and international ship transaction, and other businesses related to international logistics. Also supporting businesses such as financing, insurance, customs clearance, and wastes collection or disposal are also permitted in the zones.

Malaysia

Based on the Malaysian government directive in 1993, Port Klang is currently being developed as Malaysia's national load centre and is envisaged as a hub for the region. Port Klang encompasses an area of 806 hectares comprised of North Port, West Port and South Port. Port Klang offers comprehensive state-of-the-art facilities and services for handling cargo of all types.

At the Klang Port Container Terminal of Port Klang, under the Klang Port Expansion Programme (1999-2003), Wharf No. 16 will be converted for container operations. Upon its completion, the container terminal will have six berths with a total quay length of 1,300 metres. The current Klang Port Container Terminal's handling capacity of 1.2 million TEUs will be increased to 1.5 million TEUs with a total yard area of 48 hectares. At the West Port of Klang, four new container berths (1,200 metres) are under development, costing M\$ 500 million, which will be translated to an additional port capacity of one million TEUs. By the year 2005, container throughput of the West Port will grow to 2.5 million TEUs with eight berths.

The North Port was designated a Free Commercial Zone (FCZ) in April 1993, followed by the West Port in June 1996, with the Port Klang Authority as the Free Zone

Administrator. In line with the Free Zones Act of 1990 and within the context of a FCZ, only commercial activities such as trading, breaking bulking, sorting, grading, re-packing, re-labeling and transit are allowed in Port Klang. Any form of manufacturing activity is strictly forbidden. However, simple manufacturing processes and operations including minor assembly may be allowed, with the approval of the Director General of Customs.

The Port of Tanjung Pelepas (PTP) is Southeast Asia's fastest growing port. At Tanjung Pelepas, commercial operations at two berths began in January 2000. Phase I with six berths starting operations in 2001 offers a total linear wharf of 2.16 kilometres. This was a project directly undertaken by a concession company under the privatization deal as the newest offering of a regional transshipment hub. This new port offers both large installed capacity and a full range of equipment to match its annual throughput capacity of 3.6 million TEUs.

In August 2000, PTP secured Maersk SeaLand, the world's biggest container operator, as a strategic partner with the commitment of bring an annual volume of 2 million TEUs to PTP. Maersk-SeaLand uses this port as a transshipment centre with investment participation. Also Evergreen began shifting operations to PTP in August 2002. Evergreen is expected to move more than one million TEUs per year through the port.

PTP currently provides 110,000 TEUs storage capacity, which is one of the largest storage facilities in the region. Comprised of both free commercial and free industrial zone, all users are exempted from various customs formalities. PTP also provides facilities for value-added activities. With 400 over acres of land reserved for distribution, logistics and warehousing activities, PTP envisions a Distripark with activities for consolidation, international procurement centres and regional distribution centres. PTP provides built-up warehouses for lease of bare land for sub-lease. An additional 600 acres of land have also been reserved for industrial activities.

PTP is expanding its logistics capacity as it plans to lure even more business, especially transshipment. MIEL Logistics Sdn. Bhd. has so far invested US\$ 26 million to develop a logistic centre at PTP. The facility is located on 3 hectares or land in the Free Commercial Zone of PTP. PTP has, to date, secured main anchor tenants including Pelepas Logistics, Kenwood Logistics, Maersk Logistics, Tiong Nam, Usra and JB Cocoa. The establishment of these logistics centres within PTP's Distripark is expected to further spur logistics activities at PTP and tap the large consolidation market away from Singapore, while at the same time, acting as a catalyst for the regional economic development.

Philippines

At the South Harbour of Manila Port, Asian Terminals Inc (ATI) plans to invest on AG&P properties to provide the container division an additional 742 TGS (21 ground slots) for laden containers. The P 126 million development project will give way to 240 TGS for empty container storage, 52 truck parking bays and a transit area, as well as modern office facilities for ATI personnel and shipping lines.

In 1992, the Philippine government created in former United States Naval base at Subic Bay an export oriented free port¹⁶, governed by the semi-autonomous Subic Bay Metropolitan Authority (SBMA). The SBMA is operating the 67,000 hectares area of Subic Bay Freeport (SBF) as a self-sustaining industrial, commercial, financial, and investment and academic centre to generate, among others, employment opportunities in and around the zone.

SBF is a major base for Federal Express, one of the world's largest logistics service provider. SBF created US\$ 2 billion worth of investments in a span of four years (1993-1996) and total employment at SBF reached an estimated 50 thousand in 2001.

Sri Lanka

The Sri Lanka Port Authority (SLPA), which was set-up by an Act of Parliament in 1979, administers and operates all specified commercial ports in Sri Lanka. The Port of Colombo being the premier port in the country has naturally become the focal point of the all port development activities in Sri Lanka since the formation of the SLPA.

At Colombo port, under the North Pier Project, the North Pier is planned to be widened to 120 metres and will be utilized for container and general cargo handling. In the second phase, 90 metres of the pier will be completed and it will be equipped with three quay cranes and six transfer cranes with a handling capacity of 230,000 TEUs per annum. The terminal will also be utilized for general cargo handling. The Sri Lankan Government, the Sri Lankan Ports Authority and a private sector developer have initialized the primary project agreement with regard to the terminal development via a BOT scheme. The present quay will be expanded by 100 metres towards the harbor basin and three container berths will be countered with nine quay cranes and 28 RT transfers increasing the box handling capacity to one million TEUs per annum by early 2004 from the current 0.3 million. Additional feeder berths will be provided to improve the feeder container handling efficiency at Colombo Port. Approximately 70 per cent of the containers handled in Colombo port are transshipment cargo.

Taiwan Province of China

Taiwan is striving to improve its logistics and customs operations to become a regional transshipment and supply chain hub. In support of this endeavor, the Taiwanese government passed The *International Logistics Centre Operation Act*. Consequently upon the passing of this new act, the government has been modifying related regulations and laws. Accordingly, Taiwan Customs have made adjustments to management and custom inspections.

The *International Logistics Centre Operation Act* focus on regulations affecting the establishment of logistics centres. Approval to establish logistics centres will normally be restricted to governmental sectors, public institutes, and agencies approved by the government. The approval of other agencies is restricted to corporations of limited liability with capital of no less than NT \$ 300 million.

¹⁶ The Subic Bay Free Port Zone encompasses not only the former naval base but also an adjacent area in other provinces.

Locations for international logistics centres should be inside or near port areas, export-processing zones, industrial parks, airports, or other areas considered appropriate and permitted by the Customs or related regulations. Since all land occupied by commercial port is state-owned and the use is governed by the state-owned properties law, property can be made available only on lease and cannot be otherwise disposed of.

The facilities in large scale logistics centres can be utilized solely by their operators or partially on lease arrangements. The cargos of the leaseholder should fall under the full control of the centre. Every logistics centre is a free trade zone, except for reporting requirements at the customs for inbound and outbound movement, cargoes are free for self-operations. Logistics centres may use electronic transmission systems to control clearance without the need for Customs officers to be present.

The Port of Kaohsiung and Yangming Marine Transport Corporation have jointly commenced on the development an international logistics centre. The project, expected to cost NT\$ 300 million, will occupy 1.4 hectare and includes a six-storey high-tech building and a two-storey computerized warehouse. Under the BOT scheme, the interests of the building will be transferred to the government after a specified period of operations.

The location of Yangming's logistics centre is in the proximity of the container terminal of the Port of Kaohsiung. The site is considered to be the ideal location to attract international businesses to set up their own logistics and distribution centres in the Asia Pacific. By operating an international logistics centre at the Port of Kaohsiung, Yangming is expected to extend its logistics and transportation service on a greater scale both regionally and globally.

Thailand

In Thailand, maritime transport carries 96.2 million tons or 86 per cent of the total freight volume. Keeping in step with the global practice of container shipment, most of the general cargos have been containerized and these are handled mainly at the Bangkok Port and Laem Chabang Port situated in the Eastern Seaboard.

These two ports are focusing on developing different strengths Laem Chabang port (LCP) will continue to expand facilities for serving increasing demand while Bangkok port, which is limited by its access channel and traffic problems in the Bangkok area, will optimize its efficiency and service levels.

With an annual turnover of some 2.5 million TEUs, LCP is the main container port for the country. It is faced with the challenges of coping with continuous growth in containerized cargos, the gradual migration of containers from Bangkok to the Eastern Seaboard. LCP has launched a vast expansion plan by constructing a second basin for six container terminals, handling 2.6 million TEUs annually. These terminals will be leased out to private operators. The first terminal with annual capacity of 600,000 TEUs has been completed and is presently in the stage of bidding. Soon two other terminals will follow to keep pace with the current 8 per cent, or some 200,000 TEU annual growth rate. After completion of the two basins, the container throughput will increase to 5.1 million TEUs per annum.

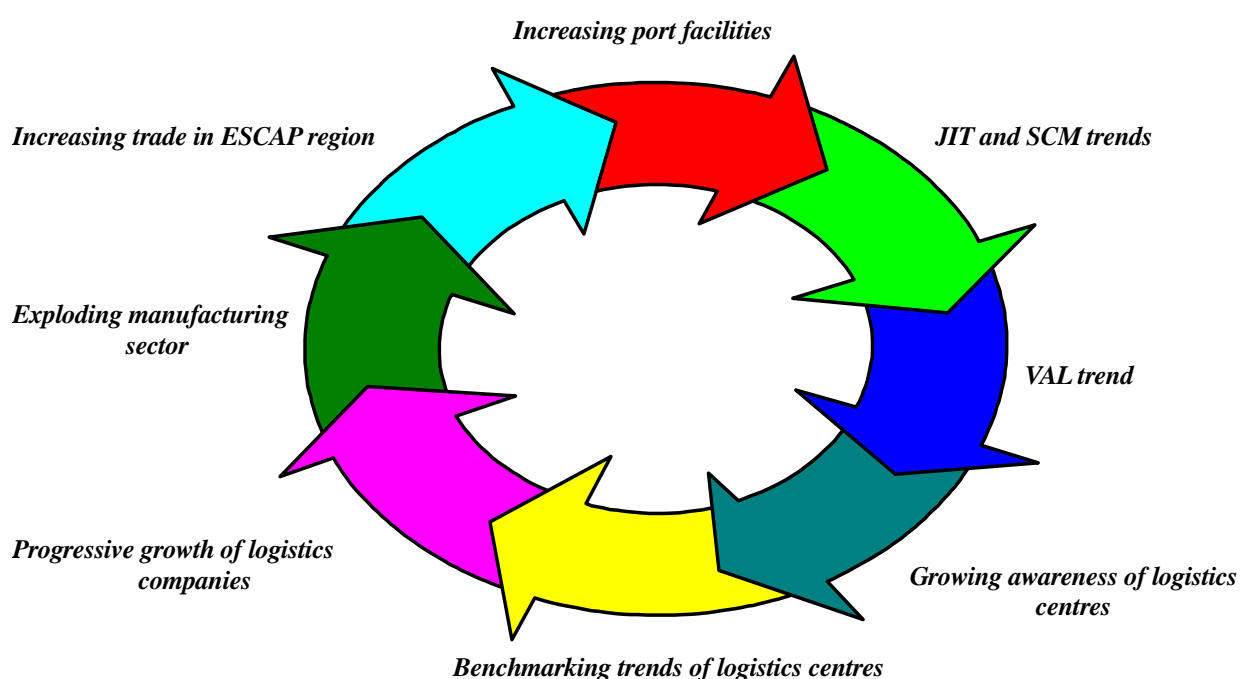
Viet Nam

In October 1999, Government Decree 2002 approved the Master Plan for port development until 2010 and provided orientation and policy for port development. The Master Plan of port development for the period 2010 and 2020 focuses on the development of ports in 8 groups, 9 projects from 2003, 7 projects from 2010 with total investment capital of US\$ 1,237 million (2003), and US\$ 2,541 million (2010) respectively. Total cargo volume is projected to reach 106 million tons by 2003 and double by 2010.

