

Doctor of Logistics in Northeast Asia

**SATISFICING STRATEGY IN DEVELOPMENT OF A PORT SYSTEM
Viet Nam Case Study**

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Abstract

The role of Viet Nam port system increases in simultaneously with its economic development. Although it has had attention and investment from the government since 1990s, it has been still facing with some problems such as congestion in ports and unbalance among ports, and meeting limitations such as geographic conditions, budgets and technologies.

Actually, development of a national economy in generally and that of port system in particularly are influenced by many factors and affected mutually. Obviously, the transportation and port systems significantly affect on economy, so they should be paid much attention. Consequently, an overview of ASEAN, Indochina and particular Viet Nam economies is presented, which shows why Viet Nam should be focused on developing its port system.

Recently, Viet Nam as well as ASEAN trade has been grown up so remarkably. As a result, Viet Nam transportation demands have been and will be increased, particularly on the maritime transport.

Due to Viet Nam geography, port system has been considered as a vital aspect of national transport infrastructure in generally and most important one of maritime transport in particularly. Consequently, a classification of Viet Nam ports would give a deep look on inside aspect and container ports would be mentioned as one of the key project in the future.

Actually, port system is a dynamic subject and government policies for development have been updated continuously. A strategic master plan to develop Viet Nam port system until 2010 and targets to 2040, which was issued in 1999, and then up-to-dated master plan issued in 2009 would be reviewed. It would show

changes of Viet Nam port system on many aspects such as demands, capacities, and policies.

Correspondingly, the transportation planning process would be introduced, which incorporates analysis of business and input from the business community. Consequently, the satisficing strategy for port development would be defined and the reasons why it should be applied for Viet Nam port development would be presented. Sequent theories of interested strategies would be reviewed, which have been applied in many successful port systems in the world. They promise to bring much contribution when making a plan for development of Viet Nam port system.

Obviously, many gravitational forces have impacts on Viet Nam port system, which force Viet Nam ports have to change, evolve or die. Responsively, the master plan has been modified to meet up-to-dated requirements. City ports especially in Ho Chi Minh City should be relocated outside to suitable location(s). In addition, strategies to enhance them should be studied and implemented, in which container ports should be paid much attention. Development of Dry Port system, transshipment ports and/or logistics activity zones such as ZALs, Distriparks and/or FTZz is considered as efficient and effective alternatives. Furthermore, other successful and interested strategies applying in developing port systems in the world should be studied and implemented for Viet Nam port system. And also Viet Nam should cooperate with other partners or countries such as the Republic of Korea, which have developed port systems, to get experience, technology, management system, and budget from them.

This research would propose some alternatives in development of Viet Nam ports as a satisficing strategy. Obviously, it could not mention all aspects of Vietnamese ports, but it hopes giving useful ideas or alternatives to enhance and develop an effective, efficient and competitive not only for Viet Nam case but also for other developing countries.

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List of Abbreviations

A	
ASEAN	Association of Southeast Asian Nations
ASEM	Asia-Europe Meeting
APEC	Asia-Pacific Economic Cooperation
ALTID	Asian Land Transport Infrastructure Development
B	
BPA	Busan Port Authority
BOP	Balance of Payment
BOT	Build – Operate – Transfer
BRIC	Brazil, Russia, India and China
C	
CIVIETS	Colombia, Indonesia, Viet Nam, Egypt, Turkey and South Africa
CKYH	COSCO, “K” LINE, Yang Ming and Hanjin Shipping
D	
DWT	Deadweight tonnage
E	
EU	European Union
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
EDI	Electronic Data Interchange
EDCF	Economic Development Cooperation Fund
F	
FTZ	Free Trade Zone
FEZ	Free Economic Zone
FDI	Foreign Direct Investment
FP	Free Port
FAZ	Free Access Zones
FIATA	International Federation of Freight Forwarders Associations
G	
GDP	Gross Domestic Product
GRT	Gross Registered Tons
H	

HCMC	Ho Chi Minh City
L	
Laos	PDR, Lao People's Democratic
Laos	
I	
IAPH	International Association of Ports and Harbors
IMF	International Monetary Fund
ISL	Institute of Shipping Economics and Logistics
ICD	Inland Container Depot, Inland Clearance Depot
INTA	International Trademark Association
J	
JIT	Just-In-Time
JICA	Japan International Cooperation Agency
JETRO	Japan External Trade Organization
M	
MAPE	Mean Absolute Percentage Error
N	
NCHRP	National Cooperation Highway Research Program
NCR	National Carriage Rate
NSER	National Seafarer Employment Rate
P	
PCDA	Plan, Check, Do and Act
PSA	Port of Singapore Authority
K	
KD	Keppel Distripark
Korea	the Republic of Korea
KL-Net	Korea Logistics Network
S	
SP-PSA	Saigon Port – PSA Singapore Terminals
SPIM	Society of Psychologists in Management
SWOT	Strength, Weakness, Opportunity and Threat
SKRL	Singapore-Kunming Rail Link
SGT	Saigon Time
V	
VPA	Viet Nam Port Association

VICT	Viet Nam International Container Terminal
VIFFAS	Viet Nam Freight Forwarders Association
VOV	Voice of Viet Nam
VN	Viet Nam
U	
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UN	United Nations
US, USA	United States of American
T	
TAR	Trans-Asia Railway Network
Z	
ZAL	Logistics Activity Zones
W	
WTO	World Trade Organization



CHAPTER 1. INTRODUCTION

In this chapter, impacts of transportation and port system on economy would be mentioned. It shows reasons why they should be paid much attention. Consequently, an overview of ASEAN, Indochina and particular Viet Nam economies would be presented, which shows why Viet Nam should be focused on developing its port system. After that, some successful strategies to develop port systems in the world would be reviewed. The research aims and objectives as well as scale and scope would be identified. And outlines of the dissertation would be sketched out.

1.1 Roles of transportation and particular port systems in economy

In the globalization of the economy, nations' economies require to be transformed as a result of many global demand and supply forces not only in manufacturing industries but all economic sectors including services. Decision to engage in global operations to achieve market growth and enjoy operational efficiency follows a natural path of business expansion when entering the global marketplace by conducting import and export operations. As a result, logistics plays an important role in any nation economy. It is the process of planning, implementing and controlling the efficient, effective flow and storage of raw materials, in-process inventory, finished goods, services, and related information from point of origin to point of consumption including inbound, outbound, internal, and external movements for the purpose of conforming to customer requirements (Bardi *et al.*, 2006).

One of significant differences in comparison to national or even regional operations of the logistics of internationalization is the distance of typical order-to-delivery operations. It is meaningfully longer in international as contrasted to domestic business. Transportation, in particular, has been affected because of the distances involved both inbound to manufacturing from foreign sourcing and outbound for additional manufacturing or delivery to customers. Transportation might account for as much as 50 percent of the total logistics costs (Bardi *et al.*, 2006). Therefore, industry expects an effective and efficient transport system to support sustainable economic growth and enable it to compete in national, regional

and global market. It could ensure products reach the markets quickly, efficiently and in good condition.

Obviously, a good transportation system is an important factor attracting foreign direct investment (FDI) to any nation economy. FDI plays an extraordinary and growing role in global business. For a host country, it can provide a source of new technologies, capital, processes, products, organizational technologies and management skills and as such can provide a strong impetus to economic development (Graham *et al.*, 2005). With a good transportation system, the firms have ability to response to changing customer demand faster and reduce their costs, so their competitive advantage is increased.

Clearly, transportation system plays a very important role in nation's economic growth, so it should be paid much attention on development. However, to reach a good transportation system is not easy, which includes many transportation modes such as railway, roadway, airway and waterway transport. Actually, each of them has its own role and characteristics, and depends on many conditions such as nation's economy, policy, requirements and geographical features, so its development requirements are distinct.

The international shipping industry is responsible for the carriage of around 90 percent of world trade. It is a key transport mode for import or export of cargoes in the global economy. Throughout the last century it has seen a general trend of increases in total trade volume. Increasing industrialization and the liberalization of national economies have fuelled free trade and a growing demand for consumer products. Advances in technology have also made shipping an increasingly efficient and swift method of transportation. Over the last four decades total seaborne trade estimates have quadrupled, from just over 8 thousand billion ton-miles in 1968 to over 32 thousand billion ton-miles in 2008 (*Source: International Shipping Industry*). Without shipping the import and export of goods on the scale necessary for the modern world would not be possible.

Ports (or seaports) should be considered as one of the most vital aspects of a national transport infrastructure as well as maritime transport in particular. Seaports are areas where there are facilities for berthing or anchoring ships and where there

is the equipment for the transfer of goods from ship to shore or ship to ship (Anderton, 2005). For the most trading nations they are:

- The main transport link with their trading partners and thus a focal point for motorways and railway systems.
- A major economic multiplier for nation prosperity. Not only a port gateway for trade but most ports attract commercial infrastructure in the form of banks, agencies, etc, as well as industrial activity.

Unquestionably, with nations meeting conditions to build ports, they would bring much contribution to national economic development if there are good plan and strategies for developing them. In Japan, for example, where there are officially classified 1,020 ports, 22 of which are main ports of special purpose, 106 main ports and 892 local ports (*Source: JapanAutoPages.com*). The major ports in Japan such as Yokohama, Tokyo, Kobe, Nagoya and Osaka handle the greater percentage of foreign containerized trade. The multiple role of port is well recognized as a distribution center, industrial zone and energy supply base, mercantile trading center, urbanization and city redevelopment centre, life activity base, and maritime leisure base (Anderton, 2005).

Busan Port, located in the southeast of Korea peninsula, is the world's fifth largest container port. The facility is used by more than 50,000 vessels annually and handles around 76% of country's container shipments. It aims to be the central logistics gateway to North East Asia. It contributes approximately US\$200 million to nation annual revenue and generates more than 150 direct jobs (*Source: Busan Port Authority, BPA, 2008*).

Another main port located in the Northeast Asia is the Shanghai International Port Group (SIPG), China, which is known as the fastest developing port in the world. Container terminal operation is a core business of SIPG. There are three major container port areas, namely Wusongkou, Waigaoqiao and Yangshan in the port. The container throughput of the Port of Shanghai increased from the 6.43 million TEUs in 2002 to 21.71 million TEUs in 2006 (*Source: Port of Shanghai*). As a master of fact, it has contributed much on China economic development.

Other developed ports located from the south to the north Asia Pacific Ocean are Kaohsiung (Taiwan), Hongkong (China) and ports in the Southeast Asia such as Bangkok (Thailand), Singapore, Port Klang (Malaysia) and Jakarta (Indonesia). They have brought many advantages on developing economies in their areas as well as their countries.

Viet Nam locates in the Southeast Asia Pacific Ocean, which meets natural conditions to develop ports. Besides, Vietnamese government has welcome policies for investment in ports. In the near future, Viet Nam will expectedly have some key ports that could participate in the world major seaport system.

1.2 An overview of Viet Nam economy and port systems

The Association of Southeast Asian Nations (ASEAN) was established on August 1967 in Bangkok, Thailand, with the first five members including Indonesia, Malaysia, Philippines, Singapore and Thailand. Today, the Members States of the association comprise ten countries, namely Brunei Darussalam, Cambodia, Indonesia, Laos PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam (*Source: ASEAN*). ASEAN aims to make a social progress, culture development, protection of the peace and stability of the region and opportunities for the members to discuss differences in peacefully, and especially to accelerate the economic growth in the region.

For socio-economic development and global competitiveness enhancement, transport has been recognized as one of the key catalysts. In other words, it is an important pillar for ASEAN's economic integration. Among transportation modes, maritime transportation has been considered as a key one for transporting the main cargo trade artery from/to members in the region as well as from/to other regions or countries in the world.

In recent years, region economy has been impressionably developing. Consequently, demands on the maritime shipping industry and on port activities have been increased so fast, especially in container cargo.

Indochina area, sub-region of ASEAN, locates on the Southeast Asia. It occupies the easternmost region of the Indochinese Peninsula, on land located directly east of Thailand and south of China, which is comprised of three countries

including Viet Nam, Laos and Cambodia (Fontaine *et al.*, 1997). Indochina area has good conditions to develop its economy. Actually, three countries are members of Association of South East Asian Nations (ASEAN) organization. In addition, Indochina area has borders with China, one of the biggest markets in the world, locates on the international marine transport network and has a good relationship among them. However, currently this region has been considered as a weak economic zone (Nemoto, 2009). The ASEAN region and Indochina area are shown on Fig 1.1.



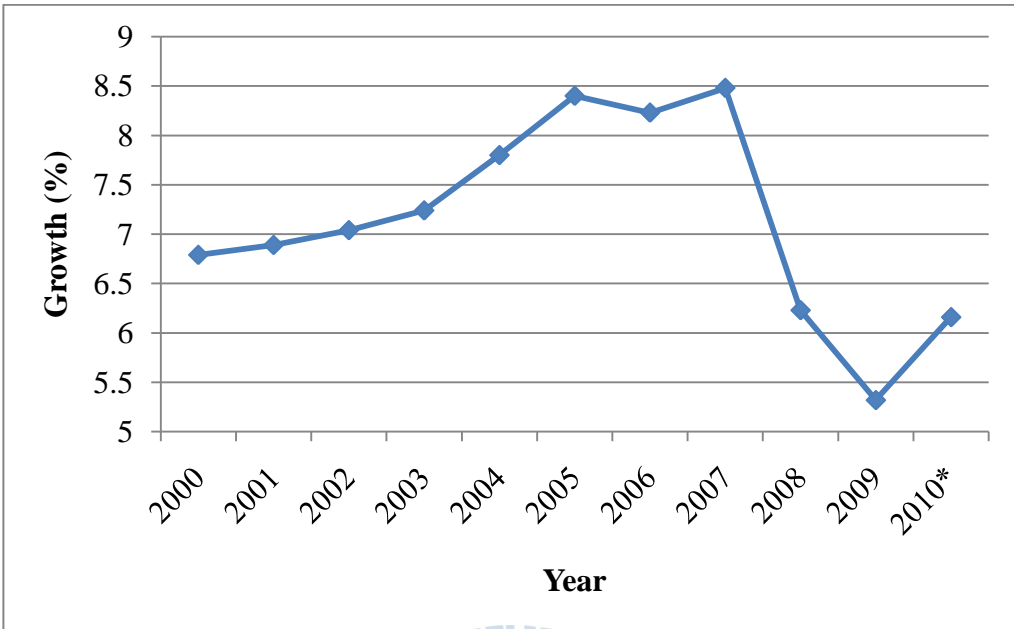
(Source: Middlebury College)

Fig. 1.1: Southeast Asia

Underdeveloped transportation infrastructure which cannot make a strong support for economic growth is one of reasons why the economic zone slowly develops. Each country has its own characteristics with advantages and disadvantages to develop its transportation system. Laos has borders with two big markets, Thailand and China, but it is a landlocked country, so it is difficult to use the marine transport. Cambodia has a seaport system, but it is weak. Viet Nam has a long coast line with suitable conditions for developing a good seaport system and has a border with China, but its seaport system could not compete with neighbor ports such as port of Singapore, Thailand and Malaysia. Therefore, it is difficult for them to construct an efficient and effective transportation system if they do not have a good cooperative plan.

Viet Nam, a full member of ASEAN since 1995, is a market economy with a population of around 86 million people, the thirteenth largest population in the world and the third one in ASEAN. Currently, it is one of the most interesting markets for business development worldwide. Annual growth in term of GDP average 7.42 percent for the period 2000 – 2009; GDP growth gained only 5.32 percent in 2009; and growth for 2010 was expected up to 6.5 percent due to global financial and economic crisis in 2008 (as seen on Fig 1.2) and reached 6.78 percent in that year (*Source: Vietnamese general statistics office*). However, the growth of the first six months of 2010 shows that the economy will be recovered soon and rapidly. As expectation from Vietnam Government, average GDP growth rate a year would be achieved around 7 to 8% in the next 10 years, 2011 – 2020.

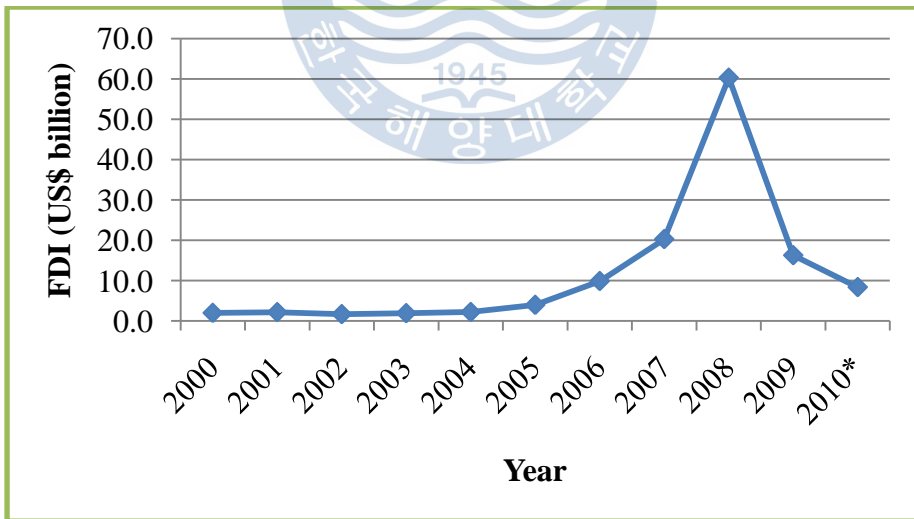
In pursuing of lower cost and increased margin, many companies have looked to Asia for product outsourcing and Viet Nam is one of preferable destinations. In order to compete for foreign investment with other developing countries, Viet Nam has relied most on the strength of its abundant and low cost for labor force, a highly educated young generations, inexpensive operation costs, and many other incentives signaling the government's warm welcome to investors and its determination to integrate into the global market. Therefore, foreign investment continues increasing as shown on Fig 1.3.



* 2010: first 6 month of 2010

(Source: Vietnamese General Statistics Office)

Fig. 1.2: Viet Nam GDP growth 2000-2010



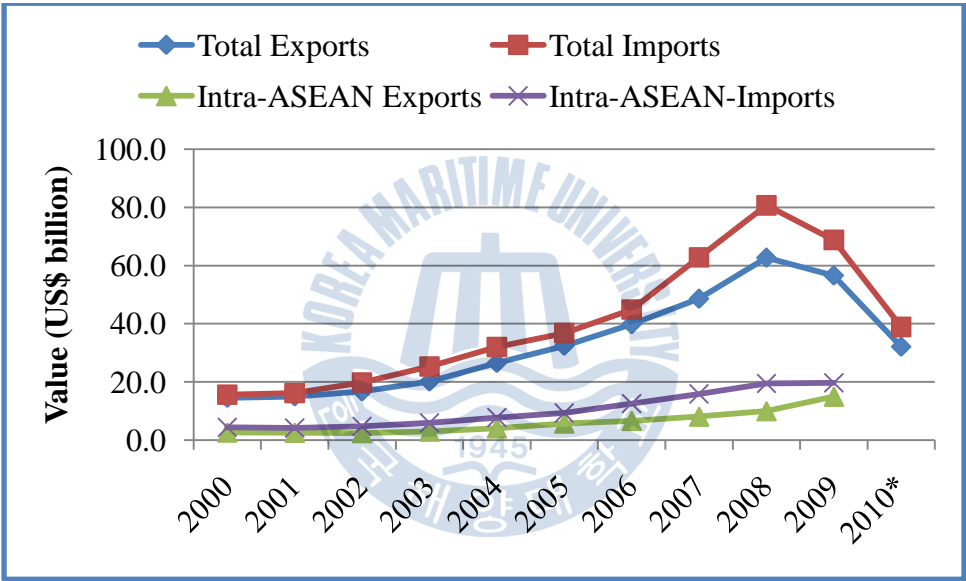
*2010: 1/1 – 20/6/2010

(Source: Vietnamese General Statistics Office)

Fig. 1.3: FDI in Viet Nam

The attracted FDI increased gradually in the period 2000 – 2007 but boomed in 2008 which reached 60.3 US\$ billion. However, because of the global financial and economic crisis, it dropped to 16.3 US\$ billion in 2009. The attracted FDI in the first six months of 2010 gained 8.4 US\$ billion, in which Netherland, the largest FDI investor in Viet Nam, invested about 2.2 US\$ billion, the Republic of Korea and Japan came next with 1.6 and 1.2 US\$ billion respectively.

Viet Nam economy has been in a developing period, so the import/export is increased dramatically, as shown on Fig 1.4. It could be seen that Viet Nam is a net importer as almost members of ASEAN.



*2010: First 6 months only

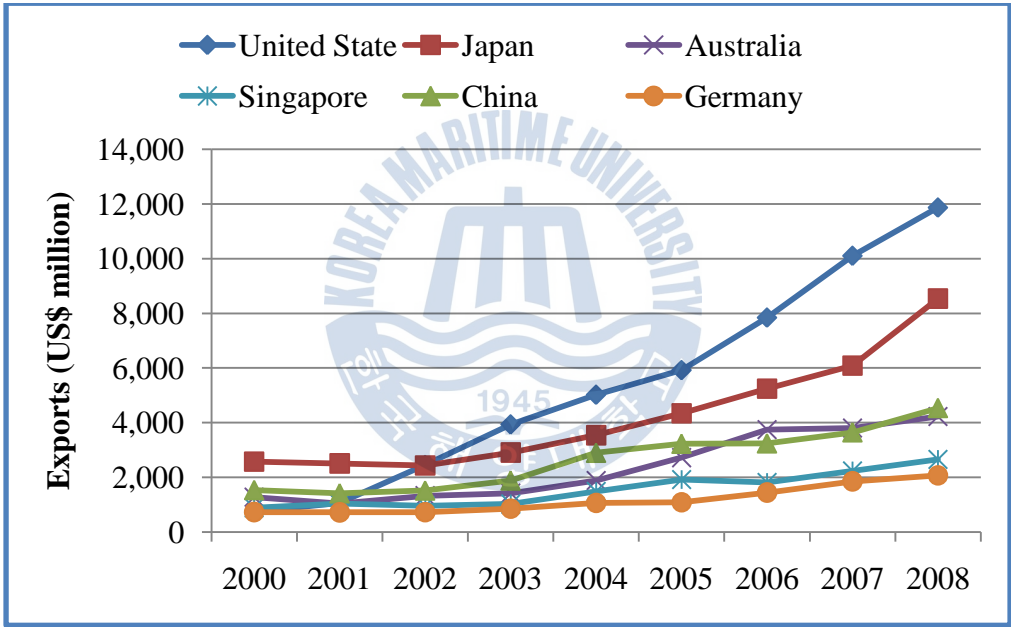
(Source: Vietnamese General Statistics Office)

Fig. 1.4: Exports and imports of Viet Nam

The export turnovers in the first six months of 2010 would be estimated at 32.1 US\$ billion, raised by 15.7% in comparison with those in the same period last year. The structure of export turnovers in the 1st half of 2010 changed in comparing with that in the same period previous year, in which the proportion of heavy industrial goods increased from 29.2% to 30.2%; the proportion of light industrial and

handicraft goods rose from 37.7% to 43.3%; while the proportion of agricultural and forestry goods slightly decreased.

Generally, Viet Nam exports have been as well as will be increased year by year. Among key export markets, the United States of America has been Viet Nam biggest export market with estimated export turnovers in 6 months of 2010 of 6.2 billion USD, raised by 22% compared to the same period last year; the next others came to ASEAN with 5.3 billion USD, up by 21%; EU 4.8 billion USD, up by 5.9%; Japan 3.5 billion USD, up by 31%; China 2.8 billion USD, up by 44%; the Republic of Korea 1.2 billion USD, up by 35% as shown on Fig 1.5.



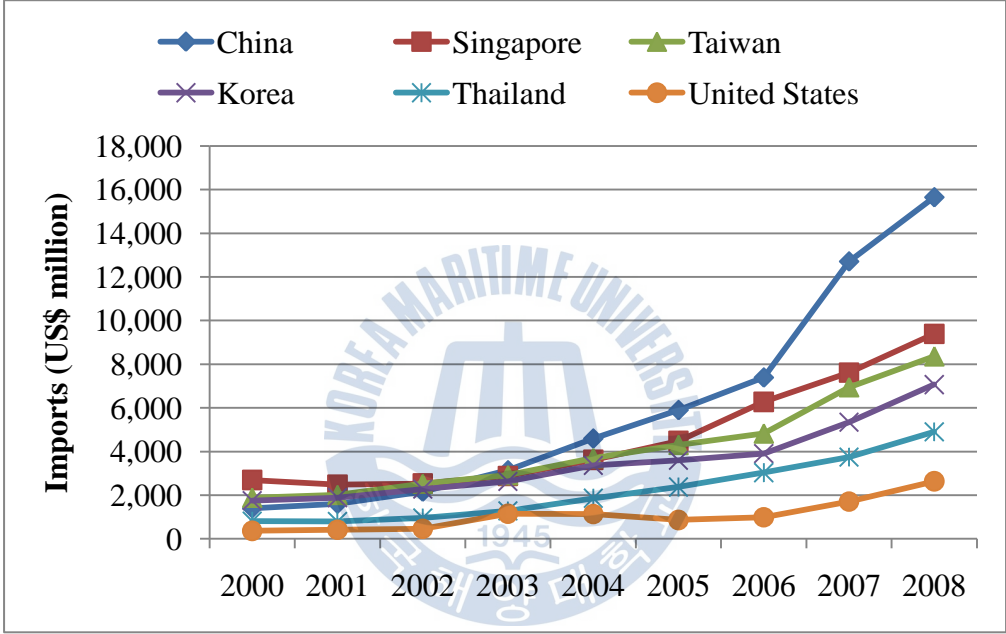
(Source: Vietnamese General Statistics Office)

Fig. 1.5: Exports by some noted countries and territories

Similarly, the general import turnover in six months was at an estimate of 38.9 billion USD, showing a rise of 29.4% in comparison to the same period in 2009. Of the total import turnovers, consumer goods accounted for 7.2%, reduced in comparison to the rate 9.7% in the same period in 2009; raw materials rose from 61%

to 65.2% and accounted for 81.5% of the import growth in 6 months; machinery and equipment slightly went down from 29.4% to 27%.

The import value in 6 months from main import markets increased in comparison to the same period last year, of which import from China valued 9.1 billion USD, up by 34%; from ASEAN 7.8 billion USD, up by 20.4%; from Japan 4 billion USD, up by 31%; from EU 2.9 billion USD, up by 20.4%; from Taiwan 3.2 billion USD, up by 11% (as seen on Fig 1.6).



(Source: Vietnamese General Statistics Office)

Fig. 1.6: Imports by some major countries and territories

In comparison between import and export value, the trade deficit in first six months of 2010 was estimated at 6.7 billion USD, equal to 20.9% of the total export value, of which the import surplus came mainly from Chinese market with over 6 billion USD.

As mentioned above, maritime transportation plays an important role for import as well as export not only intra- but also extra-ASEAN and particular Viet Nam. Necessarily, seaport that is a place at which the transfer of cargo and passengers to

and from waterways and shores occurs (Talley, 2009) is an important part of water transportation system, especially in Viet Nam, where its waters area is approximately three times larger than its mainland territory. Thanks to natural and geographical conditions, Viet Nam had approximately 160 ports varying in size and capacity, 305 wharves with total of 36,164 kilometer long, and their loading capacity was around 177.58 million tons in 2007 (Do *et al.*, 2009). It was responsible for approximately 90 percent of import/export volume. From 1999 to 2005, the number of accessed vessels, the cargo throughput, and containers volume via ports, which are members of Viet Nam Seaport Association (VPA), had increased 288%, 327% and 233%, respectively (*Source: VPA*). Besides, the freight volume through Viet Nam port system increased more than ten percent per year. Meanwhile, the port construction has been lagging behind the rapid development of the national economy (Le *et al.*, 2009).