B. Opportunities and problems

There are sound reasons to believe that the outlook for ports in the ESCAP region to become logistics centres is bright, provided they take proper steps to be competitive. Figure V.1 shows a continuous circle of strengths and opportunities for ports in the ESCAP region with regard to developing logistics centres.

Figure V.1. Strength and opportunities for ports in the ESCAP region



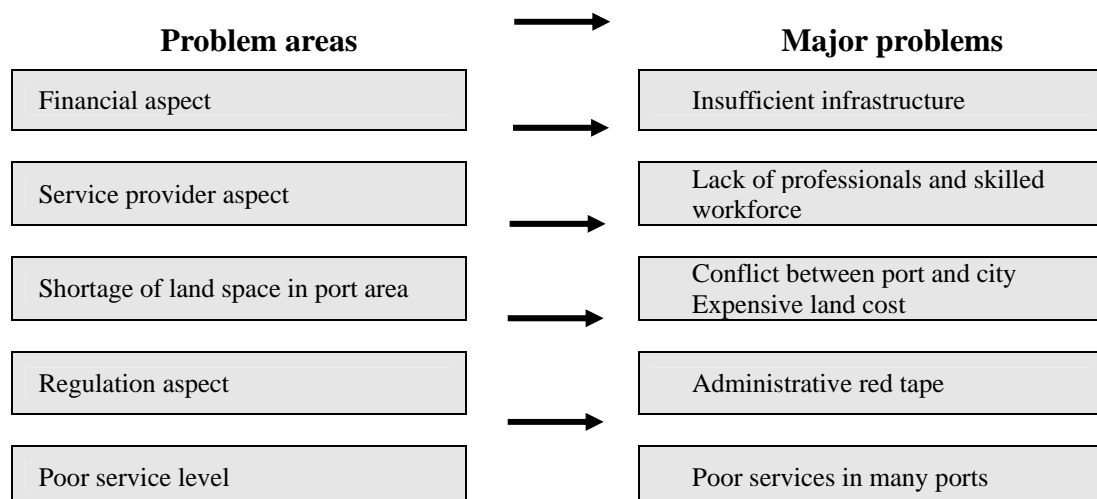
Growing trade among ESCAP countries will result in growth in container traffic in the region and consequent port facilities to handle cargo. It is probably accurate to relate the increased volume of containers to the strategic necessity of the logistics centres in ports. Increases in container shipping are eventually encouraging the use of logistics centres. As the volume of container shipments increases, it is more and more likely that the shippers are strategically driven to a value-added, time-based logistics pattern.

Further, there has been a significant shift from the conventional way of production to more time-based, JIT-type production in conjunction with SCM system in the manufacturing sector in the ESCAP region. The trend of JIT and SCM has been widely accepted to improve inventory management and shorten lead time in the distribution channel.

The trend in the adoption of JIT and SCM increase the demand for logistics centres in ports by MNCs and logistics firms in an effort to drive improved customer service. They use ports and adjacent land to create value through VAL services. With growing recognition of the benefits of logistics centres, port authorities and governments in the ESCAP region are benchmarking advanced ports in developing logistics centres in port areas.

The last factor which contributes to and shapes the efficient building of logistics centres in ports is the existence of competitive logistics companies such as 3PL service providers. The value of 3PL in the development of logistics centres cannot be overestimated. Moving from a simple logistics company to a problem solver then to a customer care provider and finally to a professional 3PL service provider is the key to the successful operating of logistics centres in ports. The experiences of advanced ports around the world demonstrate that the increased use of 3PL service providers is closely related to the operation of logistics centres in ports. While many experts view the outlook as bright, it should be emphasized that a lot of deficiencies and problems will need to be solved if individual ports in the ESCAP region are to succeed in building logistics centres. Across the ESCAP region, there are substantial barriers to the building of logistics centres behind port areas. These problems are addressed below. See figure V.2.

Figure V.2. Barriers to building logistics centres in the ESCAP region



Insufficiency of port infrastructure and related facilities for logistics activities is the most prevalent problem in the ESCAP region. Lack of professional logisticians and skilled workforce is an other example. The level of third-party logistics industries in the region is viewed negatively and global standard service levels are still rare. Expensive land costs behind port areas may also restrict the construction of logistics centres in some countries. The

lack of government support and other institutional programmes in some of the ESCAP countries are also considered a hindrance to growth. Poor service levels in the ports compared to the western ports adds to the weaknesses for the region's competitiveness.

(a) *Constraints in infrastructure*

There has been a sharp increase in container volume within the region. Since the late 1980's, the growth rate of container traffic has exceeded that of other regions. The container throughput of the ESCAP region has been flourishing ever since the industrialization of the 1980s. It should also be noted that more than 50 per cent of cargo shipments worldwide originate from, or are headed for, the Asia-Pacific region. Demonstratively, the market share of container traffic in the ESCAP region is presently estimated to approach 60 per cent of the global total.

International transport is one of the leading growth industries in the ESCAP region. Its development depends on the development of the Asian economy as a whole. Despite regional variations and development levels among member countries, traffic demand has experienced virtually uninterrupted growth since the 1980s. In general, traffic demand runs in parallel to growth in GDP. This general pattern of growing demand is likely to persist if the current pace of economic growth is maintained.

It is forecast that the total container volume in the ports of the ESCAP region will increase from 94 million TEUs in 1999 to over 155 million TEUs in 2006. The volume will grow to around 216 million TEUs in 2011 (Ha, 2002). Already the container volume in the ESCAP region now surpasses other regions such as North America and Europe, whose container traffic is very much matured, in terms of their market share of world throughput.

In order to handle the anticipated port container traffic in 2011, it is estimated that a total of 434 new dedicated berths will be required. This requires very significant capital expenditure estimated at approximately US\$ 27 billion. Moreover, substantial additional investment will also be required to secure adequate access to terminals and to build logistics centres in port areas.

However, as the overall investment in ports and related facilities has been too limited the ability of the region's ports to absorb the growing demand appears doubtful. As such, a shortage of basic capacity will be a general problem among the ports of some major ESCAP countries in the near future.

(b) *Lack of professionalism and third-party logistics providers*

Well-developed 3PL is the key to efficiently and effectively operating port logistics centres. Many logistics experts agree that the key in operating logistics centres is highly competent 3PL service provider. However, there is still a great deal of concern that the current situation of the 3PL industry in ESCAP region, combined with the lack of professionalism in 3PL service providers, these factors will have a negative impact on the development of VAL services in the region. As such, ports in the ESCAP region should concentrate their efforts on cultivating and developing professional logistics companies, especially those in the 3PL service sector. Only by doing so can they hope to become advanced logistics ports.

The provision of a skilled workforce is also essential to the management of logistics centres in ports. Increasing the traffic volume in the logistics centres will require a greater supply of highly skilled workforce in logistics centres. Many multinational logistics companies evaluate the labour force's ability to handle automated and technological equipment as poor in the ESCAP region. International logistics is, by nature, highly dependent on the IT capabilities of the workforce. The success of the Netherlands and Singapore has heightened the importance of ensuring that the workforce has good IT capabilities.

(c) Expensive land for the development of logistics centres

Some ESCAP countries, especially Japan, Singapore and the Republic of Korea, still have many problems with regard to high land prices or rental fees for the port logistics centres. See table V.1. Since the emergence of VAL services at ports, some countries in the region have started to develop vast areas of land for logistics centres behind port areas. But the costs of development are still too expensive for MNCs and logistics firms to locate their logistics centres in the region.

(d) Inefficient administrative procedures

Overly complex administrative procedures and bureaucratic attitudes among government officials in the ESCAP region can also be an obstacle to developing logistics centres in port areas. It is frequently indicated that government officials in the ESCAP region are more bureaucratic than their counterparts in the West. If such bureaucracy, such as lengthy and complex customs procedures, is not kept in check, multinational firms may be less likely to invest in the logistics centres in the ESCAP region.

Table V.1. Land costs for port logistics centres in selected economies in the ESCAP region

(US dollars)

	Land costs/m ²	Office rental cost/months/m ²	Housing rental fee
Beijing/Shanghai	82 (Economy Development Areas)	50	5000
Chinese Taipei	193	17.3	1,527
Chonan, Korea	110 (Foreign Investors Complex)	30.8	1,990
Hong Kong, China	368 (Tai Po Complex)	38-57	2,584-4,651
Singapore	9.28-20.5 (Jurong Complex)	34.6	2,632-2,806
Yokohama, Japan	1,185	26.0-31.6	3,672-5,508

Source: Korea Maritime Institute.

(e) Poor service level at ports in the ESCAP region

In addition to infrastructure problems, service levels at ESCAP ports have become fairly low in comparison to the advanced ports around the world. Many ESCAP ports have been under pressure to deal with increasing cargo volume. The low level of service at these ports, regarded as one of their biggest weaknesses, will hamper their competitiveness in the

near future and become a barrier to regional ports' efforts to forge logistics centre oriented policy. The levels of service at major regional ports, as evaluated by Korean shippers and shipping lines, are shown in table V.2. Overall, the service levels at ESCAP ports are evaluated as being much lower than their European and U.S. counterparts, with the exception of Singapore and Yokohama.

Table V.2. Service levels at twenty major world ports

Rank	Port	Degree of Satisfaction	Rank	Port	Degree of Satisfaction
1	Rotterdam	0.970	11	L.A	0.836
2	Hamburg	0.940	12	New York	0.830
3	Singapore	0.930	13	Antwerp	0.810
4	Seattle	0.900	14	Felixtowe	0.810
5	Yokohama	0.900	15	Bremer Haven	0.800
6	Long Beach	0.870	16	Le Havre	0.770
7	Oakland	0.860	17	Kaoshiung	0.738
8	Tokyo	0.860	18	Keelung	0.667
9	Hong Kong	0.850	19	Bangkok	0.560
10	Kobe	0.840	20	Busan	0.550

Source: The Federation of Korean Industries, *Policy Agenda for Increasing Port Competitiveness in Korea*, 1997.