Becoming the 150th member of WTO in 2006 is an opportunity and also challenge for Viet Nam in generally and Viet Nam port system in particularly. It has been updated to receive more ships varying in sizes, especially the large ones, while most of Viet Nam ports could only accommodate small and medium vessels currently. It is an essential need to bring them to become a main link for an integrated transportation system. Obviously, the development of a port system places a large impact on that of national and regional economies. In addition, its development, on the other hand, depends strongly on many factors where a good plan and strategy are the basic requirement for success. However, it is nearly impossible to determine a perfect strategy or plan to develop an ideal Viet Nam port system, so a suitable one should be applied, a satisficing strategy.

1.3 Review of strategies to develop port systems

The development of supply chain management practices, global alliances among shipping lines and the increase of logistics services offerings by transport companies are evidences of increasing in horizontal and vertical integration amongst organizations. It forces port authorities respond to the changing market environment. Differences in the objectives to be pursued by port authorities will affect their policies. Should they consider their primary objective to be maximizing the tonnage handled? Should they maximize the value added activities within the

port perimeter? Should they maximize profit generating opportunities for industry and services located in port? Should the community provide funds to support port investments or should port investments provide a revenue source to the local community? (Suykens *et al.*, 1998).

Alternatively, increased private participation is found in ports of most countries (Heaver *et al.*, 2001). It caused re-allocation of port property which was put to new use – increasing its capital value and stimulating local economies (Alderton, 2005). The role of private sector in seaports has been greatly expanded and the extent of privatization in ports can vary significantly. At world's top 100 container ports, privatization is a recent trend. However, although the influence of private sector actors in ports is growing, the role of public sector agencies also remains significant (Baird, 2002).

In addition, growth of containerized trade and the globalization of the manufacturing industry have created a potential demand for global services by container liner companies. Consequently, the current business patterns of shipping lines trend to be:

- Restructuring: concentration and rationalization via mergers and acquisition and strategic alliances;
- Differentiation: offering differentiated services via door-to-door transportation solutions as part of total logistics services; and
- Seeking greater operational coverage and scale economies: deploying bigger vessels and transshipment strategies.

As a result, a certain form of competition and co-operation among ports is necessary to provide services that fit into shipping lines strategies. Naturally, the competition amongst intra- or extra- ports has been increased. Port operators seek a new approach in order to benefit from their competitors (Culpan, 1993). A strategic approach called co-opetition was proposed by Song (Song, 2003), a term defined by Noorda (Noorda, 1993) meaning a mixture of competition and co-operation. Ports who were engaged in the same or similar markets should consider a win-win strategy rather than a win-lose one (Song, 2003).

Role of a port has been changed from that of a node for transferring cargoes between the sea and other transport modes to that of link in the logistics chain (Juhel, 2000). Inland distribution is becoming a very important dimension of that chain. As a result, inland accessibility as such has become a cornerstone in port competition (Cemt, 2001). A conceptual approach to port hinterland relationships, regionalization, was introduced by Notteboom (Notteboom *et al.*, 2005), which is a new phase not only of port and port system development with stronger links with their hinterland, but also of intermediary/transshipment ports with stronger links with their foreland.

Various forms of co-operation such as strategic alliances, and mergers to achieve greater control of the logistics chain have been put into practice to respond to the changing challenges and opportunities (Heaver *et al.*, 2001). Or a specialization strategy has been developed to attract customers. For examples, the Port of Singapore Authority has been pro-active in the marketing of its IT technology internationally, and P&O Ports and Hutchison Port Holdings have been active in expanding the geographic and service scope of their business. As a master of fact, they are leader ports in the world.

Actually, each port system has its own characteristics, so there are no two port systems applying similar policies. Therefore, totally copying successful strategies to develop Viet Nam port system does not promise to bring successes. Correspondingly, this dissertation would introduce a satisficing strategy in development of a port system with a case study of Viet Nam port system.

1.4 Research Aims and Objectives

This dissertation presents a study on development of Viet Nam Port system in a transforming period of the national economy. Consequently, Viet Nam economic trends would be identified and considered, which significantly influence changing transportation demand, especially on maritime transport. In addition, Viet Nam transportation system in general and port system in particular would be reviewed that promises to give an understanding on them.

Based on that information, suitable strategies to develop Viet Nam port system would be proposed. First of all, factors affecting the port development would be

considered and the satisficing strategy would be introduced. The reasons why this strategy should be applied would be explained. Continuously, applied strategies theories would be presented and considered on how to apply for development of Viet Nam port system. Clearly, they could not immediately and totally apply, so a satisficing way would be identified. It promises to bring a general frame work of this methodology to develop port systems as a guideline.

Viet Nam port system is considered as a case study, which presents how to apply to a practice system. It hopefully provides useful advices for planners and/or researchers who respond for and are interested in development of not only Viet Nam port system, but also other ones.

1.5 Scale and scope

As a master of fact, this dissertation is not a perfect research. It could not mention all aspects of a port system as well as Viet Nam port system. Author only focuses on interesting fields, but they are key ones in development of Viet Nam port system.

Obviously, only some attractive strategies, not all, are proposed. Actually, this study only suggests the ways as well as policies to develop an expectedly better port system. However, to implement them in development of Viet Nam port system is the next step and strongly depends on decision makers.

1.6 Outlines of the dissertation

In the next chapter, prospect of Viet Nam port system is summarized, which gives necessary information as well as issues that planners have been facing. Correspondingly, methodology of this dissertation is presented, in which main applied theories are reviewed as in Chapter 3. In Chapter 4, a Viet Nam port system is considered as a case study that provides a practice application. It promises to improve one of developing port systems. Finally, some essential conclusions and suggestions are proposed.

CHAPTER 2. PROSPECT OF VIET NAM PORT SYSTEM

First of all, this chapter would provide an overview of Viet Nam as well as ASEAN trade. It shows that Viet Nam transportation demands have been and will be increased, particularly on the maritime transport. Consequently, a classification of Viet Nam ports would be done, which promises to give essential information on them. Particularly, Viet Nam container ports would be mentioned as one of the key projects in the future. In the next section, a strategic master plan to develop Viet Nam port system until 2010 and targets to 2040 would be reviewed. Finally, chapter conclusion would be concluded.

2.1 Viet Nam and ASEAN trade

2.1.1 International trade pattern of main cargoes

The ASEAN countries are strategically situated in the Southeast Asia trading area. It is closely linked with the advanced economies of the North and Northeast Asia, the United States of America, and the European Union. ASEAN trade has been significantly contributed on world merchandise trade together with some selected regions in the world as shown in Table 2.1. In terms of exports and imports, in the period of 2005-2009, ASEAN trade increased its share in the global trade about six and five percent on average respectively. Due to the global financial and economic crisis, ASEAN exports and imports in 2009 dropped 18 and 23 percent with regard to previous year respectively.

Table 2.1: World merchandise trade by selected regions

(Billion dollars and percentage)

Region	Exports				Imports			
	Value	Annual percentage change			Value	Annual percentage change		
	2009	2005-09	2008	2009	2009	2005-09	2008	2009
World	12147	4	15	-23	12385	4	16	-24
North America	1602	2	11	-21	2177	-1	8	-25
South and Central America	461	6	21	-24	444	10	30	-25
EU	4995	3	11	-23	5142	3	12	-25
Asia	3566	6	15	-18	3397	6	21	-21
ASEAN	814	6	14	-18	724	5	21	-23

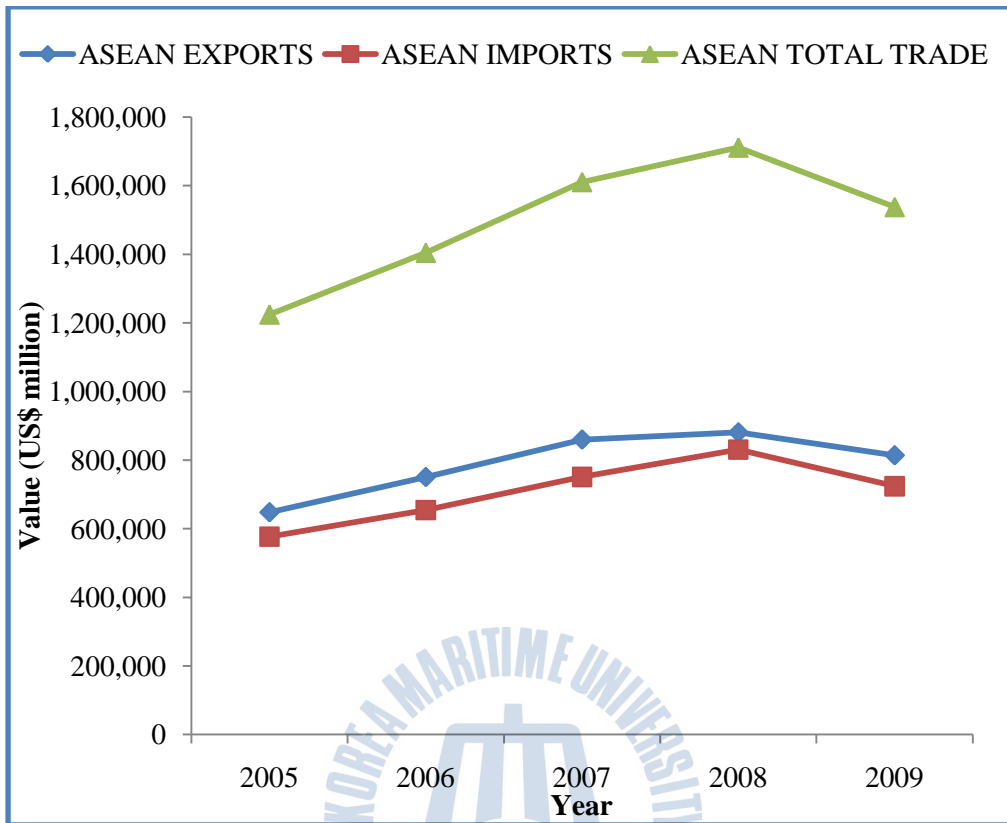
(Source: WTO, *World Trade Statistics 2009*)

In more detail, the region top-ten trade commodity groups are presented as in Table 2.2. Although at some industries import value exceeded export value such as vehicles, iron and steel, optical, photographic *ect.*, in general ASEAN is a net exporter. It achieves a trade surplus (exports minus imports) as seen on Fig 2.1, in which some major commodities contributing to the trade surplus include electric machinery, and mineral fuels. Furthermore, ASEAN total trade trend has been and would be increased.

Table 2.2: ASEAN Top-Ten trade commodities groups in 2008

Description	Value (US\$ million) [Share to total ASEAN trade (percent)]		
	Exports	Imports	Total trade
Electric machinery, equipment and parts; sound equipment; television equipment	175,493.3 [23.4]	166,069.7 [25.4]	341,563.0 [24.3]
Mineral fuels, mineral oils & products of their distillation; bitumen substances; mineral wax	150,380.1 [20.0]	146,518.7 [22.4]	296,898.8 [21.1]
Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	121,640.0 [16.2]	118,460.5 [18.1]	240,100.5 [17.1]
Vehicles, (not railway, tramway, rolling stock); parts and accessories	26,386.1 [3.5]	26,828.9 [4.1]	53,215.0 [3.8]
Iron and steel	10,254.5 [1.4]	38,830.7 [5.9]	49,085.1 [3.5]
Plastics and articles thereof	24,321.8 [3.2]	22,865.2 [3.5]	47,186.9 [3.4]
Organic chemicals	20,100.6 [2.7]	17,551.5 [2.7]	37,652.2 [2.7]
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	33,718.3 [4.5]	3,637.8 [0.6]	37,356.1 [2.7]
Rubber and articles thereof	28,375.8 [3.8]	7,115.8 [1.1]	35,491.6 [2.5]
Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments/apparatus; parts & accessories	15,094.1 [2.0]	17,580.2 [2.7]	32,674.3 [2.3]
Natural or cultured pearls, precious or semiprecious stones, precious metals and metals clad therewith and articles thereof; imitation jewelry; coin	15,138.2 [2.0]	17,410.1 [2.7]	32,548.3 [2.3]