Note: Evaluated by Korean Shippers and shipping lines.

VI. GUIDELINES FOR DEVELOPING LOGISTICS CENTRES IN PORTS

The preceding sections have identified trends in logistics and a range of practices, in several ports not only in the ESCAP region but also in other parts of the world. Taken together, these findings provide some guidelines, which might be helpful for other ports in the ESCAP region in order to draw upon the experiences of a few of successfully restructured ports. The guidelines listed below are not intended to be prescriptive models for all ports to follow. Rather, they are intended to serve as a helpful resource which other ports in the ESCAP region may follow, if they would so choose.

- Effective Planning and Development of Logistics Centres
- Institutional Incentive Scheme
- Development of Free Trade Zones
- Financing Infrastructure Related to Logistics Centres
- Developing 3PL Service Providers and Logistics Professionals
- Development of Information Technology
- Regulatory and Administrative Issues

A. Effective planning and development of logistics centres

Objective: To utilize a system-oriented approach for planning and developing ports, associated logistics centres, and city functions.

Collaboration between the port and logistics centres is crucial for the success of port. However, in the past, the planning and development of port and logistics centres has been approached in an isolated manner. The problem basically boils down to an insufficient understanding of logistics centres in regional ports and a lack of integrated planning. There is a need for a systems-oriented approach to planning and developing ports, associated logistics centres in port areas, and city functions to meet the demands of shippers, port users, and citizens.

Action 1: Ports should, in advance, prevent the use of land space behind them for random development or without regard to port-related functions.

One of the reasons why the lack of logistics centre has become a salient issue in the ESCAP region is because governments have not adequately understood the importance of sufficient land space for developing logistics centres. That is, the general practice in developing ports in the past have given little consideration by port authorities to securing sufficient land space for the development of logistics centres. Consequently, the shortage of land space has led to difficulties in building logistics centres at most city ports in the ESCAP region. Ports should place a high priority, in advance, on preventing the land space behind them from being used for random developments or from being used without regard to the original port and port-related functions.

Legislative measures should to be taken to control port land extending beyond the boundaries of the port. Otherwise, ports will continue to be beset by problems of competing land uses through out its life. Even if port authorities set up a long-term plan, their time and

efforts would fail, if they are unable to maintain the consistent control of land necessary to execute that plan. Therefore, it is desirable for a port to control all its land resources.

Even with full control of land-use, ineffective management practices can cause problems. Examples of such problems include the granting of contracts to use port land for purposes which extend far beyond the economic life of the activity and afterwards become an embarrassment and a frustration to the port¹⁷.

This example indicates that all port contracts for land should be drawn up to cover use, level of activity and time duration. Therefore land use management policies must aim at:

- retaining operational land in operational use;
- retaining maritime industrial land at an appropriate level of industrial use;
- ensuring that full economic use is made of occupied areas;
- making it possible to recover land from obsolescent and obsolete uses for redevelopment; and
- phasing contracts as closely as possible to the life of the activity.

Measures to provide for the use of dredged land areas or other land provision matters can make a useful contribution to building logistics centres in ports. An example of a best practice in the development of logistics centres can be found in the Port of Rotterdam, which has succeeded in transforming the barren land along the port area into sophisticated and highly successful composite logistics centres.

In Rotterdam, the first logistics centres were established in old port basins, next to the existing container terminals in the Eemhaven Region. Construction of the Botlek Distriparks followed. In the 1980s, as the container trade started to grow substantially, the Port of Rotterdam redeveloped Maasvlakte, a large port basin originally developed in the late 1960s but remained empty because of stagnation.

Action 2: Measures should be taken to integrate the objectives of city development into logistics development policies especially with regard to improving the harmony between city functions and port functions including logistics centres.

Activities in logistics centres may cause a number of problems, including water and soil pollution, dust pollution, land intrusion, traffic congestion and other problems inherent to port activities. Although the resulting social costs are impossible to quantify, they still remain a substantial burden to the supporting city. Consequently, reflecting the logistics centre development into the city development plans is a vital component of integrating city development objectives into logistics development policies, especially with regard to improving the harmony between city functions and port functions.

¹⁷ Suppose a case that port grants a 50 years contract of site in port areas for the use of conventional industrial activity. Twenty years after the contract was granted, that industrial activity may cease to be viable. Nevertheless, the port may be denied economic port use of the area for a further 30 years if the contract contains no clause to cover this eventuality.

In this regard, for the development of logistics centres in port areas, more attention must be paid to the development of city-related functions, international conventions and other related facilities as well. In turn, building convention centres or trade related facilities would provide new sources of commercial impact for the port industry in the ESCAP region.

Summing up, strengthening city-functions and creating an internationally competitive urban setting in conjunction with logistics centre development will attract major service and trade related activities to the port region. The Port of Yokohama in Japan is an example of success in redeveloping an older port area, a site where conventional berths used to be, has been replaced with a complex of urban and logistics area with composite facilities including hotels, offices, department stores, and logistics centres. The Port of Yokohama succeeded because of its use of sophisticated plans and effective connections with the city development, its early retrieval of development expenses through land sales, and direct supervision of the marketing of logistics facilities by top management of the port and city authorities. Therefore, actions for planning and developing logistics centres should include effective harmonization with city development plans, functions and facilities.

Action 3: Regional ports should approach partnership and conduct in-depth research in planning and developing the logistics centres in port areas to prepare for future requirements, to avoid possible conflicts among all parties involved in the development, and to promote integrated and rapid development.

Planning and developing the logistics centres in ports involves parties at all decision-making levels: the central government, local governments, port authorities, shippers, the logistics companies, and so on. In this regard, coordination and cooperation are essential among them to promote integrated and rapid development. In order to achieve such integration, the public authorities (including governments and the planning agencies) and the users should form a “task force” or “partnership.” Furthermore, in-depth research should be conducted in planning and developing the logistics centres in port areas to prepare for future requirements.

A legal framework enshrining the principles of consultation and compromise should be set up to institutionalize a processor public participation process. In such cases, it is mandatory for port authorities/agencies in charge of developing logistics centres to document their proposals, and the expected impacts of the proposals. In the course of documenting their proposals for public consideration, some alternatives may be offered to gain community acceptance. Ports, which involve the public in their planning and development stages of logistics centres, generally succeed in having their vision as commercial logistics centres realized.

The need for this partnership approach is nowhere more evident than at the close interconnection between land transport and logistics centre. Since it is essential for ports and logistics centres to have easy access to inland transport and close inter-connection between them to perform their functions properly, providing or improving rail and local road access into logistics centres should be one of the highest items on the agenda for ports in the ESCAP region. To achieve an efficient, seamless transport and distribution system, the Integrated Transport Strategy of the Sydney Ports Corporation demonstrates that land transport is of no less importance than adequate port facilities and services (Hayes, 2002). Consequently, co-

ordination is required among ports, rail operators and local authorities with strong assistance from the government with regard to land, roads, railways, and energy. The cooperation that exists between all parties concerned at the Japanese ports to develop ports and logistics centres (Free Access Zones) may serve as a good guideline for developing ports in the ESCAP region.

B. Institutional incentive schemes

Objective: *To provide MNCs and international logistics service providers with institutional incentive schemes such as tax incentives and other supporting schemes to establish their logistics centres in ports.*

Developing logistics centres requires a long construction period and large investments. Considering the examples from successful ports, tax incentives and other supporting schemes are essential for developing the logistics centres. Ports and relevant government agencies should accordingly support the MNCs and international logistics service providers through tax incentives and other schemes to attract their operations in their port regions.

Action 1: *Ports should provide a variety of incentives, such as pioneer status, preferential taxation, loan guarantees, credit insurance, low-interest financing and bonded services in the development of logistics centres.*

Table VI.1 shows the various tax and other incentives used to support logistics centre investors in selected economies in the ESCAP region.

Table VI.1. Tax favors and incentives for the logistics centre behind port in selected economies in the ESCAP region

Country	Tax and incentives for the construction of logistics centre in ports
China	15% of tax on juridical persons levied. If a firm operates D.C. more than 10 years, tax on juridical persons will be exempted for a specified period of time. When the specified period expires, 50% of tax will be exempted.
Hong Kong, China	16% of tax on juridical persons and 15% of property tax levied. No tax on interest income, dividend income etc.
Taiwan Province	In Export Processing Areas, import tax, commodity tax and trade tax will be exempted. In Science Industrial Areas, tax on juridical persons will be exempted for 4 years when a firm increases its facilities.
Japan	35% of tax on juridical persons and total tax on permanent asset will be exempted for firms that employ more than 20 workers for 5 years.
Singapore	Economic Development Board and Trade Development Board provide various incentives. 10% of tax on juridical persons levied. Over depreciation system adopted.

An example of some best practices in embarking on an active campaign to encourage MNCs and a number of international logistics service providers to establish their logistics centres can be garnered from the Port of Singapore, which has succeeded in transforming the city-state into a logistics hub for the region through various incentive schemes such as pioneer status, tax exemptions, and so on.

Japanese ports also provide examples of a variety of incentives, including preferential taxation, loan guarantees, credit insurance, low-interest financing and bonded services in the development of logistics centres (FAZ). Table VI.2 shows detailed incentive schemes in Foreign Access Zone provided by Kobe city and the Japanese government. Further examples from other successful countries make it clear that tax and other incentives are essential for efficient logistics centre construction.

Table VI.2. Incentives for Kobe FAZ

1. Incentives For The Import Related Enterprises In The Special Concentration Zones				
Classification	Authority	System	Targeted Businesses	Conditions
Tax Reduction and Exemption etc.	Central	Special depreciation allowance on machinery and building	Transportation Manufacturing Wholesale Retail Packing	Periods: February 19, 1997-March 31 2002 Condition: When acquiring assets subject to depreciation such as machinery and building. Limited Amount = Regular depreciation Amount + Special depreciation Amount (Building 10%, Machinery 22%)
	Prefecture	Real estate acquisition tax on a differential basis	Import Cargo Distribution Promotion Set Up Facilitator	Period: February 19, 1997-February 19, 2002 Condition: (1) Facilities acquired at a cost of 300 million yen or more and used by the business(es) for sorting, storage purposes etc. Applies to facilities which are newly built or expanded on or after April 1, 2000. (2) When establishing exhibition or conference facilities for unspecified users. Tax Rate: Regular 4% to 2%
	City/ Town/ Village	Fixed assets tax on a differential basis	Import Cargo Distribution Promotion Set Up Facilitator	Period: February 19, 1997-February 19, 2002 Condition: (1) Facilities acquired at a cost of 300 million yen or more, and used by the business(es) for sorting, storage purposes etc. Applies to facilities which are newly built or expanded on or after April 1, 2000. (2) When establishing exhibition or conference facilities for unspecified users. Tax Rate: Regular 1.4% to 1st year 0.7%, 2nd year 1.05%, 3rd year 1.225%
		Special property tax exemption	Processing Wholesale Retail Transportation	Period: February 19, 1997-March 31, 2002 Condition: When acquiring property for import cargo processing, sorting or storage facilities new buildings or remodeling.
Duty Guarantee/ Credit Guarantee	Funds	Loan guarantee for the Industrial Structure Improvement Fund	Transportation manufacturing Wholesale Retail	Equipment Capital: Period within 10 years working Capital: Period within 5 years Limited Amount: 10 billion yen (When over 1 billion yen, national approval is required.)
	Financing Corporation/ Council	Special examples of small to mid-size company credit insurance	Transportation Manufacturing Wholesale Retail	Credit guarantee council rate 80% (Regular 70%) Insurance rate of small to mid-size company credit insurance financing corporation: Draft discount (0.25%), No collateral (0.29%)

2. Government Financing Agency with Low Interest Loans		
Agency Name	System	Eligible Businesses
Development Bank of Japan	“Financing Programme for Import Facilities Enhancement”	Prepare equipment and facilities for foreign companies to establish a sales office in Japan or for Japanese companies to expand their import products. *Expenses such as rental fees and damage insurance premiums are also applicable for new foreign businesses.
	Low Interest Loan	Direct construction expense of specified facilities by civil law. (Maximum 50%)
Small Business Finance Cooperation	“Loans to Facilitate Import Sales”	Necessary equipment capital and operation capital to expand import product sales for small to mid-size retail and wholesale companies. The amount available for low interest loans will be increased for import wholesalers and retail businesses based in or conducting business in the FAZ.