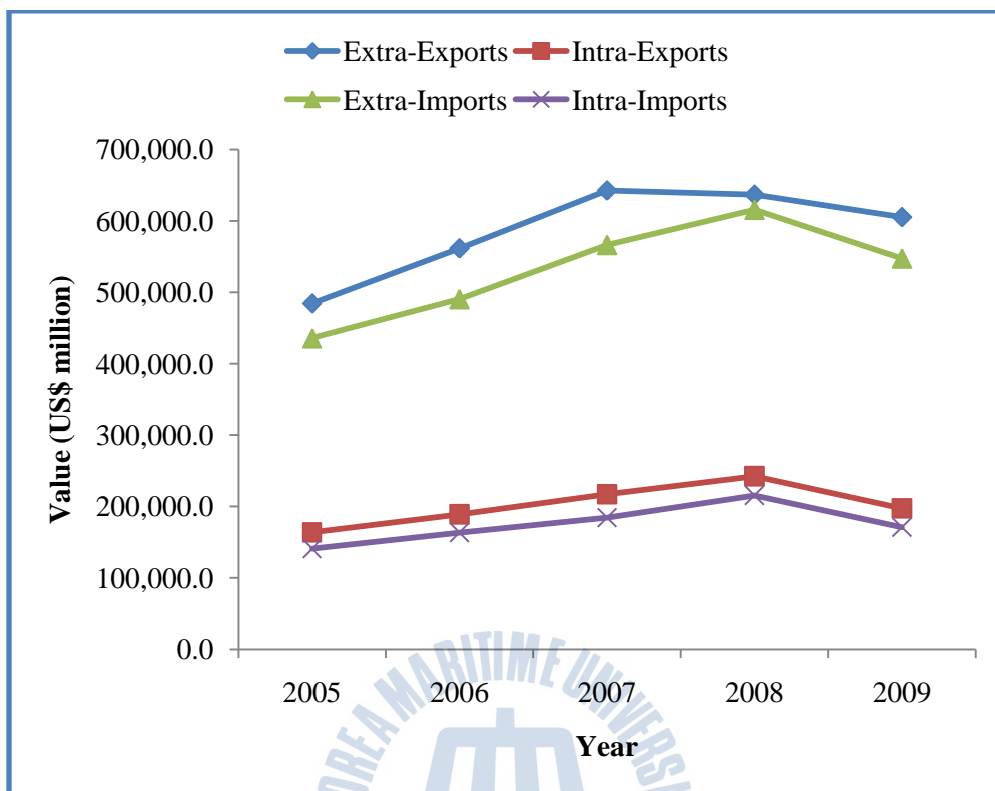
(Source: ASEAN Trade Database)



(Source: Compiled from ASEAN Trade database and WTO World Trade Statistics)

Fig. 2.1: Trend of ASEAN total exports and imports 2005 – 2009

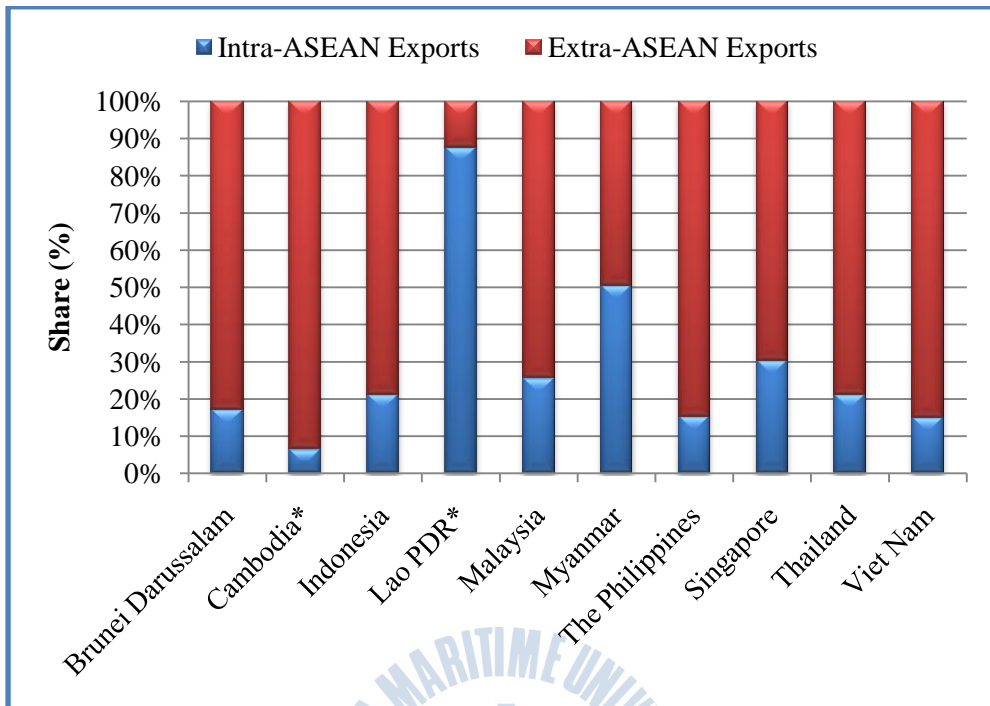
Actually, the members in ASEAN trade not only in ASEAN region, but also around the world. It is simple to call intra- and extra-trade of ASEAN. The development of extra- and intra-trade of ASEAN by export and import is shown on Fig 2.2. For both export and import, the average growth in extra-trade is much higher than that in intra-trade. From the export side, the rest of the world is the most important resources for export growth in ASEAN, and from the import side, the majority of products needed by ASEAN consumers and producers are supplied by the rest of the world. Overall, it implies that regions outside ASEAN are still the most important markets.



(Source: ASEAN Trade database)

Fig. 2.2: Trend of Extra and Intra-ASEAN exports and imports 2005 – 2008

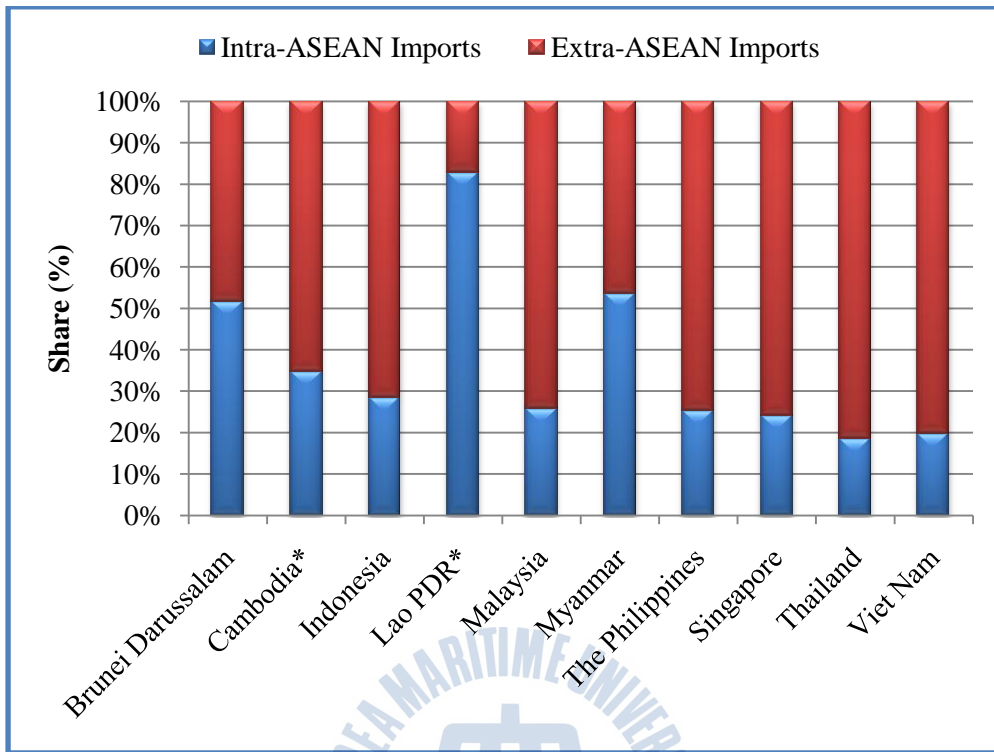
Generally, individual ASEAN members follow similar pattern with regard to regional decomposition of exports as does ASEAN on average, with exception of Lao PDR and Myanmar. In case of both countries, the share in intra-export is larger than that in extra-export (as seen on Fig 2.3).



*Trade information of Laos and Cambodia in 2008
 (Source: ASEAN Trade database)

Fig. 2.3: Share of Extra and Intra-ASEAN exports by country 2009

In terms of imports, Brunei Darussalam, Lao PDR, and Myanmar have the share in intra-imports higher than that in extra-imports (as seen on Fig 2.4).

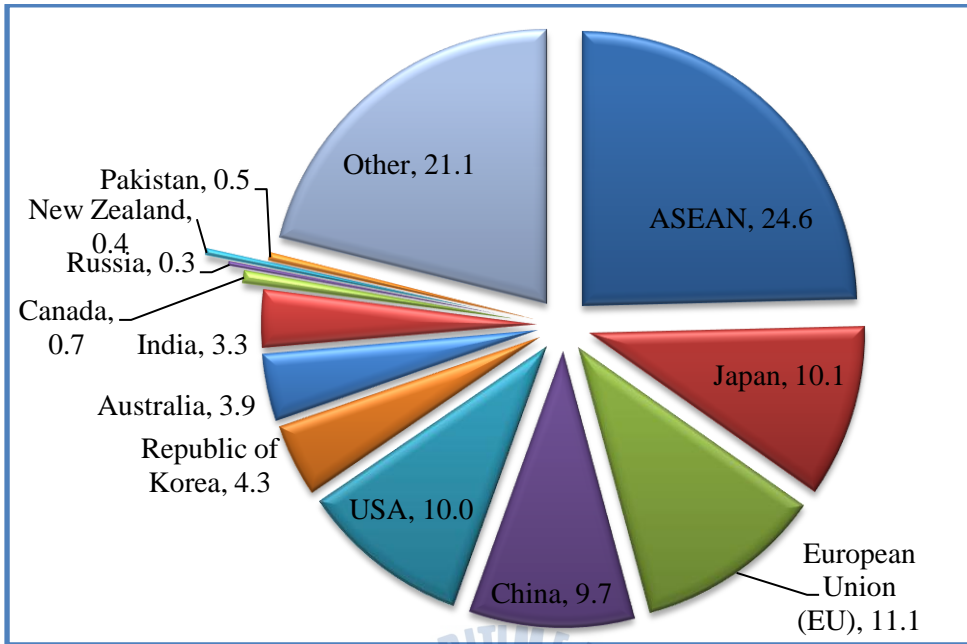


*Trade information of Laos and Cambodia are in 2008
 (Source: ASEAN Trade database)

Fig. 2.4: Share of Extra and Intra-ASEAN imports by country 2009

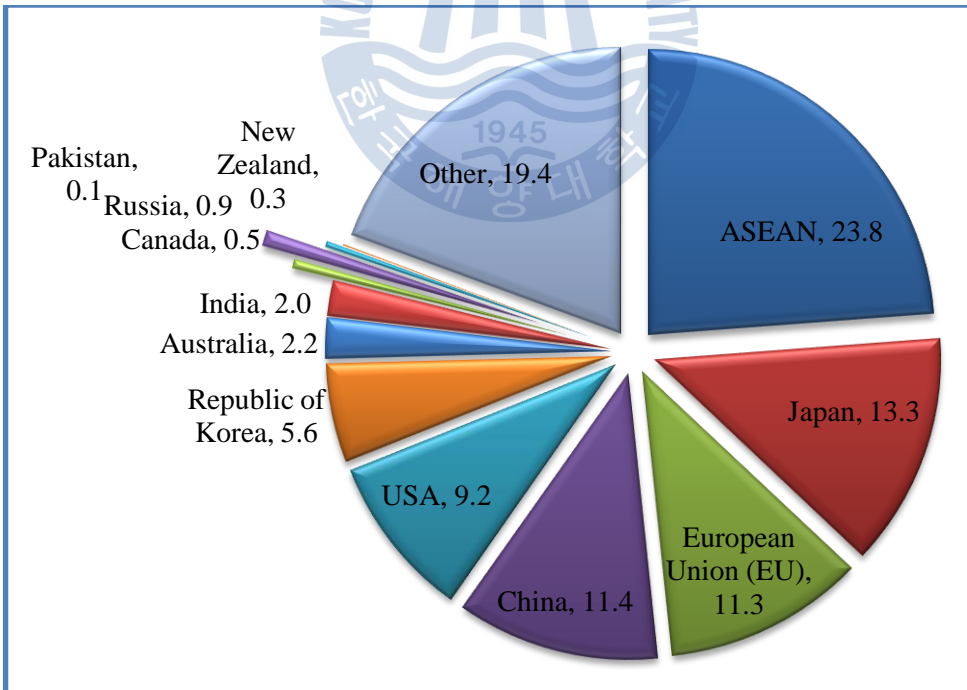
In both cases, Viet Nam majorly imports or exports with extra countries, more than 80 percent.

Obviously, the above figures have shown that the ASEAN had traded more with the rest of the world than among themselves as shown on Fig 2.5 and Fig 2.6. The four major markets of ASEAN trading partners are EU, Japan, USA, and China, which make up more than 40 percent of ASEAN trade. It is easy to recognize that EU is the largest export market while Japan is a major source of import goods.



(Source: ASEAN Trade database)

Fig. 2.5: ASEAN Export Market 2009



(Source: ASEAN Trade database)

Fig. 2.6: ASEAN Import Origin 2009

2.1.2 Trend of container cargo movements

World container traffic continued to expand at an average rate of 11 percent annually from about 203 billion TEUs in 2000 to around 502 billion TEUs in 2008. Of which ports in ASEAN region share about 14 percent annually. Since 2000, some ASEAN ports have been in top world busiest container ports. Among them, port of Singapore was ranked at the second place just after Hong Kong port in the period 2000-2003. Since 2004 it has risen to become the world busiest port in term of container volume handled. Besides, port Kelang and Tanjung Pelepas of Malaysia have been in top 20 in term of container volume handled in recent years. Expanding to top 50, ASEAN region additionally contributes Laem Chabang (Thailand), Manila (Philippines), Tanjung Priok (Indonesia), and Ho Chi Minh City (Saigon) port (Viet Nam).

The ASEAN economies handling the most container traffic were Singapore, Malaysia, Indonesia, Thailand, Philippines, and Viet Nam. The container volume handled by ports in the ASEAN region increased from about 27 million TEUs in 1999 to about 70 million TEUs in 2008, which were summarized as in Table 2.3 and on Fig 2.7. The trend of ASEAN container volume has been increased so significantly.