Source: Port of Kobe.

Action 2: Port authorities or relevant government agencies should try to accept delayed financial returns when providing land for logistics centres, in order to attract investment of MNCs and international logistics companies in their port regions.

Whether major logistics firms or manufacturing companies are willing to invest will depend on the price of land provided by the ports. While the government or ports will try to provide the land at a fair value, MNCs and logistics companies will try to lower the value to a level where they can assure making reasonable returns, thereby resulting in a conflict between the two parties. As such, attracting investors will depend on the degree to which the ports can accept delayed returns, and how much investors are willing to pay for the land or buildings.

Some ports in the ESCAP region, especially Japan, Singapore, Hong Kong, Chinese Taipei and Korea, still have many problems with regard to high land prices or rental fees for the port logistics centres. Since the emergence of VAL services at ports, some economies in the region have started to develop vast areas of land for logistics centres in port areas. But the costs of development are still too expensive for multinationals or logistics firms to locate in the region.

A measure to provide land at affordable prices by exploiting intensive utilization of land by constructing high rise building can be an option as in the case of Hong Kong. See box VI.1. Another measure for the ESCAP economies to induce as many multinational firms and logistics companies as possible to the port areas is that the government and port authorities should lower land related costs in developing the vast land areas. Although lowering the cost of land will likely mean much slower returns on investment, cheaper land costs could help to differentiate the port from other emerging competitors by attracting more investors into the logistics centre. Subsequent growth in port region's employment and tax revenues will be expected.

Box VI.1. ATL Logistics Centre Hong Kong Ltd.

Logistics Centre is the world's first and largest intelligent multi-storey drive-in cargo logistics centre designed for fast turnaround of cargo. Conveniently located in the heart of Kwai Chung Container Terminals and within near reach of Hong Kong's commercial and population centres, airport, as well as the Mainland border, the Centre offers warehouse and leasing as well as a full range of cargo handling, a container freight station (CFS) and distribution services.

ATL Logistics Centre is comprised of 7 floors at Centre A and 13 floors at Centre B providing over 9.3 million square feet total floor area and over 6 million square feet leasable area to CFS, Logistics, Air-freight and all kind of business operators under one single roof.

It has 3 lane ramp (2 lanes up and 1 lane down) for vehicular access and its traffic throughput is average 8,000 vehicles a day.

**C. Development of free trade zones**

Objective: To establish Free Trade Zones as part of wider port policies aimed at inducing port traffic and producing value-added services by attracting logistics centres of MNCs and international logistics companies, thereby increasing employment and tax revenues in the local economy.

In order to lead global logistics within their respective regions, logistics centres in the Netherlands, Singapore, and Hong Kong have consistently expanded their logistics facilities such as ports and airports. Using such facilities as a base, they have actively established FTZs as part of their efforts to consolidate and centralize logistics management. These ports, each of which is a major regional logistics centre, have become favorite locations for global firms. Assistance given to the Japanese ports for building ports and logistics centres (FAZs) may serve as a good institutional guideline for the developing FTZs in ports of the ESCAP region.

Action 1: In order for the FTZs to function effectively, ports and relevant government agencies should eliminate or reduce the unintended costs or obstacles associated with tax and trade laws.

A FTZ has long been considered as a way to contribute to the efficiency of international trade and logistics services. Furthermore, a FTZ has long been a part of wider policies aimed at attracting port traffic and producing value-added services by attracting logistics centres, thereby increasing employment and revenue in the local economy. The setting up of FTZs to facilitate entrepot trade in dutiable and quota-restricted goods contributed to today's success of Singapore as a logistics and business centre in Southeast Asia.

There are currently 845 free trade zones that offer comprehensive logistics and production capabilities (UNCTAD, 1999). There is, however, no uniform pattern for a free trade zone in the world. Rules governing the zone vary greatly from one country to another. Singapore and Hong Kong have a long history of free trade zones in ports. Japan and Chinese Taipei have already established FTZs in several ports and developed logistics centres in the zones. China has actively developed logistics centres through large-scale foreign capital injection beginning in the early 1990's, adopting a free trade zone system to ensure the free trade of global firms. Recently developed Port of Tanjung Pelepas in Malaysia is aggressively developing FTZ for distribution, logistics and industry to cater to increased traffic.

A notable exception is in the Netherlands' distribution parks, which are not FTZs. However, each company within them can be considered as a free zone, or a "free point," in and of itself. In the Netherlands, there are approximately 1,500 of these free points. The Distriparks can offer freer facilities than a free port. When a company fulfills certain conditions with respect to security, and when it has established an on-line computer connection meeting certain standards with Customs, it may obtain a license from the customs permitting it to carry out certain basic customs formalities by itself. Such a system makes the goods flow faster and more efficiently.

Summing up, FTZs are intended to promote host country's participation in trade and commerce by eliminating or reducing the unintended costs or obstacles associated with host country's trade laws. Of course, this is not an easy task or one that could be accomplished in a short period of time. Therefore, legal and institutional procedures should be arranged in a continuous and integrated way.

D. Financing infrastructure related to logistics centres

Objective: To make the best possible use of limited funds and to maximize the effectiveness of the respective roles of all parties concerned.

Financing the development of logistics centre in port regions poses a number of major problems. Since the volume of port traffic in the ESCAP region will continue to grow for many years to come, the ports must make massive and sustained capital investments to meet the demand.

In addition, a particular consideration should be given to the additional investments required to replace existing older and deteriorating infrastructure in many of this region's ports. The physical conditions of existing port facilities are several decades old and will be unable to meet the minimum standard that will be required of port services in the future. Furthermore, the life cycle of most existing port facilities will come to an end, thus compounding the burden of cargo handling and traffic movement. Consequently, future investment will need to be made not only in new port facilities, but also in replacing older ones. Furthermore, considering the huge demand for financial resources for the development of the Chinese port sector, fierce competition will arise for financial resources with those of other economies. These facts will certainly have a great effect on the capabilities of infrastructure financing in the ESCAP region.

Action 1: High priority should be placed on financing infrastructure including port facilities and related logistics centres to meet the growing demand for logistics activities.

The above mentioned facts imply that ports and logistics facilities have to put more emphasis on financing infrastructure including port facilities and related logistics centres. In many cases, however, the central and local governments in the ESCAP region do not have the proper funds to develop even basic port facilities. Consequently, at present, they do not place high priority on developing logistics centres in port areas.

The need to make the best possible use of limited funds will require that every effort from all parties concerned should be made to maximize the effectiveness of their respective roles. This clearly implies that the public sector's investments are intended to support the infrastructure only, whereas private investors provide the superstructures in most cases.

Furthermore, progress towards the privatization of the port and related facilities has to be continued. This will bring greater operational efficiency, reduced labour costs and less bureaucracy through the invisible power of free enterprise. But before promoting participation of the private sector, a clear and systematic framework for regulation and supervision has to be established to restrict monopolistic and unfair practices that might be exercised by the private sector.

Action 2: Measures should be taken for better utilization of existing facilities and innovative approaches to financing relevant infrastructure of logistics centres.

To overcome severely limited financial capacity in the region's logistics centres in ports, the following measures should be taken. First of all, careful planning and sound investment will be needed to avoid over-capacity and unprofitable operations while assuring continuous growth. Also, to overcome the chronic shortage of facilities, new approaches to financing infrastructure have to be adopted. The most significant may be the strengthening of private sector participation in the development of logistics centres. Already, the range of private sector participation is very wide, from straight-forward BOT (build-operate-transfer) to the extreme case of complete privatization with no government involvement. History shows that the private participation in the development of logistics centres has led to greater efficiency and reduced lead times for development. However, in many cases including the Republic of Korea, protracted negotiations over the terms of BOT developments have actually delayed the development of the logistics centres and related infrastructure. In order

to induce private capital for the development of logistics centres, ports in the region will have to provide more favourable institutional, regulatory and administrative environments in a timely manner, and share the risks in the approach.

E. Developing 3PL service providers and logistics professionals

Objective: To improve the quality of logistics service providers, and to develop a solid workforce of logistics professionals.

In many cases, policymaking in the logistics sector has focussed on ‘hard’ factors instead of ‘soft’ factors. Particularly, the ESCAP region has hardly paid attention to ‘soft’ factors such as policy to develop professionalism and manpower in the logistics industry. These soft factors became important during the late 1990s. To do business in foreign markets, MNCs need the capacity to handle a variety of factors, including the new and uncontrollable economic environment, laws and systems, social and cultural values and behavioral standards, the structure of the market, as well as desired service levels and the quality of usable information. Thus, in order to meet the demand of these global firms, there is an urgent need to improve the quality of logistics service providers, and to develop a solid workforce of logistics professionals. Both of these things have contributed to the Netherlands’ and Singapore’s status as the hubs of Europe and Asia, respectively.

Action 1: Professional logistics services should be promoted by attracting global 3PL providers for new logistics centres in ports.

In response to lean production and distribution systems, the trend towards outsourcing of logistics services continues. The specialized service providers, so-called third-party logistics (3PL) service providers, offer global firms many advantages, including reducing the need for capital investment, reducing working capital needs, and enabling penetration into new markets more quickly and with less capital.

Consequently, the demand for stability, consistency, and flexibility has led to an increasing use of 3PL in almost every aspect of logistics activities. In the EU, 3PL accounted for 65 per cent of logistics services in 1997. In the US, the use of 3PL has soared since the mid-90’s, accounting for over 50 per cent of logistics.

Table VI.3 shows how 3PLs function as full-service providers, thus ensuring that all services required by customers can be met cost effectively. 3PL service providers in the Netherlands and Singapore offer a wide range of services that complement the specific needs and capabilities of global firms. The quality of 3PL’s services is considered to be an important factor in attracting new logistics centres in their countries. In line with this trend, ports in the ESCAP region must attract and develop world-class providers of customized logistics services in order to attract global firms to set up their logistics centres in the region.

In regards to the 3PL industry, efforts will have to be made to identify those companies, which have the highest potential for operating logistics centres and also to promote the 3PL industry at the local level. Given the reality that most ESCAP economies

lack a professional 3PL industry, the future success of logistics centres depends critically on the promotion of the 3PL industry.

Table VI.3. Range of services offered by 3PL providers

Classical	Advanced Services	Full Services
Warehouse management	Pick and pack	Order processing
Transportation	Assembly/packaging	Order planning
Dispatch	Returns	System/IT
Delivery documentation	Labeling: <i>price and bar code</i>	Invoicing
Customs documentation	Stock account	Payment collection
		Logistics consulting
		Shipment tracking
		Materials planning

Source: OECD, Logistics Integration in the Asia-Pacific Region, 2000.

Action 2: An effective education and training programme must be prepared to produce not only logistics specialists equipped with SCM, IT and strong language capabilities, but also technologically trained and skilled work force.

Every port in the world is putting forth great efforts to build its information infrastructure and train personnel for a knowledge-based economy. Just as knowledge enterprises are recognized as the best firms, only those ports that are armed with knowledge will be able to maintain their status as competitive ports. Ports in the ESCAP region will only be able to achieve their goal of becoming logistics centres if they direct adequate resources toward training logistics professionals and skilled work forces at the most advanced level.

An effective programme must produce logistics specialists that not only have strong language capabilities and the ability to work effectively with information technology, but also a solid foundation in all aspects of the supply chain, including warehouse management, inventory management, customer service, transport, purchasing, budgeting, accounting and forecasting.

Skilled personnel is also a necessity, as evidenced by the growing gap between the supply of and demand for technologically competent labour forces in logistics services. Technologically trained workforces in ports and logistics centres are increasingly in short supply. However, the current system of workforce training is simply incapable of producing the specialized workers needed to meet the requirements of highly specialized logistics centre operations.

In the Netherlands, a large government initiative had started in the mid-1990s in developing specialized knowledge related to the logistics sector as a whole. This government initiative to transfer new knowledge to the Dutch logistics sector is designed to increase its competitive advantage. This is done by means of two knowledge centres: one for transportation

research, aimed at the transport-industry called Connekt, and one for chain-management, aimed at shippers, called KLICT. Another notable example of an effort to support growing manpower needs in the logistics sector is AFT-IFTIM (Association of the Development of Professional Training in Transport/Institute of Training and Warehousing Technique) in France.

In order to achieve its vision of becoming a global logistics hub, Singapore's Trade Development Board (TDB)¹⁸ has been consistent in training logistics professionals equipped with supply chain management skills and other critical IT skills. As part of this effort, it launched a professional accreditation programme for logistics professionals, i.e., Certified Professional Logistician, ensuring a high-level professional certification worthy of regional and international recognition.

In comparison to Singapore and advanced European counterparts, ports in the ESCAP region lack professionals and specialists in logistics. Recently, in Korea a programme has been proposed to train 10,000 logistics specialists over the next five years in order to produce personnel to meet the growing needs of the Northeast Asian logistics system. However, this kind of programme cannot be achieved without greater institutional support. As such, the government should support the establishment of logistics education and training systems for managers and employees of logistics centres. The government should also expand continuing education programmes and institutions to ensure more highly-trained and skilled labour force for the future.

F. The development of information technology

Objective: To make the best use of IT to reap the benefits of e-commerce and to improve the efficiency of the logistics chain.

It is commonly recognized that ports play a critical role in their countries' trade growth. Therefore, a number of ports have taken steps to improve the quality of their services, and to provide basic logistics and communications infrastructure in order to reap the benefits of e-commerce. Due to the increasing importance of the development of IT and information systems to control logistics activities, expenditure on IT and information system is expected to surpass inventory-carrying costs in its priority next to transportation costs in the logistics chain¹⁹. This fact represents a fundamental shift in logistics strategy toward information-intensive control system from asset-intensive strategies, such as warehousing and inventory level.

Action 1: Common-user and robust e-commerce-based administrative and commercial services should be available to allow the ports in the ESCAP region to connect to the IT networks of administrations, transport operators and logistics centres.

¹⁸ This year the Singapore's TDB has been restructured to International Enterprise Singapore (IE Singapore) to meet the challenges of an increasingly competitive global market.

¹⁹ D.L. Anderson and R.G. House, "Logistics and Material Handling systems in the U.S.: Trends and future Outlook," *Logistics Perspective*, July 1990.

Information technology, especially internet-based systems, is increasingly being employed in all logistics services. As shippers become more attuned to sophisticated supply chain management, ports will be faced with challenges to overcome. The growing power and speed of information processing is reshaping the port industry.

IT has transformed transport operators into valued-added logistics service providers. Ports will have to adapt to such changes, by offering one-stop value-added services. However, in many ports of the ESCAP region, the transaction capabilities offered by a number of port websites, which are likely to become standard features in the near future, are still not accessible to many customers. This is mainly due to a multitude of factors such as limited information and telecommunication infrastructure, limited levels of e-commerce and internet culture, and a limited skill base for building e-commerce.

The application of e-commerce in ports could contribute to the efficiency of international trade. The availability of common-user and robust e-commerce-based administrative and commercial services in the ports of the ESCAP region would allow them to connect to the IT networks of administrations, shipping lines and other transport operators. Of course, scalable systems with certain core functions are needed in order to cater to the different needs of a wide range of ports and terminals serving developing countries' trade.

Action 2: Steps based on balanced, coordinated and standardized information systems must be taken to improve the efficiency of administrative and customs activities in the ports of the region.

In most ports of the ESCAP region, shippers and clients suffer from the burdensome and time-consuming administrative and customs clearance procedures. As such, there is a need to place priority on reforming the various complex administrative systems in the region. Customs are major bureaucracies where it is difficult to change operational and administrative procedures to improve services. Even a developed economy like Japan has a restrictive customs law, which states that the declaration and clearance process is accomplished only after the cargo is moved to a bonded area. For these reasons, steps must be taken now to improve the efficiency of customs activities in the region.

In addition to customs clearance, shipping companies and their agents must deal with onerous and inconsistent reporting and inspection procedures for notifying the port, coast guard, immigration and health authorities and other government organizations regarding a ship's arrival/departure, cargo handling requirements and other vessel services needed. These are all formal requirements related to the ship's port activities. The information for vessel, crew and cargo manifest, collected by one organization is seldom shared with another organization within the same port, or even within the same organization's offices in other ports. This reporting system of redundant information is labour intensive, costly and inefficient.

In order to remedy these difficulties, information system can be used effectively to streamline and enhance supply chain processes, enhance cooperation between carriers and their customers by enabling instant communications, and eliminate many burdensome procedures and regulations. For most countries in the ESCAP region, existing information systems have been developed individually for each sector, resulting in a lack of balance,

coordination and standardization between different systems and transport modes. Thus, the main issue for the development of logistics information systems in the future will be how to build balanced, coordinated and standardized information systems without interfering with the continuous development of existing systems.

Most developed ports have already implemented a variety of strategies and policies to develop their information infrastructures. In many ports, they have been transformed into integrated logistics information systems through interconnected efforts with other logistics-related information systems. INTIS at the Port of Rotterdam, DAKOSY at the Port of Hamburg, and SEAGH at the Port of Antwerp are good examples of IT that facilitates electronic submissions and clearance of shipping information.

The most advanced IT of its kind may be the PORTNET at the Port of Singapore. The PORTNET, which was developed in 1984 and then refined and improved upon over many years, is the world's first and still-only nationwide e-commerce network that has the participation of the entire shipping and port community in Singapore. The PORTNET system facilitates end-to-end information workflow and creates value for port users in many areas, including the on-line booking of resources, e-fulfillment of port services, facilitation of billing services, customs clearance and linkage to government agencies.

G. Regulatory and institutional issues

Objective: To develop a legal framework and key institutions for the building of logistics centre in ports.

Overly complex administrative procedures and bureaucracy are frequently identified as an obstacle to building a logistics centre. If such complicated array of laws and regulations, and bureaucracy are not kept in check, MNCs may be less likely to invest in the logistics centres in the ESCAP region.

Consequently, to develop logistics centres in regional ports, there must be a high level of institutional support, with fewer regulations for its logistics centres. Indeed, ports with high institutional support and few regulations usually exhibit a high degree of development in logistics areas. Therefore, legal and institutional issues must be addressed before establishing logistics centres in port areas. The main emphasis will be on the development of a legal and institutional framework for the building of logistics centre in port regions.

Action 1: Legal and institutional issues must be identified before establishing logistics centres in port areas, and the new logistics-related laws and national strategies should be launched to transform and upgrade ports to the next level of logistics development.

As to the legal aspects regarding logistics centres in ports, institutional schemes should be made to improve the conditions and simplify the administrative procedures affecting logistics centres. Experiences around the world also show that the existence of an effective institution plays a crucial role in building logistics centres in ports. Table VI.4 shows how the building of logistic centres is promoted at the central and regional government level in the ESCAP region.

Recently, some ports in the ESCAP region have set up a new port policy, whose goal is to stimulate employment and create added-value in the region's economy by establishing logistics centres in ports. They launched logistics-related laws and national strategies to transform and upgrade them to the next level of logistics development.

As part of its logistics-promotion efforts, the Japanese government enacted a special law in July 1992 called the *Law on Extraordinary Measures for the Promotion of Imports and Facilitation of Inward Investment*. The stated purpose of the law was to enhance access to the Japanese market for foreign products and to encourage more foreign companies to export to and/or invest in Japan. The law permitted the establishment of a nationwide network of Foreign Access Zones (FAZs), disagreed to establish and strengthen logistics facilities located in ports.

Table VI.4. Organizations developing logistics centres in port areas in selected economies

Country		Organization
China		Appointed by Board of National Affairs through the application of regional government
Hong Kong, China		Free trade area is stipulated by law
Taiwan Province of China	Export processing zone	Appointed and approved by the Board of Administration through the application of the Ministry of Economics
	Science industrial area	Appointed and approved by the Board of Administration through the application of the National Science Committee
	Special area	Same as the Export Processing Area
Japan	Foreign access zone	Approved by Minister of Commerce through the application of regional government
	Free trade area	Developed by the Administration of Okinawa Development
Republic of Korea		Appointed by the Minister of Finance and Economy, through the application of other central government
Singapore		Appointed directly by Minister of Finance and Economics

Source: Korea Maritime Institute.

Singapore already launched the *Logistics Enhancement and Applications Programme*, as well as the *Logistics Master Plan*, which was drafted by a steering committee comprised of thirteen agencies and headed by the Trade Development Board. Both of these aim to position Singapore at the forefront of logistics services in the region by creating new logistics capabilities and enhancing competitiveness.