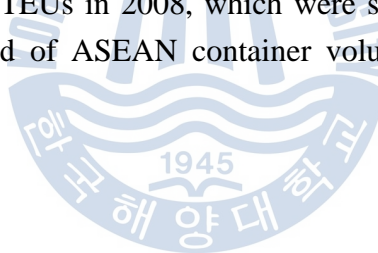


Table 2.3: Container volume by country (1,000 TEUs)

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Brunei Darussalam	62	60	59	67	77	101	108	102	98	90
Cambodia	n.a									
Indonesia	n.a	3798	3902	4540	5177	5369	5503	4316	6313	6788
Lao PDR*	Landlocked country									
Malaysia	3978	4642	6225	8752	10210	11510	12027	13419	14829	15724
Myanmar	263	313	351	382	361	316	325	379	n.a	n.a
Philippines	2856	3126	3133	3407	3639	3828	3824	3988	4474	4685
Singapore	15944	17086	15572	16940	18410	21329	23192	24792	27935	29918
Thailand	2892	3259	3438	3885	4245	4875	5194	5701	6200	6586
Viet Nam	963	1190	1292	1718	2043	3315	2911	3421	4489	5611
ASEAN	26957	33474	33972	39690	44162	50643	53084	56117	64339	69402
<i>Annual Change (%)</i>		24.18	1.49	16.83	11.27	14.67	4.82	5.71	14.65	7.87
World traffic	203,207	231,689	243,815	276,553	299,280	351,060	382,622	433,253	484,361	502,388
<i>ASEAN share in total world traffic (%)</i>	13.27	14.45	13.93	14.35	14.76	14.43	13.87	12.95	13.28	13.81

n.a: Data are not available

(Source: ASEAN trade database, WTO, IAPH)

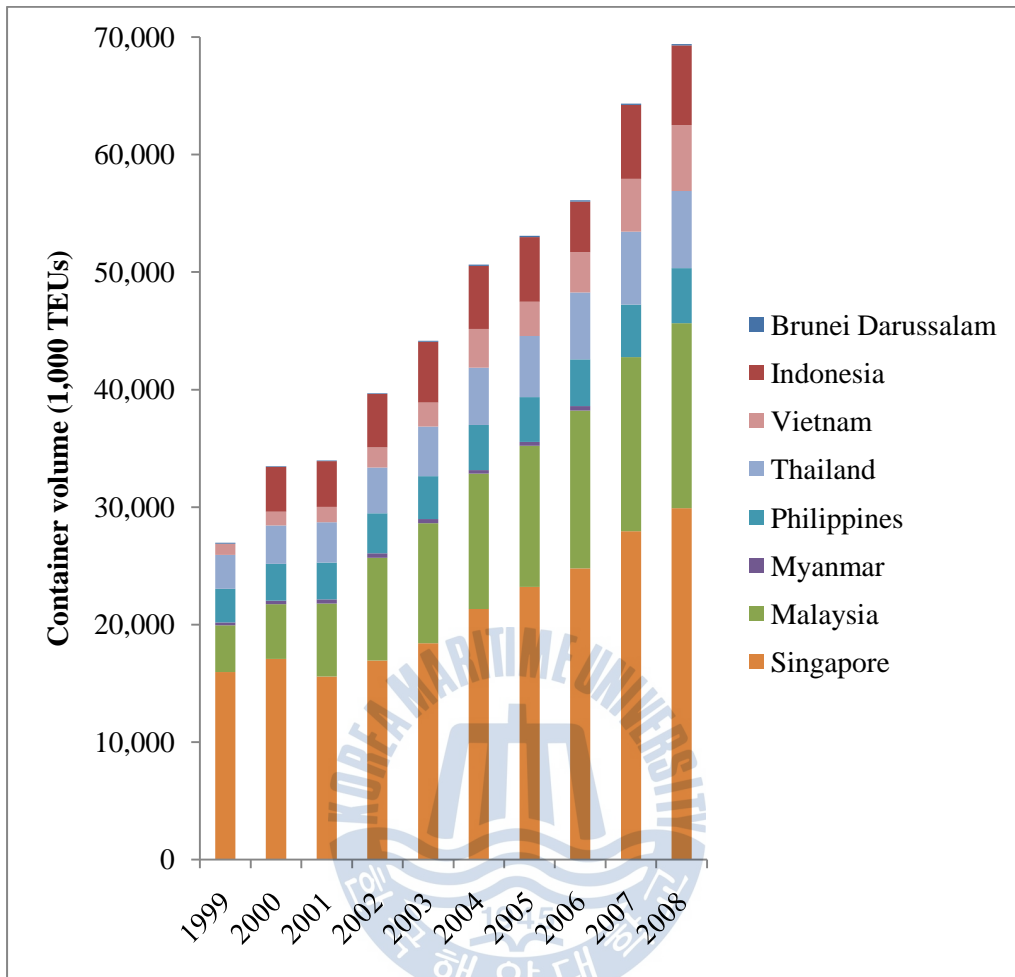


Fig. 2.7: Container volume handled by ASEAN countries

2.2 Classification of Viet Nam ports

A classification of ports would provide essential information such as their advantages and/or disadvantages, functions, and roles in a port system of both nation and global. They are necessary information for making a plan or strategy to develop a port system. According to Alderton (Alderton, 2005), ports could be classified into two large groups – by function and by geographic type. In the former, ports could be classified based on cargo interface, maritime industrial development area, and specific ship/shore interface. In the latter, ports could be classified as coastal submergence, tidal, artificial harbours, and river ports.

Viet Nam has a long coast approximately 1,650 kilometers in length extending from the north to south, is a narrow country where there are only 50 kilometers across at its narrowest hinterland points, and includes 64 cities and provinces that are temporarily grouped into three economic zones in simultaneously with their locations including the North, Middle (Centre) and the South of Viet Nam, as shown on Fig 2.8. As a result, there are many seaports located along the coastline, in which a few of them are crucial for the nation’s economic development by serving three focal economic zones. As mentioned above, to give essential information on Viet Nam port system, they would be classified based on geographic locations and functions as in the following sections.



(Source: Viet Nam Map)

Fig. 2.8: Viet Nam’s Cities and Provinces

2.2.1 Classification by geographic location

Viet Nam port system included around 114 ports varied in size, 2007 (*Source: VPA*). They are momentarily divided into eight groups as in the Viet Nam master plan for ports development until 2010 (*Le et al., 2009*). Only in a comprised area including Ho Chi Minh City, Dong Nai, and Ba Ria- Vung Tau provinces, there are 44 ports making up around 39 percent of the number of Viet Nam ports. They mainly serve for the biggest economic center of Viet Nam, Ho Chi Minh City, in which four ports including Saigon port, Saigon New port, Ben Nghe port, and VICT port of Ho Chi Minh City, and one deep seaport just opened in Cai Mep-Thi Vai, Ba Ria-Vung Tau, in 2009, have been played very important roles for not only the Southern economic zone but also the whole Viet Nam. The numbers of ports located in other groups are shown in Table 2.4, which would be mentioned more detail in following sections. These ports have been managed by 23 port authorities, the representatives of Viet Nam Port Maritime Administration, which located in different areas of the nation.

Table 2.4: Classification by geographic location

Group	Area	Provinces	Quantity
1	Northern	Quang Ninh to Ninh Binh	24
2	Northern Center	Thanh Hoa to Ha Tinh	07
3	Central Center	Quang Binh to Quang Ngai	14
4	Southern Center	Binh Dinh to Binh Thuan	10
5	Ho Chi Minh City, Dong Nai and Ba Ria-VungTau	Ho Chi Minh City, Dong Nai and Ba Ria-VungTau	44
6	Mekong River Delta	Mekong River Delta	13
7	Western South Island	Western South Island	01
8	Con Dao Island	Con Dao	01

(*Source: VPA, 2007*)

2.2.2 Classification by ports' functions

a. Cargo interface

Following cargo interface, ports could be classified into hub port, feeder port, transit port, and domestic port (Alderton, 2005).

Unfortunately, there is no hub port or transshipment port in Viet Nam, though some ports have a quite high cargo and/or container traffic volume. For example, the cargo volume and container volume of Ho Chi Minh ports in 2006 were about 35 million tons and 2.3 million TEUs, in respectively, but they have been considered as feeder ports. The limited hinterland and foreland of these ports as well as current conditions of geographic locations and facilities are ones of reasons. There is no port that could receive medium sized vessels of 50,000 DWT or 3,000 TEUs in Ho Chi Minh City area. They could only receive up to 32,000 DWT vessels at berth, though it could receive up to 60,000 DWT at Thieng Lieng buoy berth (far from current terminals) because of limitations. In the northern, Cai Lan port has been planned to receive 50,000 DWT and/or 3,000 TEUs; however, it has only accommodated vessels of 10,000 to 20,000 DWT due to some reasons such as limited hinterland as well as the weak competition in comparison with other ports in region.

It is possible to have a hub port in Viet Nam, because recently ports in Ho Chi Minh City have been planned to remove from inner city towards the East Sea, at Thi Vai- Cai Mep area, in order to take advantages of deep water. This location has a great geographical position as the centre of South East Asian region and located in important international marine routes, as well as room to expand. One of them has been operated and in the June 3, 2009, it served the first large ship, MOL Premium, with 73,000 DWT (Le *et al.*, 2009). Especially, Van Phong International Container Transshipment Port would play a very important role for transshipments from southern China and Asian countries as in the Vietnamese Government Officer plan. Besides, remain ports in Viet Nam could be considered as domestic feeder ports including foresaid four ports of Ho Chi Minh City of the Southern, Da Nang port in the Centre, Hai Phong port of Northern and other ones.

b. Maritime Industrial Development area

In order to take an advantage of cheap transport of bulk raw materials as well as delivery goods, some industries have located in port areas such as Hon La (Quang Binh), Hai Ha (Quang Ninh), Vung An (Ha Tinh), Hon Da-Dung Quat (Quang

Ngai), Long Son (Ba Ria – Vung Tau), and Hiep Phuoc (Ho Chi Minh City). There are four ports serving mainly for four industrial parks located in four deep seaports in Hai Phong, Dung Quat (Quang Ngai), Van Phong (Khanh Hoa), and Cat Lai-Hiep Phuoc (Ba Ria-Vung Tau and Ho Chi Minh City). Besides, there are about 33 ports serving for petroleum, oil and gas in Viet Nam.

c. Specific ship/shore interface

For specific ship/shore interface, ports could be classified into naval, fishing and specific commodity ports. The numbers of ports in each class are shown as in Table 2.5.

Table 2.5: Classification by specific ship/shore interface

No.	Type	Qty.
1	Naval	3
2	Cement	8
3	Coal	3
4	Steel, iron ore	3
5	Wood chips	3
6	Sand	1
7	Salt	1
8	Fertilizer	1

(Source: VPA)

2.3 Container port system

In Viet Nam, this revolution, containerization, came during the mid 1990s, quite late in comparison with other developed and developing countries. In the period 1995 – 2008, the container volume has increased nearly 1,000 percent, which reached about 5.6 million TEUs. Recently, more than ever, ports have been considered as a very important element for boosting a national economy.

As mentioned in previous sections, Viet Nam import/export volume has increased significantly recent years. Its major trade partners include the United States, European Union, China, the Republic of Korea, Japan and ASEAN member

countries. Consequently, the increase in exports and imports has led to the increase in port throughput. It is estimated that approximately 90 percent of the import/export volume has been carried by water way in recent years. According to VPA (Viet Nam Port Association), about two third of import/export volume are from Southern Viet Nam, of which 70 percent are container cargoes.

Although Viet Nam has more than a hundred of ports along the country, only nine of them are major ones, which include three dedicated container ports (located in the South) and six conventional/multi-purpose ones, receiving container vessels regularly. However, none of them is considered as a hub port. Therefore, almost Viet Nam cargoes in general and container cargoes in particular cannot be directly shipped to/from trade partners. For instances, export cargoes are shipped to ports such as Hong Kong, Kaohsiung, Singapore, and Kelang by feeder ships before reaching their destination markets. Similarly, import cargoes also have to go through above mentioned ports before entering Viet Nam by feeder ships. As a result of increasing trend in cargo movement, many major shipping lines such as Maersk, Hanjin, Heung-A, CMA, CGM, K'Line, NOL, NYK, and so on have provided services in Viet Nam.

From 2010, Viet Nam has direct services from SP-PSA international port (Viet Nam first deep sea container terminal) to both East and West coast of the U.S. For instances, Mearsk line has launched a direct container service route from SP-PSA international port to Port of Los Angeles (the U.S.). Major export goods are garment and textile, coffee, electric machinery, equipment and parts, shoes, sea food, and wood & products. This direct service brings more benefits to export customers without transshipment and operational risks. However, currently SP-PSA throughput is about 250,000 TEUs per year; once the second development phase completed in 2012, this figure will reach 2 million TEUs annually.

In spite of that, in order to have direct services to all major trading partners as well as increase competitiveness in maritime sector, it requires more money, time, and effort. Building hub port(s) is one of strategies. It is possible to have a hub port if it is invested suitably not only on port's infrastructure, superstructure and management, but also on other relative transportation infrastructures. Besides, a variety of specific ship/shore interface ports also make a diversified prospect of

Viet Nam port system. Viet Nam locates in the advantageous position in the Indochina region including Viet Nam, Laos and Cambodia. It is considered as a leader flag for development of this region economy.

Unfortunately, development of Viet Nam’s seaport system has been facing with many limitations. For examples, there has not had much money to invest in ports, at least USD 4 billion to meet the development rate around 340 million tons in 2020 (*Source: Vietnamese Prime Minister Officer*). Technology has been evaluated at lack up-to-date. Labor skills and infrastructure/superstructure have not caught up with the economy development rate. For port productivity, except SP-PSA international port can handle 103 boxes per hour, the other ports’ productivities are very low as in Table 2.6.

Table 2.6: Handling rate of some major ports in Viet Nam

(TEUs/crane/hour)

Saigon	Saigon New	Ben Nghe	VICT	Da Nang	Hai Phong
12	15	12	25	18	12

(*Source: Summaried from relative port websites*)









Furthermore, most Vietnamese container ports have been facing challenges including increases in imbalance of ports system, size of containerships and size of containers.

Actually, the seaports system recently meets some problems or challenges such as overload, congestion in ports, more requirements, large investment required, more competition and required replacement for the existing city ports.

The unequal location of seaports has happened. The seaports system in the north has only held up 25 to 30 percent of transport volume, so its capacity has been still abundant. Similarly, seaports in the central have only served around 13 percent of transport volume, which have been in lacking goods. Whilst those in the south have been overloaded, they handle approximately 57 percent of transport volume

(Source: VPA). Therefore, the expansion strategy has been not efficient, so other alternatives should be considered.

In addition, by transforming traditional miscellaneous liner goods into standardized container ones, an adoption of the container concept has created a revolution in ports that have permitted liner shipping to benefit greatly not only from economies of scale in cargo handling but also in size of containerships as

		Length	Draft	TEU
First (1956-1970)	 Converted Cargo Vessel	135 m	< 9 m < 30 ft	500
	 Converted Tanker	200 m	< 30 ft	800
Second (1970-1980)	 Cellular Containership	215 m	10 m 33 ft	1,000 – 2,500
Third (1980-1988)	 Panamax Class	250 m	11-12 m 36-40 ft	3,000
	 Panamax Plus	290 m	36-40 ft	4,000
Fourth (1988-2000)	 Post Panamax	275 – 305 m	11-13 m 36-43 ft	4,000 – 5,000
Fifth (2000-2005)	 Post Panamax Plus	335 m	13-14 m 43-46 ft	5,000 – 8,000
Sixth (2006-)	 New Panamax	397 m	15.5 m 50 ft	11,000 – 14,500

(Source: EURANS LTD)

Fig. 2.9: Container ship size

shown on Fig 2.9.

Since the beginning of containerization in the mid 1950s, containerships undertook six general waves of changes from the first generation of containerships that could transport up 1,000 TEUs to the sixth generation of containerships that could carry more than 11,000 TEUs. As a plan in a near future, a new containership generation would be introduced soon in the year 2013, Tripple-E Maersk Class, which could accommodate up to 18,000 TEUs (Source: Maersk Line).

Adaptably, ports and terminals have also had to respond to market demand by making large and rapid investments in infrastructure to cope with these new containership sizes. Container ports are under increasing pressure to provide capacity for larger containerships such as dredging channels and berths to deeper water depths, providing wider ship turning basins and utilizing larger dock cranes.

Unfortunately, Viet Nam has only one port, SP-PSA, which could serve the containerships up to 11,000 TEUs, the fifth generation of containerships, but it has not been considered as a transshipment port. As a notable admission, construction of at least a modern International Container Transshipment Port is one of important projects of Vietnamese.

Besides, the size of containers has gradually increased over time from the 20- and 40-foot containers to 45-, 48- and 53-foot containers. Especially, the shipping line APL introduced the Ocean53, the first 53-foot ocean capable container, which is built to handle the stresses of ocean voyages and repeated lift. The 53-foot container presents to the shipper because its capacity is 60 percent greater than that of the 40-foot container. As a result, it allows the shipper to consolidate more cargo into fewer containers and incur lower handling and transportation costs. However, it requires the adoption from container ports for the variety of size of containers. Currently, Viet Nam ports only handle for 20- and 40-foot containers. Therefore, they need to improve their infrastructure if they want to attract the shipping lines.

2.4 Strategic master plan

Viet Nam seaport system has been always considered to be upgraded as a part of its economic development plan. Viet Nam Maritime Administration has been expected to reach about 200 million tons in 2010 and 340 million tons in 2020 as in its plan approved by the Vietnamese Prime Minister Officer in 1999. However, due to the underdeveloped infrastructures such as roadway, railway, inland terminals and other supports, the seaports have been indispensable in transporting goods to export and in distributing imports. Therefore, they have not been able to meet the increase of demand.

As in the master plan for ports development, the overall objective is to serve as the basis for the construction and development of Viet Nam port system according

to a national overall and synchronous planning; for the establishment of communications and transport infrastructure-linking centers in different regions and particular in key economic regions; for the creation of port technical and material bases, in order to promote the economic development and, at the same time, to confirm the region and the world, the position and advantages of the country marine economy, and create ambitious important hubs for economic exchange between the country and foreign countries.

In order to achieve these overall objectives, the master plan pointed out three specific ones. The first objective is to plan the development of Viet Nam port system so as to meet the requirements of national industrialization and modernization. Second, Viet Nam port system would ensure the handling of the whole volume of goods imported and exported by seaway to meet the requirements of national economic growth, with the expected capacity of around 200 million tons per year by the year 2010 and targeted capacity of approximately 340 million tons a year in 2020. Third, Viet Nam ports system would be planned and distributed all over the country at the locations where conditions and demands for the construction of ports existing.

Together with the development of ports, the synchronous development maritime services and related infrastructures are also the essential need in order to rise the port's servicing capability and enhance efficiency and effectiveness in investment.

Viet Nam port system by the year 2010 included eight groups (as seen on Fig 2.10) as followings. Actually, because of new requirements, an up-to-date master plan for developing Viet Nam port system until 2020 and vision to 2040 was just issued in 2010 and would be presented in Chapter 4.



(Source: VPA)

Fig. 2.10: The eight port groups as in the master plan until 2010

Group 1: group of northern seaports

It includes 24 ports and 2 potential ones lasting from Quang Ninh to Ninh Binh provinces, where Hai Phong and Cai Lan deep water ports are the most important ones. They have served industrial parks and economic development of the Northern of Viet Nam, and also been an indispensable link of this region to other regions and

countries such as Laos and China. These ports could serve vessels up to 50,000 DWT. The cargo throughput via this group might reach 58 million tons by the year 2010. Lach Huyen International Container port is another key project of this group and would become a main container port in this area.

Group 2: group of ports in the northern centre of Viet Nam

This group includes 7 ports and 3 potential ones serving the economic development of Thanh Hoa, Nghe An and Ha Tinh provinces and attracts transit goods of both Thailand and Laos countries via highways 7 and 8. These ports could serve vessels up to 30,000 DWT by the year 2010. It is estimated that cargo throughput handed at this port group may reach 10 million tons by the year 2010.

Group 3: group of ports in the mid-centre of Viet Nam

Three of 14 ports in this group are very important, in which two of them are national integrated ports and the other is a specialized port for petrochemical and metallurgy industrial park. All ports in this group have served provinces in the mid-center of Viet Nam as well as neighbor countries, which include the central highlands, southern Laos and northeastern Thailand via national highways 9 and 24. The vessels of up to 50,000 DWT and 200,000 tons crude oil ships could be handed at these ports. It is expected that goods handed at these ports could reach 50 million tons by the year 2010.

Group 4: the group of ports in the southern centre of Viet Nam

This group could serve the southern center provinces lasting from Binh Dinh to Binh Thuan and also the northeastern Cambodia and northeastern Thailand via national highways 19 and 24. A development plan for a modern international container port was carried out at Van Phong bay. Once constructed, this port could receive the vessels up to 80,000 DWT or larger and play an important role in the economic zone and also for goods transited between southern China and ASEAN countries. It has been expected to become the international transshipment port serving for not only Viet Nam, but also ASEAN region.

Group 5: group of ports in Ho Chi Minh City, Dong Nai and Ba Ria-Vung Tau

Nearly 50 ports are included in this group serving southern provinces, especially

Ho Chi Minh City – Dong Nai – Binh Duong – Ba Ria-Vung Tau focal economic zones. This group has played a very important role in Viet Nam port system. Only container volume throughout ports in Ho Chi Minh City area was accounted more than 65 percent of total whole Viet Nam port volume.

However, port development is restricted by their current conditions. These ports are river ports, located just nearby Ho Chi Minh City center and nearly 90 kilometers far away from the pilot station. Therefore, as a matter of course, the hinterland is limited; the traffic is congested; and accessing channel is limited. During the 2005-2010 period, they had been planned to remove out of Ho Chi Minh City center to outskirts of the city such as Cat Lai, Hiep Phuoc, Phuoc An, and to the Thi Vai - Cai Mep area. By 2020, all remaining ports in Ho Chi Minh City would be relocated to the Thi Vai – Cai Mep area.

Ba Ria – Vung Tau is a province known as its advantageous geographical location, such as Cai Mep – Thi Vai area, which is able to accommodate large vessels, so as many as 26 investment projects aimed to build ports along the Thi Vai River system have been licensed. Of those, five projects were completed and have been in use. The other projects have been underway with the new container ports, Cai Mep and Ba Son shipyard. Ben Dinh – Sao Mai complex port is one of the key national projects for development in the period 2006 – 2010 under the national master plan for seaports, which are located in downstream of the Thi Vai River close to the sea. Recently, parts of these projects have been operating. The complex ports would provide oil, gas and container handling services and have a shipyard and a petroleum depot. It would have six container wharfs capable of handling 100,000 DWT vessels and around 50 million tons of goods annually.

Group 6: group of Mekong River Delta ports

In order to serve transport demands of domestic goods, this group plays a vital role for economic development in whole Mekong Delta downstream area in Viet Nam. Amongst those, Can Tho port is the most important one, which was expected to be capable of up to 1.2 million tons of cargo in the year 2005, and to reach 2.5 million tons in the year 2010.

Group 7: group of ports of islands in the western south of Viet Nam

Located in the Gulf of Thailand, Phu Quoc Island is currently the largest island of Viet Nam. It is called the Emerald Island because of its natural treasures and high tourism potential. Therefore, the port development plan by the year 2010 concentrated on both cargo and passenger services. Currently, the objective is to develop An Thoi port in order to serve 300 thousand tons of goods and 450 thousand passengers annually. Later, a new integrated port capable of 2,000 passenger ships and 30,000 DWT vessels would be built in Dam Gulf. Fish port is also an important part of the overall plan.

Group 8: group of ports in Con Dao Island

Con Dao district also offers great potential for seaport development. Ben Dam bay with 6 to 18 meters in depth could house a seaport capable of receiving around 5 to 6 million tons of goods annually. A tourist port for yachts would be constructed in Con Son Bay. This complex port would serve the transport of goods and passengers between Con Dao and mainland and between islands in this area. It is also a base for oil technical service, seafood processing, tourist centers, as well as storm shelters for fishing vessels and oil service ships in the Nam Con Son sea area.

2.5 Analysis

Port should be considered as one of the vital elements of waterway transportation system. For most trading nations, port is a main transport link with its trading partners and thus a focal point for motorway and railway systems (Alderton, 2005). Therefore, it is obvious that a suitable port development will boost a national economy.

Viet Nam has an interlacing system of rivers and ditches of approximately 40,998 kilometers in length, and the coastline around 3,200 kilometers (excluding islands) and nearly locates at the important international marine lines, linking current eventful economic centers of the world (Do *et al.*, 2007). It is very advantageous to transport goods and/or passengers among local areas inside Viet Nam, and between Viet Nam and other countries in regions or in the world by waterways. Historical data show that approximately 90 percent of the import/export volume was carried by waterways, and inland waterway transport accounted for about 34.5 percent of the domestic cargo transport volume in the past few years.

This figure was even more impressive for Mekong River Delta, where inland waterway system is one of the most popular means, handling for around 66 percent of cargoes and 32 percent of passengers. These evidences show that waterway transportation has been taking a very important role in the nation's economic development. Port is a key element which should be paid much attention to enhance the capacity of the waterway transportation system.

A second major driving force is the nature of modern markets, globalization. Levels of international trade and economic interactions continue to be increased. National economies become ever more integrated into global system and corporations possess an international perspective, so production, assembly, and outsourcing all take place in countries that offer competitive advantages (Szyliowicz, 2000). Viet Nam is one of the most potential places for such activities. As a result of favorable government policies, a well educated workforce, and concerning about China's rising cost, more and more foreign investors have considered Viet Nam as a potential place for establishing manufacturing and distribution centers, primarily for export. This suggests that logistics should be placed a suitable consideration.

On logistics standpoint, port is a very important node, because it serves as an intermodal/multimodal transport intersection and operates as a logistics centre for the flows of goods and people (Bichou *et al.*, 2005). In other words, this requires national transportation systems with sophisticated ports and other infrastructures to handle the international trade.

Development of other infrastructures such as highways and railways also affects to that of port system. For instance, Asian Highway network connecting 32 countries and covering around 140,000 kilometers is one of the most important projects to improve the highway systems in Asia. Thanks to this network, Viet Nam could connect closely with other countries in region such as Laos, Cambodia, and Thailand. Therefore, some Viet Nam ports could become regional ports even hub ports, and/or transit ports to serve for not only the nation but also some parts of neighbor countries. For examples, ports in Ho Chi Minh City could serve for the Southern Key Economic Zone and Southeast Asian countries; shipments from southern China and Asian countries could transit via the Van Phong port to save

time and money. This promising future also places a pressure on Viet Nam ports system.

Thank to geographic conditions, Viet Nam has many deep water seaports located on the long coast, in which Hai Phong, Da Nang and Ba Ria-Vung Tau ports have been considered to develop as international maritime gateways and especially the Van Phong-Khanh Hoa port has been developed to become the international transit port not only for Viet Nam but also for Indochina and ASEAN region (Source: Vietnamese Prime Minister Officer, 2009). Their main characteristics are summarized in Table 2.7.