In support of the development of ports of (Chinese Taipei) into regional logistics centres, (Chinese Taipei) introduced *The International Logistics Centre Operation Act* in 1999 under the Asia Pacific Regional Operation Centre (APROC) plan. The APROC plan was launched in January 1995 in an effort to encourage global firms to set up regional operation centres in Taiwan as their base for business and logistics in Southeast Asia and mainland China. For effective implementation of the plan, most of the legal revisions were

embodied in one comprehensive piece of legislation for speedy enactment as a package. *The International Logistics Centre Operation Act* is also focusing on amending laws and regulations that are outdated and no longer suitable for newly emerging business practice.

Recently, the Korean government also enacted *The Act on Designation and Management of Customs-Free Zones for Fostering International Logistics Centres*, and Busan and Gwangyang ports have been designated as customs-free zones. However, this act raises two major problems due to its inflexibility and the overly rigid regulations regarding FTZ and logistics centres.

The first is its minimum physical requirement to be designated as a customs-free zone. If logistics facilities are to become international logistics centres, such a method of prioritizing certain seaports only by physical size will not be successful. Instead, it will be necessary to develop major trading ports, as well as adjacent areas, into customs-free zones. It is both rational and internationally accepted to prioritize certain areas as customs-free zones based on their potential economic impact rather than on physical conditions. This is because, only by this method can global firms invest in areas that can operate at their full capacity based on functional characteristics and the amount of land required to build VAL service complexes in each region.

There is also a problem because within customs-free zones, production functions such as processing, manufacturing and assembly are excluded, and the only type of processing activity included is simple processing. However, in most free trade zones, it is normal to include functions such as manufacturing, assembly and processing, in addition to VAL services. Only in this way can synergy be achieved. Therefore, it is essential to integrate logistics and manufacturing functions into customs-free zones, then the logistics promotional function and the value-added logistics function can be greatly enhanced.

Action 2: Forging key drivers for building ports into logistics centres must be encouraged to execute the tasks more efficiently and effectively.

Some government agencies and institutions in the Netherlands and Singapore have been given credit for building their ports into logistics hubs and leveraging the existing base of regional logistics centres located in their countries to provide integrated logistics support for MNCs operating in Europe and Asia respectively.

The Netherlands' role as an international logistics and distribution centre was promoted by two key drivers: the Netherlands Foreign Investment Agency (NFIA) and the Holland International Distribution Council (HIDC). In Singapore, the corresponding champion agencies were the Economic Development Board (EDB) and the Trade Development Board (TDB). These government agencies drew up a logistics master plan to develop Singapore into Asia's leading integrated logistics hub. Correspondingly, Chinese Taipei set up the Coordination and Service Centre, which acts as a bridge between different agencies and coordinates their involvement for the effective execution of the APROC plan.

Summing up, ports in the ESCAP region must learn lessons from the above mentioned ports in order to ensure successful development of logistics centres. Setting up a champion agency will help in executing the task more efficiently and effectively.

APPENDIX. CALCULATING NATIONAL LOGISTICS COSTS

Logistics costs are an important factor affecting the competitiveness of both firms and nations. Firms can enhance their market competitiveness by reducing their logistics costs, thus lowering the total costs of goods and services. Greater market competitiveness of a nation's firms can then give rise to greater national industrial competitiveness on a global scale.

Total logistics cost analysis is the key to managing the logistics function. It is important that management consider the total of all logistics costs. Controls should be instituted to minimize the total costs of logistics rather than to minimize the cost of each component. However, determining which component of logistics costs to reduce can be problematic, since there is a trade-off between cost components. In fact, attempts to reduce the cost of individual logistics activities in isolation may even lead to greater total logistics costs. Thus, at the level of the firm, attempts should be made to integrate the logistics system so as to minimize total logistics costs.

From the perspective of government policy, however, effective cost reduction in the national logistics system can be accomplished only by identifying individual components. Consequently, the calculation of individual logistics cost components has been critical to nations in their efforts to make appropriate policy decisions.

In this appendix, the concept of logistics costs is first defined. This is then followed by an overview of the national logistics methodologies of the U.S. and the Republic of Korea.

A. The concept of logistics costs

Logistics consists of activities that facilitate the movement of goods from supply to demand. As many such activities require the use of ports, port authorities have taken a particular interest in the various port activities involved in logistics.

Performance indicators of logistics activities measure the performance of a logistics system and evaluate its efficiency level. As such, performance indicators can be used in improving logistics systems within a particular firm or throughout a national economy. The major reason for measuring logistics performance is to reduce operating costs. Measuring operating costs helps to identify whether and where to make operational changes to control expenses and identify areas for improved assets.

Although logistics performance indicators can be evaluated in various ways, depending on the purpose, in general they fall into one of two categories: (1) costs indicators, which indicate costs consumed in carrying out logistics activities, and (2) service indicators, which indicate the results of logistics activities. Since business competitiveness can be enhanced through cost reductions and service improvements in logistics activities, it is important that companies and governments be competent in measuring logistics related performance.

Cost indicators are popular performance indicators, though the measurement methodology has not been standardized. Moreover, there is no guideline regarding which

indicator to use when measuring the efficiency or productivity of individual logistics activities. Logistics costs include the following:

- cost of transport activities, for each mode;
- cost of storage or warehousing activities;
- cost of time value or investment in goods in a logistics system, including the added value of transportation;
- cost of physical form changes required for effective and/or safe transport, storage, and handling;
- cost of marking, identifying, recording, analysis, as well as data transfer and handling;
- cost of stacking/unstacking activities;
- cost of added packaging required;
- cost of material transfer activities;
- cost of consolidation/deconsolidation activities;
- cost of information and telecommunications integration;
- cost of logistics system management;
- cost of unavailability of goods (when required).

In general, the costs of transport activities and non-physical handling activities, such as an inventory and related time costs, constitute the majority of logistics costs.

B. Comparison of macroeconomic logistics costs

Though business circles and government policy makers had become increasingly concerned about rising logistics costs, Haskett, of Harvard University, was troubled that the discussions surrounding logistics costs were not based on reliable statistics. Therefore, he developed a methodology to estimate macroeconomic logistics costs, one that included transportation-related infrastructure investment costs and business-related logistics costs. His attempt was the first of its kind to emphasize the importance of total logistics cost estimates that were based on annually-published official government statistics.²⁰ According to his estimates, macroeconomic logistics costs amounted to about 18.5 per cent of the national wealth invested in private and government logistics activities. Over 80 per cent resulted from investment by private enterprises or individuals, and the rest from investment by the public sector (national, state, or local governments).

Several countries, such as the United States, Japan and the Republic of Korea, publish their national macroeconomic logistics costs every year. Cass Information Systems, Inc. publishes the national logistics costs of the U.S. annually, while the Korea Transport Institute publishes those of the Republic of Korea. Recently, the Japan Institute of Logistics Systems also began to publish macroeconomic logistics costs based on the methodology that was originally developed by Haskett and further elaborated by Cass Logistics Ltd.

²⁰ J. L. Haskett, "Macroeconomic Cost of Physical Distribution." ATRF, 1962 and Haskett and others, *Business Logistics* (2nd ed.), 1973.

Because the United States, Japan and Korea employ very similar methodologies in compiling their statistics, a comparison of their results can provide a representative comparison of the efficiency of the logistics systems at an advanced economic level. In each country's compilations, logistics costs are categorized by activity, with each activity including information on its share of costs in the logistics system and its size as a percentage of GDP. Through analysis and comparison of such annual statistics, it is possible to identify trends, the strengths and weaknesses of each national economy, as well as the successes and failures of each country's logistics related policies.

Table A.1 compares logistics costs as a percentage of nominal GDP for the United States, Japan, and Korea. In the United States and Japan, logistics costs as a percentage of nominal GDP has either been steadily decreasing or remained stable. In Korea, however, logistics costs as a percentage of GDP have shown a steady increase in the 1990s.

Estimates of expenditures for transportation and logistics services are provided annually for the U.S. market by Cass Information Services, based on data from a number of public and private sector sources. The CASS's "Annual State of Logistics Report" shows that over \$ 800 billion will be spent within the U.S. for logistics performance in 1998. This represents 10.6% of GDP, down from 16.6% in 1980, i.e. before deregulation of freight transport operations.

Michigan State University (MSU) researchers have estimated that the global logistics expenditure is approaching \$ 3.5 trillion annually. The MSU's Collaboratory on the Global Logistics Market is developing methodologies to estimate and forecast the level of global logistics expenditure on a per nation, regional and aggregate basis. It is also seeking to improve understanding of the composition and trends of logistical expenditures, and to identify the so-called "battlefield" issues separating the public and private sector that impact on logistical effectiveness and efficiency. The sponsors of this initiative are still seeking collaborators from the private and public sector, including financial supports from United States and foreign stakeholders.

Table A.1. Logistics costs as a percentage of gross domestic product

Year	(Percentage)		
	U.S. ¹⁾	Japan ²⁾	Korea ³⁾
1991	10.6	10.6	14.8
1992	10.1	10.1	15.1
1993	9.9	9.8	14.8
1994	10.1	9.6	14.8
1995	10.4	9.7	15.3
1996	10.3	9.5	15.2
1997	10.1	9.6	15.4
1998	10.1	-	16.5
1999	9.9	-	16.3

Source: 1) Cass Logistics Ltd., 11th Annual "State of Logistics Report".

2) Japan Institute of Logistics Systems.

3) The Korea Transport Institute.

C. Estimates of macroeconomic logistics costs in the United States

Cass Logistics System Inc. calculates and publishes annually national logistics cost statistics for the United States in annual *State of Logistics Report*²¹. The report breaks down overall logistics costs into three key components: transportation costs, inventory carrying costs, and administration costs.

(a) Transportation costs

Total transportation costs include costs for both primary and secondary transportation. Primary transportation is the movement of finished goods from plants and vendors to warehouses. Primary transportation costs include costs for replenishment movement from plants or distribution centres to other plants or distribution centres, and inbound freight on purchased finished goods movement to plants or distribution centres for resale. Secondary transportation is the delivery of finished goods to customers. Secondary transportation costs include payments to carriers, pickup allowances, truck or rail equipment and operations costs, and freight allowed. Freight may originate in plants, distribution centres or terminals. Transportation costs include costs for all modes, including trucking, rail transport, water and oil pipeline, and both international and domestic airfreight transport, as well as freight forwarding and shipper-related costs.

The freight transportation costs in the Cass report account for the largest portion of logistics costs. These estimates are based on the annual *Transportation in America* report published by the Eno Transportation Foundation. Of total transportation costs, trucking costs continue to dominate the United States business logistics system, accounting for more than 80 per cent share of the nation's freight billing. Shipper-related costs include the loading and unloading of transportation equipment, as well as traffic department operations.