Table 2.7: General characteristics of Viet Nam four main ports

Port	Accommodated ship
<i>Hai Phong</i>	
Lach Huyen	50,000 – 80,000 DWT or 4,000 – 6,000 TEU
Dinh Vu	20,000 – 30,000 DWT
Cai Lan	50,000 DWT or 3,000 TEU
<i>Da Nang</i>	
Tien Sa, Son Tra	30,000 – 50,000 DWT or 4000 TEU
Lien Chieu	50,000 – 80,000 DWT or 4,000 – 6,000 TEU
<i>Ba Ria – Vung Tau</i>	
Cai Mep, Sao Mai – Ben Dinh	80,000 – 100,000 DWT or 6,000 – 8,000 TEU
Phu My, My Xuan	50,000 – 80,000 DWT or 4,000 – 6,000 TEU
Long Son	30,000 DWT
<i>Van Phong, Khanh Hoa</i>	
Dam Mon	9,000 – 15,000 TEU
South Van Phong	400,000 DWT
West Van Phong	50,000 – 100,000 DWT

(Source: Vietnamese Prime Minister Officer)

However, all ports in Indochina region have been still considered as feeder ports as shown on Fig 4.14, although some ports, especially Viet Nam ports, meet required conditions to become international hub ports or transit ports.

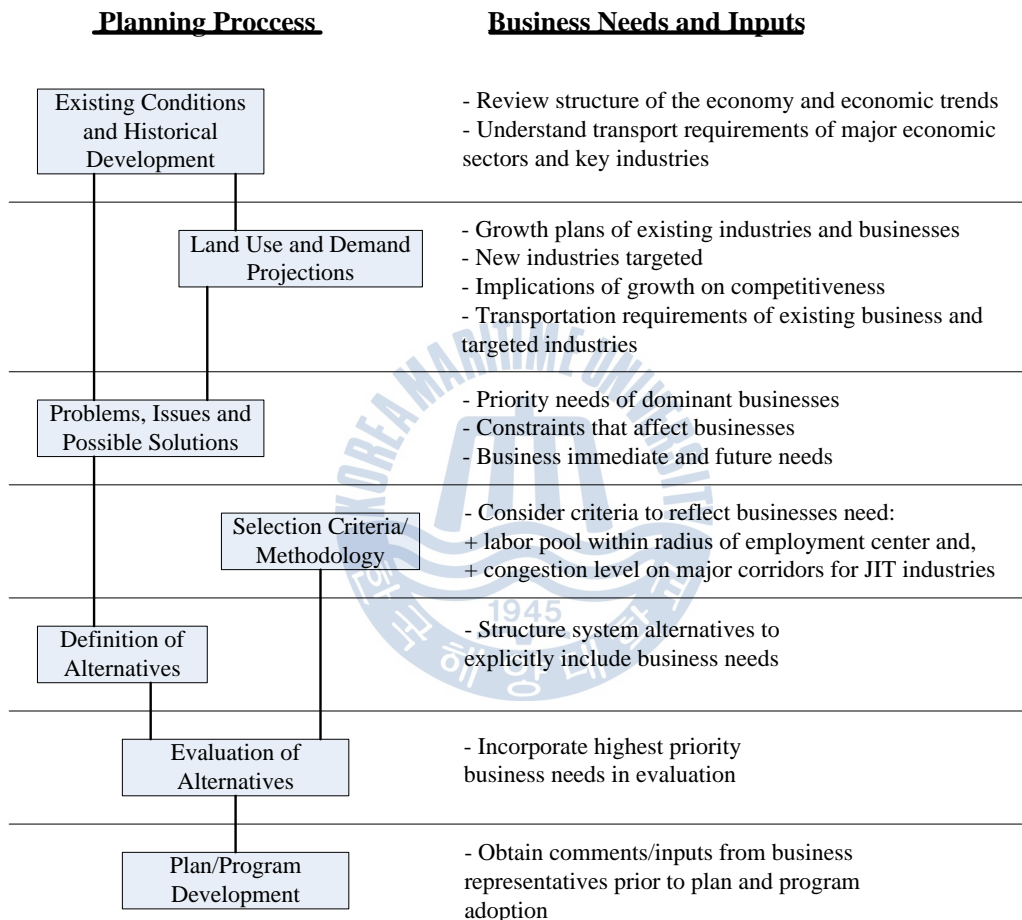
2.6 Conclusion

Viet Nam has been in progress to become an important and dynamic economy in ASEAN and largely in global trade. Consequently, its transportation demands have been increased and required much on infrastructure development, especially on transport systems. Due to Viet Nam geography, maritime transport plays an important role in national economy. As a result, Viet Nam port development requires much attention as a key project in the future, especially on developing container ports. A quality plan or strategy is the first requirement of its success.



CHAPTER 3. METHODOLOGIES

Transportation planning process should incorporate analysis of business and input from the business community. The Transportation Research Board (USA) introduced the steps for incorporating business needs into the transportation planning process as shown on Fig 3.1.



(Source: NCHRP Report 421)

Fig. 3.1: Incorporating business needs into transportation planning process

Following the suggested planning process, this dissertation would

- Review structure of ASEAN, Indochina and particular Viet Nam economy and economic trends.

- Analyze transport requirements of key area industries,
- Review growth plans of area businesses,
- Consider new industries targeted in economic development plans,
- Analyze implications of business growth on transportation demand and competitiveness of area businesses,
- Identify priority transportation needs of dominant business,

(They were mentioned in Chapter 1 and Chapter 2)

- Consider transportation constraints that affect businesses,
- Summarize immediate and anticipated priority transportation needs of businesses,
- Develop an evaluation methodology that formally incorporate criteria reflecting business transportation needs,
- Structure transportation alternatives to include highest priority business transportation needs, and
- Obtain comments from reviewers.

(They would be presented in the next sections of Chapter 3 and the remain Chapters)

Consequently, the satisficing strategy for port development would be defined and the reasons why it should be applied for Viet Nam port development would be presented. Sequent theories of interested strategies would be reviewed, which have been applied in many successful port systems in the world. They promise to bring much contribution when making a plan for development of Viet Nam port system.

3.1 Satisficing strategy

It is very difficult and virtually impossible to find out well-defined, unique, optimum solutions for a port development. Instead of striving to obtain an optimum alternative, planners are generally interested in obtaining a satisfactory one. Actually, it is not assured that the selected alternative is perfect in terms of satisfying all required criteria at the highest levels, which both satisfies as well as sacrifices them in some aspects.

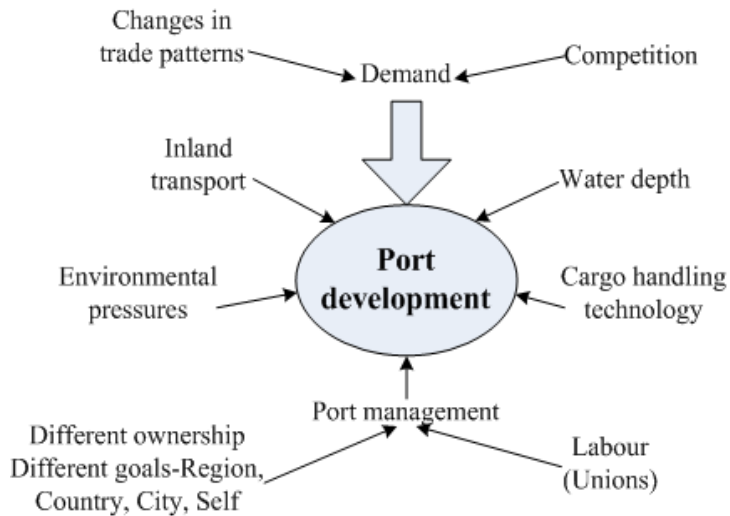
The notion of “satisfice”, a mixture of “satisfy” and “sacrifice”, was first introduced by Herbert Simon (Simon, 1957), which is defined as “to be good enough for the real world although not perfect”. Simon characterizes the solution

used as satisficing rather than optimizing. Herbert Simon's ideas have been influenced directly and/or indirectly scholars in the study of decision making and entrepreneurship in the large and complex modern business corporation (Minkes *et al.*, 2003).

In maritime industry, seaport can play a major role in promoting international trade by generating commercial and industrial activities which directly assist the economic progress of the country. The history of many ports shows how a bold policy of extending and modernizing ports can revitalize the economy of the Global as well as ASIA, ASEAN, Indochina region in general and Viet Nam in particular as mentioned in previous Chapters.

Within the broad national strategy, development of each individual port must be comprehensively planned. The development of a port consists of a combination of medium-term and long-term planning of new facilities plus-in the case of an existing port-a programme of short-term action to improve the management, the present facilities and their use (UNCTAD, 1985).

In addition, ports are constantly changing (Alderton, 2005), because many factors cause ports to change, evolve or die as show on Fig 3.2. Their effects on Viet Nam port development would be mentioned in the next Chapter.



(Source: Alderton, 2005)

Fig. 3.2: Factors constraining port development

Actually, competition is influenced by the geography of port jurisdiction as an issue for port authorities. Port competition may happen between ports or within ports called interport or intraport competition (Talley, 2009). It also happens between ports not only in different countries, but also in a country. For example, the competition naturally happens between neighbouring container ports of Shanghai and Ningbo in China (Cullinane *et al.*, 2005).

As a matter of fact, Viet Nam ports meet a competition with neighbouring ports in ASEAN region such as Port of Thailand, Malaysia, Singapore and Indonesia, as well as among them (Do *et al.*, 2007, 2008, 2009, 2011 and Le *et al.*, 2007, 2008, 2009). Therefore, they have been up-to-date and developed to cope with changing and new requirements and attract more customers, shippers.

The choice of ports by shippers is influenced by port money prices, port characteristics, and ship-schedule characteristics of ships that call at a port (Tiwari *et al.*, 2003). In a competitive environment, ports not only compete on the basis of operational efficiency and location, but also on the basis of the fact that they are embedded in the supply chains of shippers (Robinson, 2002). Actually, important

factors proposed for port choice are a little difference in shipping line or freight forwarder perspective as summarized in Table 3.1 as examples.

Table 3.1: Important factors for port choice

Jose L. Tongzon, 2007 (Shipping lines' perspective)	Jose L. Tongzon and Lavina Sawant, 2008 (Freight forwarders)	Theo E. Notteboom, 2008
Frequency of ship visits	Cargo size	Availability of <i>hinterland</i> connections
<i>Port efficiency</i>	Connectivity	Attainability of consumers
<i>Adequate infrastructure</i>	Efficiency	<i>Maximum depth of port approaching route</i>
<i>Location</i>	Infrastructure	Port ship time (high productivity)
Port charges	Location	<i>Reliability</i> (absence of labour disputes)
Quick response to port users' needs	<i>Port charges</i>	Reasonable tariffs
Ports' reputation for cargo damage	<i>Wide range of port services</i>	Degree of congestion

Summarily, some main factors should pay an attention when a plan or strategy for port development is made as suggested in Table 3.2.

Table 3.2: Suggested important factors

Factors	Descriptions
Geographic location	Ability to connect the immediate and extended hinterland and the main shipping lanes
Inland transport	Railways system, and road transport
Demand	Quick response to port users' needs, become port's reputation for cargo damage, meet the traffic flows, can compete with others, ...
Labour force and social climate	Labour skills, peace, education, availability... Government policies, environment pressures...
Port efficiency	Speed and reliability of port services, on-time delivery, capital and labour productivity, asset utilization rates.
Nautical access	Water depth, maximum draft and maximum vessel length, tidal windows, and restrictions to vessels
Technology	Cargo handling technology, IT systems, containers...
Port costs	Quality and costs of auxiliary services, efficiency and costs of port management and administration, costs of inland transport services and port community systems.

(Source: Synthetized from many sources)

Actually, port development not only in Viet Nam but also in any country faces with many constraints such as budget, infrastructure, superstructure, technology, labor skill, and geography (Do *et al.*, 2009). In Viet Nam, most of them could not catch up the economic development rate. Therefore, it is really difficult or rarely possible to achieve a port system satisfying all expected factors at the highest levels with existing limitations. Correspondingly, a satisficing alternative is suggested as mentioned above. There are three central relaxed assumptions of subjectively expected utility theory (Simon, 1957):

- Alternatives are not fixed in advance but generated or identified. The process of generation or identification is not in any way comparable to an optimum search.
- It should not assume that probability distributions of outcomes are known. It should assume that people develop strategies for dealing with uncertainty.
- It should not assume utility maximization but satisficing.

The satisficing strategy has been applied in many fields such as economy as determinants of the quality decision making in economic organizations with a good significant influence (Minkes and Foxall, 2003), production where it is used to analyze the performance of a production unit in two directions including resource utilization versus output performance and interunit comparison (Tchangani, 2005), and project management with making the project compression decisions (Salem *et al.*, 1984). Herbert Simon's emphasis on processes as determinants of the quality of decision making in economic organizations has been a significant influence (Minkes and Foxall, 2003).

In strategic decision making for public policy planning, supporting the decision process is more important than supporting the search for an optimum solution to the problem, especially since for most policy problems a well-defined objective function does not exist (Van Groenendaal, 2003). Therefore, any policy planning will, at best, lead to a satisficing solution, which is a solution path acceptable (not optimal) for almost all parties concerned.

Economic crisis and trends in ports and shipping sectors are causing port planners to rethink their approach towards port planning, design and project evaluation. Attributes such as flexibility and adaptability can provide a port infrastructure system with the capacity to be useful under changing requirements, making it robust in face of uncertainty, lengthening its economic lifetime and guaranteeing payback on investment (Taneja *et al.*, 2010). Therefore, flexibility has received much attention. It could be introduced in the organization, in procedures and regulations and in contracts and operations, where satisficing solutions were suggested to formulate requirements at the level of output specifications and functional requirements for flexible port's operation and management.

In marine industry, there has been considerable historic and current research in Western Port, making it one of the better-studied embayments in Australia. A coordinated and cooperative approach is needed to address the impacts to and management of Western Port via identification of priority research needs. Many stakeholders also identified the need for better access to and sharing of scientific knowledge. A process to achieve agreement on the priorities for research to address the gaps in understanding for management is proposed to ensure efficient and targeted research. Critical principles to consider and multiple objective decision support tools could be used in this process. Multiple objectives recognize that within the community there are many values and objectives related to a particular decision and also that an individual decision-maker can hold multiple objectives. Actually, an optimal solution with regards to all the objectives is rare. Therefore, a satisficing compromise solution should be sought (Counihan *et al.*, 2003).