(b) Inventory carrying costs

Inventory carrying costs include the cost of money (opportunity or interest), ad valorem taxes, insurance and shrinkage. Following extensive research and analysis, Cass Logistics set this level at 18 per cent in 1974, when it started the Database. The figure still represents a reasonable measure of the cost of carrying inventory, although there have been many arguments for both lower and higher figures. Inventory carrying costs include those costs that vary with the level of inventory stored. They can be categorized into the following four groups: (1) capital costs, (2) inventory service costs, (3) storage space costs, and (4) inventory risk costs.

Capital Costs for Inventory Investment

Holding inventory ties up money that could be used for other types of investments. Consequently, the company's opportunity cost of capital should be used to reflect accurately the true cost involved. All inventory carrying cost components must be stated in before-tax numbers, since all the other costs in the trade-off analysis, such as transportation and warehousing, are reported in before-tax dollars.

²¹ This report has taken on oracle status in the profession and statistics in it are often cited in federal government reports.

Inventory Service Costs

Inventory service costs comprise taxed and insurance paid as a result of holding inventory. In general, taxes vary directly with inventory levels. Insurance rates are not strictly proportional to inventory levels, but are related to the value of certain items over a specified time period.

Storage space costs

Storage Space Costs can be incurred at four types of facilities:

- plant warehouses;
- public warehouses;
- rented (leased) warehouses;
- company-owned(private) warehouse.

Inventory risk costs

Although inventory risk costs vary depending on the company, in general, they include charges for: (1) obsolescence, (2) damages, (3) pilferage, and (4) relocation.²²

Inventory carrying costs, the cost of taxes, and obsolescence, depreciation and insurance are estimated according to the Alford–Bangs Production Handbook formula, which has been used in the methodology of *Transportation in America* since its was first published in 1973.²³ In this formula, obsolescence accounts for nearly 40 per cent of total inventory carrying costs, thus demonstrating the challenges facing inventory managers in the world of fast cycles and just-in-time procurement. Total warehousing cost estimates encompass both public warehouses and private warehouses operated by manufacturing and distribution companies. Public warehousing costs are obtained from the public warehousing services data reported by the Commerce Department’s Census Bureau.²⁴ Private warehousing costs are independently obtained from the public warehousing costs, by Cass Logistics.

(c) *Administration cost of distribution*

The third component of logistics costs, administration costs, includes indirect management personnel and support staff, including the central distribution staff, inventory planning and analysis staff, and the traffic department. Nowadays, computer software and hardware cost allocations are an important distribution expense. Such costs are included in the appropriate cost categories, with any remainder considered part of administration costs.

²² Relocation costs are incurred at the transshipment of inventory from one warehouse location to another to avoid obsolescence.

²³ They applied 25 per cent of inventory carrying rate. L. P. Alford and J. R. Bangs (eds.), *Production Handbook*, New York: Ronald Press, 1955.

²⁴ Meanwhile, Haskett applied 22 per cent in his paper, which includes warehousing costs (.25 per cent), insurance (.25 per cent), taxes (.5 per cent), depreciation (5 per cent), interest (6 per cent), obsolescence (10 per cent).

Logistics administration costs are set at four per cent of the sum of the inventory-carrying costs and transportation costs, in line with the methodology that has been consistently employed since *Transportation in America* was first published in 1973.

(d) Trends of logistics costs

According to the estimates by Cass Logistics Inc., the costs associated with the business logistics system in the United States in 1999 increased to \$ 921 billion, or 9.9 per cent of nominal GDP.

Transportation costs account for more than 60 per cent of total logistics costs, with road transport accounting for more than 80 per cent of transportation costs. Trucking costs increased by 5.9 per cent in 1999. Railroad revenues increased by 1.0 per cent, while water and oil pipeline transportation costs remained flat. Domestic airfreight revenues increased by 6 per cent, and international air freight revenues increased by 8 per cent.

In 1999, the average investment in all business inventory in agriculture, mining, construction, services, manufacturing, wholesale and retail trade stood at \$ 1.376 trillion. Inventory investment during 1999 was \$ 4.9 billion higher than the previous year. The cost of carrying inventory in 1999 includes interest at the annualized commercial paper rate of 5.1 per cent. See table A.1.2.

Table A.2. United States of America national logistics costs, 1999

	\$ Billions	
Inventory Carrying Costs (\$1.376 trillion in Total Business Inventory)		
Interest	70	(0.008)
Taxes, Obsolescence, Depreciation, Insurance	187	(0.020)
Warehousing	75	(0.008)
Subtotal	332	(0.036)
Transportation Costs		
Truck – Intercity	300	(0.032)
Truck – Local	150	(0.016)
Subtotal	450	(0.049)
Railroads	36	(0.004)
Water	22	(0.002)
Oil Pipelines	9	(0.001)
Air	26	(0.003)
Forwarders	6	(0.001)
Subtotal	99	(0.011)
Shipper Related Costs	5	(0.001)
Logistics Administration	35	(0.004)
Total logistics cost	921	(0.099)

Source: Cass Logistics Ltd., *11th Annual "State of Logistics Report,"* June, 2000.

Note: Figures in parenthesis are per centage of nominal GDP.

Table A.3²⁵ shows that logistics costs as a per cent of equivalent nominal GDP declined from 16 per cent in 1981 to 10 per cent in the 1990s. Since 1982, improvements in inventory efficiency have been dramatic, as the United States business logistics system has replaced inventory with more versatile and responsive transportation services. The United States business logistics system has succeeded at keeping transportation costs stable at 6.0 per cent of GDP for the past seven years. Inventory management has also been a key factor in maintaining U.S. business logistics costs at 10 per cent of nominal GDP or lower.

Logistics is the management of inventory in motion or at rest. Inventory is in motion during transportation and at rest when it is awaiting production of finished goods and distribution at the final point of sale. The ratio of manufacturing and trade inventory-to-sales has been reduced substantially over the years as transportation facilities become more ubiquitous and as electronic communication technology facilitates the exchange of information among shippers and carriers, thus increasing the flow of deliveries. The ratio of inventory as a percentage of GDP was 7.6 per cent in 1980 and declined to 3.6 per cent in 1999, with a consequent reduction in overall logistics cost. However, this reduction in cost could have only been achieved when all transport infrastructure, effects for all stakeholders.

Table A.3. The cost of the business logistics system in relation to gross domestic product

Year	Nominal GDP (Trillions of US \$)	Inventory carrying costs (Billions of US \$)	Transportation costs (Billions of US \$)	Administrative costs (Billions of US \$)	Total U.S. logistics cost (Billions of US\$)	Logistics of GDP	Inventory as a percentage of GDP	Transportation as a percentage of GDP
1980	2.88	220	214	17	451	15.7	7.6	7.4
1981	3.17	259	228	19	506	16.0	8.2	7.2
1982	3.31	234	222	18	474	14.3	7.1	6.7
1983	3.64	211	243	18	472	13.0	5.8	6.7
1984	4	239	268	20	527	13.2	6.0	6.7
1985	4.23	227	274	20	521	12.3	5.4	6.5
1986	4.51	217	281	20	518	11.5	4.8	6.2
1987	4.74	225	294	21	540	11.4	4.7	6.2
1988	5.11	251	313	23	587	11.5	4.9	6.1
1989	5.49	283	329	24	636	11.6	5.2	6.0
1990	5.8	283	351	25	659	11.4	4.9	6.1
1991	5.99	256	355	24	635	10.6	4.3	5.9
1992	6.32	237	375	24	636	10.1	3.8	5.9
1993	6.64	239	396	25	660	9.9	3.6	6.0
1994	7.05	265	420	27	712	10.1	3.8	6.0
1995	7.4	302	441	30	773	10.4	4.1	6.0
1996	7.81	303	467	31	801	10.3	3.9	6.0
1997	8.43	315	503	33	851	10.1	3.7	6.0
1998	8.76	324	529	34	887	10.1	3.7	6.0
1999	9.26	332	554	35	921	9.9	3.6	6.0

Source: Cass Logistics Ltd., *11th Annual "State of Logistics Report,"* June 2000.

²⁵ Data Sources are National Income and Products Accounts – Levels; Survey of Current Business March 2000; U.S. Statistical Abstract; U.S. Department of Commerce, *Transportation in America*, Rosalyn Wilson, 1999 ENO Transportation Foundation, Washington, D.C.

D. Estimates of macroeconomic logistics costs in the Republic of Korea

The Government of the Republic of Korea has been particularly concerned about logistics problems since the 1980s. A sudden and rapid increase in national logistics costs during the mid-1990s convinced the government to pursue various approaches in devising solutions. The solutions it came up with include: continuous investment in infrastructure such as ports, airports, roads and railways; development of freight and logistics terminals in several provinces; and building an integrated logistics information network to be used in inducing advanced communication techniques from overseas.

However, the growth in logistics costs has weakened the international competitiveness of the Republic of Korea products and services, and has led to high domestic distribution costs. Thus, in an effort to better understand the current national logistics system and implement strategies to improve it, the Korea Transport Institute initiated a project to develop a methodology for estimating logistics costs in order to evaluate the efficiency of the logistics system of the Republic of Korea.

(a) *Methods of estimation*

Logistics efficiency is evaluated based on various logistics cost factors, such as transportation costs, inventory holding costs, packing costs, stevedoring costs, information costs and administration costs. Each cost factor is further classified as a private cost or a public cost, such as consignment. Table A.4 shows the sources of statistical data for each logistics cost factor.

1) *Transportation costs*

Transportation costs include the cost of rail, road, water and air transport, as well as agent costs and other shipper-related costs. Rail transportation costs are further divided into various categories of freight cost. Road transportation costs are evaluated separately, based on whether they are public costs or private costs. Water transportation costs include costs of inland ports, ocean freight, and domestic coastal maritime transportation. International maritime transportation costs are divided into transportation costs of domestic carriers or foreign carriers. Airfreight transportation cost is estimated in a similar way. Airfreight transportation is categorized as national transportation costs or international transportation costs, and international transportation costs are further divided into costs by domestic airlines and foreign airlines.

Rail transportation costs

Rail transportation costs are estimated using the *Railway Statistics Annual Report*, which is published by the Korean National Railroad Administration. The Report includes income and expenses in the car-load freight section and the mini-load (less than car-load) section. Also, it assumes that rail freight transportation income is equal to rail's costs, since the rail freight business section of the Korean National Railway Administration has been posting a deficit whenever rail transportation operating costs exceed rail transportation revenues. For this reason, KOTI also assumes rail transportation income to be equal to rail transportation costs.

Table A.4. Sources of statistical data for logistics costs in the Republic of Korea

Items	Class I	Class II	Class III	Sources
Transportation	Rail	Freight		Railway Statistics Annual Report
		Mini-load		
	Road	Public	Route	Transportation Industry Statistical Investigation Report
			Special	
			Zone	
			Contract	
			Other	
		Private	Operations	Own Calculation
			Tolls	Korea Highway Corporation
	Water	Inland port		Transportation Industry Statistical Investigation Report; Korea Vessel Agency Association
		Ocean	Domestic	
			Foreigner	
		Inland water		
	Air	National		Annual Report of Ministry of Construction & Transportation
		International	Domestic	
			Foreigner	
	Agency	Agency		Transportation Industry Statistical Investigation Report
Inventory Carrying	Custody	Public	Ordinary	Transportation Industry Statistical Investigation Report
			Cold storage	
			Dangerous	
			Agricultural	
			Other	
	Private		Korea Chamber of Commerce & Industry	
	Inventory holding		Enterprise Management Analysis	
Breakage		Korea Chamber of Commerce & Industry		
Packing	Corrugated cardboard		KCCA	
	Pallet		Korea Chamber of Commerce & Industry	
Handling and Lading/ Unloading	Land and Air		Transportation Industry Statistical Investigation Report	
	Water			
Information			Korea Chamber of Commerce & Industry	
Administration			Korea Chamber of Commerce & Industry	

Road transportation costs

Public road transportation costs are computed using transportation revenue data from the following business areas: special freight, sector freight, delivery service freight, funeral vehicles, pipeline transportation business, etc. In contrast, private road transportation costs are estimated in the following way:

a. Estimation process

Compared with public road transportation costs, there is very little relevant data on private road transportation costs. Since official statistical data are not reported for public road transport costs, applying simply the cost of the public to the private cost brings the result, which disregards its characteristics. For this reason, KOTI calculates private road transportation costs using its own methodology.

b. Items included in vehicle operation costs

The Vehicle operating cost factor is classified as the cost of materials, labour costs, and expenses. Cost of materials includes the cost of fuel, miscellaneous oils, tires, tubes, etc. Labour costs include drivers and maintenance technicians. Expenses are divided into direct expenses, meaning those expenses necessary in order to operate a vehicle, and indirect costs. Direct expenses include maintenance costs, insurance costs and depreciation. Indirect costs include worker's compensation, welfare expenses and public taxes.

c. Classification of vehicles, and estimates of the number of vehicles

There are various types of freight vehicles, and they are categorized by usage and by size. Costs and efficiency of freight vehicles depend on usage and tonnage class. Thus, vehicle operation costs must be computed based on the particular vehicle's usage and tonnage.

d. Calculation of operating costs for each vehicle

- **Fuel costs**

Fuel cost is estimated as: annual average fuel used x unit cost of one litre. The corresponding amount for annual average fuel used is taken from the report *Total Investigation*, published every three years by the Ministry of Commerce, Industry and Energy. The unit cost is the retail price of low-sulfur oil, which contains a value-added tax.

- **Miscellaneous oil costs**

Miscellaneous oils include both engine oil and anti-freeze solution. KOTI calculates miscellaneous oil costs as 5 per cent of the total annual fuel costs.

- **Tire wear-and-tear costs**

Annual tire wear-and-tear costs are computed by dividing annual total driving distance by standard distance, then multiplying by the number of tyres for the appropriate tonnage class vehicle, as follows:

$(\text{Annual total driving distance} / \text{Appropriate standard distance}) \times \text{Number of tires attached to the vehicle type} \times \text{Standard unit cost per tire}.$

In figuring out the number of attached tires, KOTI uses 6 ties for vehicles under 8 tons, and 10 tires for others. KOTI also assumes 60,000 kilometres for the substitution standard distance.

- **Labour costs**

Annual labour cost is the expense for personnel used in the operation and maintenance of freight trucks. This labour cost is derived as follows:

$\text{Average monthly labour cost} \times \text{Number of personnel} \times 12 \text{ (months)}.$ Base salaries and pension plan appropriations are both included.

- **Insurance**

Insurance is calculated as:

$\text{Liability} + \text{full coverage insurance} (= \text{driver insurance} + \text{substance insurance} + \text{vehicle damage insurance}),$

Where, $\text{Vehicle damage insurance} = \text{Vehicle price} \times \text{Vehicle Class insurance ratio}$

- **Repair and Maintenance Costs**

Repair and maintenance costs are calculated as follows:

$\text{Repair and maintenance costs} = \text{Public vehicle maintenance cost of repair} \times \text{Price coefficient} \times \text{Private vehicle conversion coefficient}$

- **Depreciation costs**

$\text{Depreciation costs} = \text{Redemptive amount of money} / \text{endurance year (6 years)}$

Where, redemptive amount of money is the difference between initial value and final value. Initial value is obtained by multiplying the vehicle value by 1.02 (2 per cent acquisition tax), and the final value is obtained by multiplying the initial value by 10 per cent.

- **Indirect expenses**

Public welfare costs are calculated by multiplying the sample ratio to all direct expenses (① +... + ⑦), where sample ratio is obtained by dividing public welfare expenses in transportation business sector by direct expenses in the transportation business sector.

- **Tolls**

The annual toll income of the Korea Highway Corporation is used.

Water Transportation costs

Water transportation costs are classified into domestic freight transportation costs and international maritime freight costs.

- a. **Domestic water transportation costs**

Domestic water transportation costs are computed using the transportation income of coastal shipping business and inland water transportation business from the *Transportation Industry Statistical Investigation Report*.

- b. **International maritime transportation costs**

These costs include the income from foreign trade by the maritime sector, including maritime transportation costs by both domestic and foreign shipping firms. The transportation costs of domestic shipping firms are taken from the transportation income of the international freight transportation business found in the *Transportation Industry Statistical Investigation Report*, whereas the maritime transportation costs of foreign shipping firms are calculated using data from the Korean Vessel Commercial Agent Association.

Air cargo transportation costs

These include domestic air cargo transportation costs and international air cargo transportation costs. These figures are taken from the air cargo income data of the Ministry of Construction and Transportation.

Cargo transportation agency costs

Agents do not control transportation modes. Rather, they arrange transportation services for both carriers and shippers, receiving fees for services performed. These fees are obtained from the *Transportation Industry Statistical Investigation Report*.

- 2) **Inventory-carrying cost**

Inventory-carrying cost includes capital cost on inventory investment, inventory service cost, storage cost and inventory risk cost.

Warehousing cost

Since private warehousing costs incurred by manufacturing and distribution companies for their own use are not available, these costs are estimated indirectly, using the expenditures data for public warehousing services in the *Transportation Industry Statistical Investigation Report*. Public warehouses are classified into four types, according to their function: ordinary warehousing, cold storage, dangerous commodity custody, and agricultural products warehousing.

Inventory-holding costs

Inventory-holding costs are estimated by multiplying average borrowing interest rate by inventory assets.

Inventory-risk cost

These costs are estimated by multiplying inventory assets by risk rate (damaged rate).

3) Packing costs

Packing costs are incurred for the purpose of either protecting products or efficiently handling the movement of products more efficiently. They include corrugated cardboard packing costs and pallet costs.

Corrugated cardboard packing costs are taken from the annual sales revenue figures of the Korean Corrugated Cardboard Association. Pallet costs, however, are calculated as follows:

Potential quantity of goods transported by pallet (tons) = (Road freight quantity of goods transported - Bulk freight quantity of goods transported) x Pallet coefficient of utilization (0.682).

To calculate annuals numbers of pallet used, KOTI divides pallet usable quantity (tons) by units load tonnage per pallet (0.9421 tons). Then, to estimate the annual cost per pallet, KOTI divides the purchase cost (20,000 won) by the number of endurance years (2 years). Consequently, annual pallet packing costs are obtained by multiplying the numbers of pallets used in the particular year by the annual cost per pallet.

4) Handling and loading/unloading costs

The costs of loading and unloading cargo along the transportation chain are estimated by adding all handling costs for each transport mode: port handling costs, road transport handling costs, railway handling costs, and airfreight handling costs. Since private handling costs are not available, the handling costs by manufacturing and distribution companies for their business use is estimated by indirectly linking to the expenditure for the commercial handling firms, which are taken from the *Transportation Industry Statistical Investigation Report*.

5) Logistics information costs

Logistics information costs include the cost of handling and managing information for the entire logistics activities. These costs are obtained by multiplying the ratio of information cost in sales by the annual sales in the respective industry.

6) Administrative costs

Administrative costs include all costs used to support logistics activities. These costs are obtained by multiplying administration costs as a percentage of overall sales by the annual sales figure for the respective industry.

(b) Trends and analysis

Macroeconomic logistics costs in Republic of Korea are estimated using the above-mentioned methodology and by adding the following costs: transport, inventory, packing, handling, information and administration. The total cost of logistics in Republic of Korea in 1999 was estimated at 78.9 trillion won (about US\$ 61 billion). Of this amount, transport costs accounted for 69.9 per cent; inventory costs 18.1 per cent; and other costs 12.0 per cent.

Total expenditures on logistics comprised 16.3 per cent of Korea's GDP in 1999, showing a steady increase from 13.8 per cent in 1988, 14.8 per cent in 1994, and 15.4 per cent in 1997. See table A.5. This rapid growth in logistics costs as a percentage of GDP since 1988 was due mainly to an increase in transportation costs. As in the case of the United States, the transport costs continuously dominate Republic of Korea business logistics system, accounting for almost two-thirds of total logistics costs. High levels of private truck ownership and road traffic congestion are among the major factors causing the increase in transportation costs. Another major reason for the increase in transportation costs in 1999 was the sharp rise in both oil prices and labour costs. In contrast to transportation costs, however, inventory-carrying costs associated with holding goods in storage or inventory at rest have been continuously decreasing.

Table A.5. Trends of national logistics costs in the Republic of Korea, 1999*(Billions of Won and percentage)*

Year	GDP	Total logistics costs	Transport costs	Inventory carrying costs	Administration costs
1991	216,511 (100.0)	31,989 (14.8)	18,857 (8.7)	11,834 (5.5)	1,298 (0.6)
1992	245,700 (100.0)	36,995 (15.1)	23,607 (9.6)	11,950 (4.9)	1,438 (0.6)
1993	277,497 (100.0)	41,201 (14.8)	26,836 (9.7)	12,750 (4.6)	1,615 (0.6)
1994	323,407 (100.0)	47,753 (14.8)	31,037 (9.6)	14,780 (4.6)	1,936 (0.6)
1995	377,350 (100.0)	57,916 (15.3)	38,095 (10.1)	17,538 (4.6)	2,283 (0.6)
1996	418,479 (100.0)	63,754 (15.2)	42,378 (10.1)	18,824 (4.5)	2,552 (0.6)
1997	453,276 (100.0)	69,590 (15.4)	46,546 (10.3)	20,015 (4.4)	3,029 (0.7)
1998	444,367 (100.0)	74,170 (16.5)	50,244 (11.2)	20,768 (4.6)	3,158 (0.7)
1999	482,744 (100.0)	78,892 (16.3)	55,178 (11.4)	20,416 (4.2)	3,298 (0.7)

Source: Korea Transport Institute.

Note: 1. Figures in parentheses are per centage of nominal GDP.

2. Inventory-carrying costs in this table include not only inventory-carrying costs, but also packing, loading/unloading and information costs.

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