Obviously, decision-makers are faced with a decision that must be made or a problem that must be resolved. This is at the heart of policy analysis, which is to evaluate, order, and structure incomplete knowledge so as to allow decisions to be made with as complete an understanding as possible of the current state of knowledge, its limitations and its implications (Morgan and Henrion, 1990). A satisficing or behavioural decision approach was suggested as a tool for sustainable transport policy design. It was assumed that decision-makers are not completely informed nor are they utility maximisers as in the normative approach, but rather satisficers searching for acceptable, though rational, but not necessarily optimal, solutions (Zuidgeest, 2005).

Several real world problems are characterized by combinatorially explosive solution spaces as well as multiple, conflicting criteria. Therefore, it might be more fruitful to analyze policies with the aid of a satisficing approach rather than using traditional assumptions of optimizing or maximizing behavior (Mosley, 1976). The satisficing approach is more suitable for an understanding of a policy than the traditional optimizing or maximizing method, so the better idea can be obtained when and under what circumstances the one or the other approach is appropriate (Rothschild, 1999).

Viet Nam port development copes with many gravitational forces, expected factors, and limitations as visually viewed on Fig 3.3. In this paper, therefore, author introduces the satisficing strategy in port development with a case study of Viet Nam port development, of course, which is not a new one as far as.

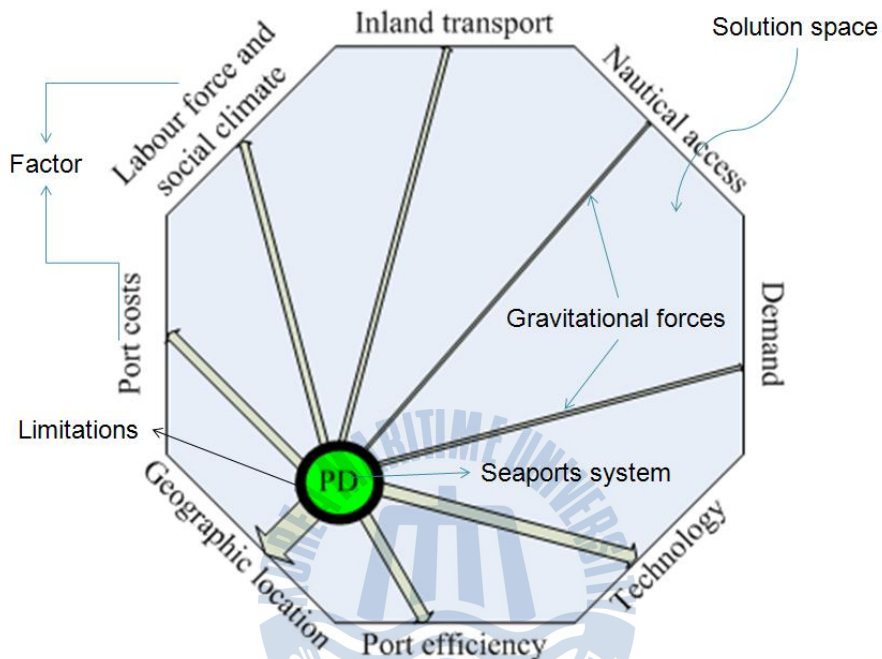


Fig. 3.3: A visual view of port development

3.2 Quick evaluation of port systems

Nowadays, competition among ports becomes more severe, and customers always expect to get better and better services. Therefore, it is very important for ports to maintain at least or improve their competitive ability. Obviously, customers who use the port services could accurately reflect the quality of them through their satisfaction level on provided services. As a result, customer satisfaction measurement is an important method to help evaluate, improve and then keep loyal customers as well as attract new ones for any organizations.

Port service quality, therefore, should be evaluated through customer satisfaction. Because the satisfaction levels are collected in qualitative data in terms of linguistic data, so a fuzzy logic model seems applicable. It would be introduced and a numerical example is given as an illustration in followings.

More than ever, businesses are subjected to be stronger, more rapidly changing forces such as globalization, deregulation and convergence of industries. These changes bring more competition to organizations including port systems. According to Brown (Brown, 2000), treating customer well is the best source of profitable and sustainable revenue growth. Measuring customer satisfaction is a key to formulating customer value strategies and to continuously improving implementation (Bound *et al.*, 1994). Summarily, good customer value strategies would increase organization's competitive advantages.

It is not easy to build and maintain a consistency level of customer satisfaction because the expectation of product/service varies from a customer to another. It is essential to know customer expectations as well as understand key elements those most heavily influence retention for organization. In other words, by understanding customer expectations and feedbacks, and implementing suitable strategies, organizations could achieve the continuous improvement of customer satisfaction.

Unfortunately, customer satisfaction information collected by conducting surveys is usually expressed in linguistic terms. Usually, statistics techniques are favorably used to process data. However, they are not capable to handle with linguistic data. For this reason, fuzzy set and fuzzy logic would be developed to support making decisions in the presence of imprecise and uncertain information. A fuzzy logic based model would bring many advantages in determining customer satisfaction in order to evaluate the port service quality.

3.2.1 Literature review

Retaining customers is a key issue of business today because business managers have recognized that loyal consumers translate to relationship revenue over the life cycle of product or service. As more and more of these consumers demand a higher level of service, any business able to provide would dominate the market segment, strengthen brands and defend the position in the industry. Customer satisfaction is one of single strongest predictors of customer retention, which is related to offering services. In order to acquire, retain and grow profitable customers, it requires a clear focus on the service attributes that represent value to customers and create loyalty.

In port operations, port service quality features include port location, port charge, frequency of ship visits, port efficiency, port infrastructure, response level to users' needs, and reputation for cargo damage (Ugboma *et al.*, 2007). Amongst of them, port geographical location is one of main determinants of port attractiveness. Another determinant of port choice is port charge. Amongst elements of port charge, patronage is likely to be minimal among competing ports. Customers concern that they are getting competitive charge because of the impact on their profit situation. Frequency of ship visits also affects on port choice decision. The more ship visits a port has, the more attractive to shippers it is.

Moreover, the most important aspect of offered services is port's efficiency including speed and reliability of port services. It also reflects freight rates charged by shipping companies, turnaround time of ships, and cargo dwelling time. Obviously, the longer a ship stays in berth, the higher the cost is. In addition, port infrastructure is another determinant of a port, which is not only number of container berths, cranes, tugs, and terminal areas, but also quality of cranes, quality and effectiveness of information system, availability of inter-modal transport, approach channel provided, and preparedness of port management.

Actually, ports are expected to response quickly to users' needs. It means that ports would have to constantly monitor and understand users' needs in order to devise the quickest way to response. Another mentioned factor is port's reputation for cargo damage. If a port has a reputation that means the handling cargo is unsafe, it could drive away potential customers and discourage existing clients.

Quality of service is a degree of fit between customer expectation and perceptions of service (Parasuraman *et al.*, 1985). After receiving a service, customers would compare between their expectation on that service and the actual quality received. Consequently, satisfaction level is reflected usually in the linguistic term because it is an emotional assessment.

3.2.2 Fuzzy based model

a. Methodology

The establishment for a satisfaction concept of each customer can be summarized as on Fig 3.4. It comes from the comparison between customers' perceiving quality

of provided services and that of expectations. Based on satisfaction level, then, customers would decide whether they should repurchase services or in other words to become loyal customer or not.

For this reason, utilizing the feedback of customers on their satisfaction levels would help ports understand what their clients want and need, so they can apply right strategies to retain and attract more customers.

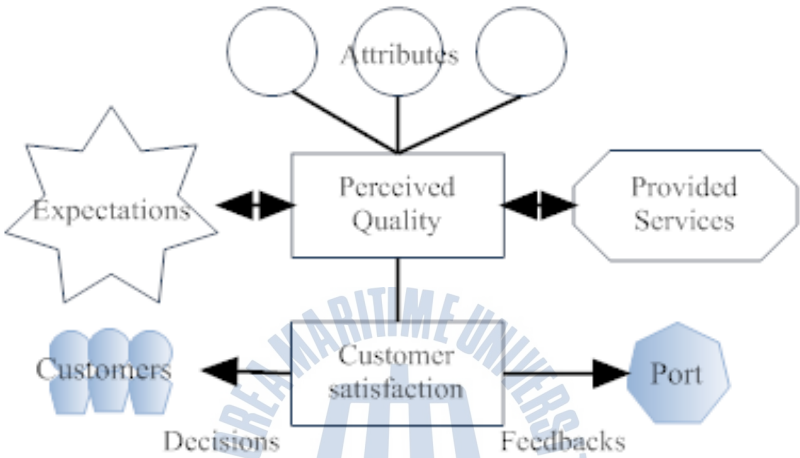


Fig. 3.4: Customer response

Customer feedback about their satisfaction level can be acquired by conducting a survey. In order to achieve a successful and accurate customer satisfaction measurement, following steps are suggested as shown on Fig 3.5.



Fig. 3.5: Systematic ways to achieve customer satisfaction measurement

Asking right questions to right people will help an organization obtaining good data for measurement. Besides, because obtained data are usually vague, fuzzy model is applied to provide the right conclusions. This model is built in next section. Obtained results should be used to improve the customer service effectively. Consequently, the following PCDA cycle as seen on Fig 3.6 is suggested as a useful way to improve customer service.

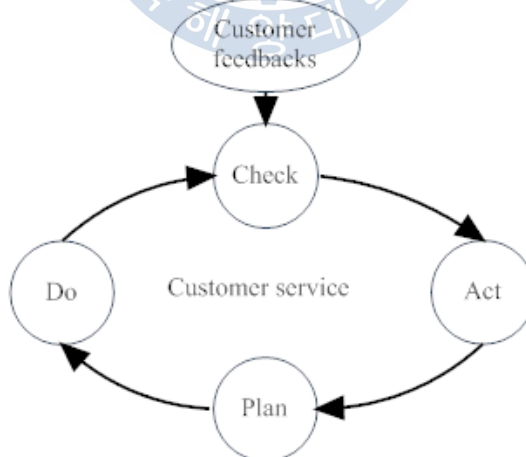


Fig. 3.6: PCDA cycle for improvement of customer service

b. Model

A fuzzy model is suggested and summarized as on Fig 3.7, which include six main functions.

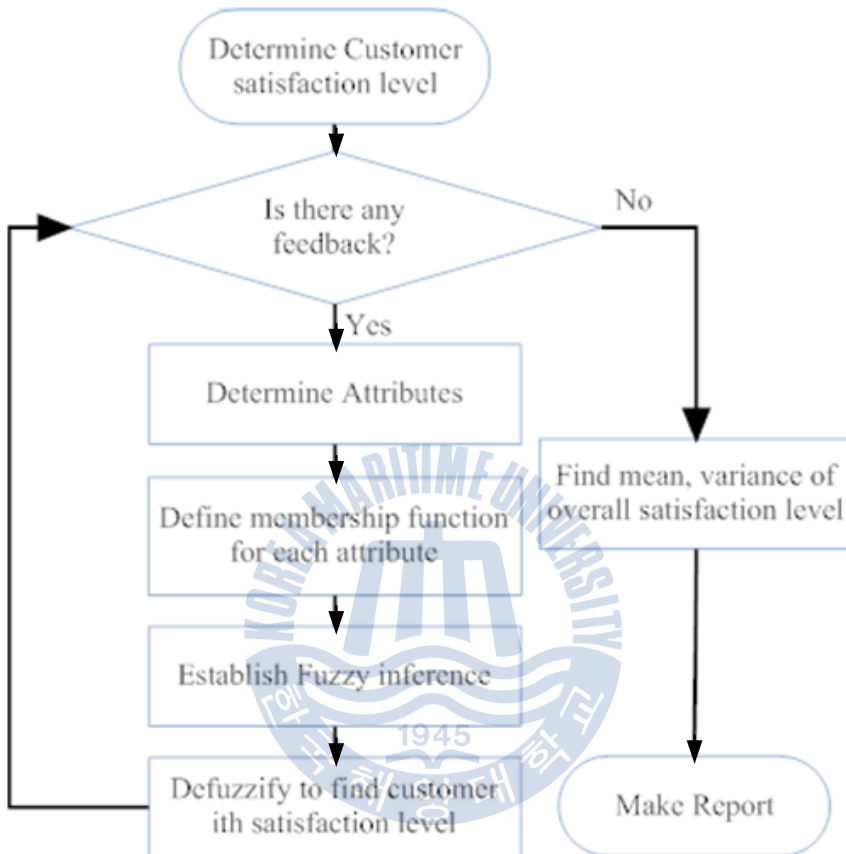


Fig. 3.7: A fuzzy based model

1. *Determine attributes*

Service attributes are very important because they present values to customers and create loyalty. Choosing attributes depends on organizations. A set of port location, port charge, frequency of ship visits, port efficiency, port infrastructure, response level to users' needs, and reputation for cargo damage would be considered as port applicable attributes.

2. *Define membership function for each attribute*

In order to deal with vague inputs, the appropriate membership functions are constructed. Unfortunately, the problem of constructing membership functions, which usually happens in the contexts of various applications, does not happen in fuzzy set theory. It is a problem of knowledge acquisition, a subject of a relatively new field called knowledge engineering. The process of knowledge acquisition involves one or more experts in the application area and a knowledge engineer. The role of the knowledge engineer is to elicit the knowledge of interest from the experts and to express it in some operational forms of a required type. In some cases, it is reasonable to request that the experts define a membership function for a linguistic term in a given application context either to be completed or to exemplify it for some selected individuals in the universal set.

There are many shapes of membership functions that could be used, but the trapezoid, and triangular shapes are usually used because they are simple and easy to compute and they can express the vagueness of data (as seen on Fig 3.8).

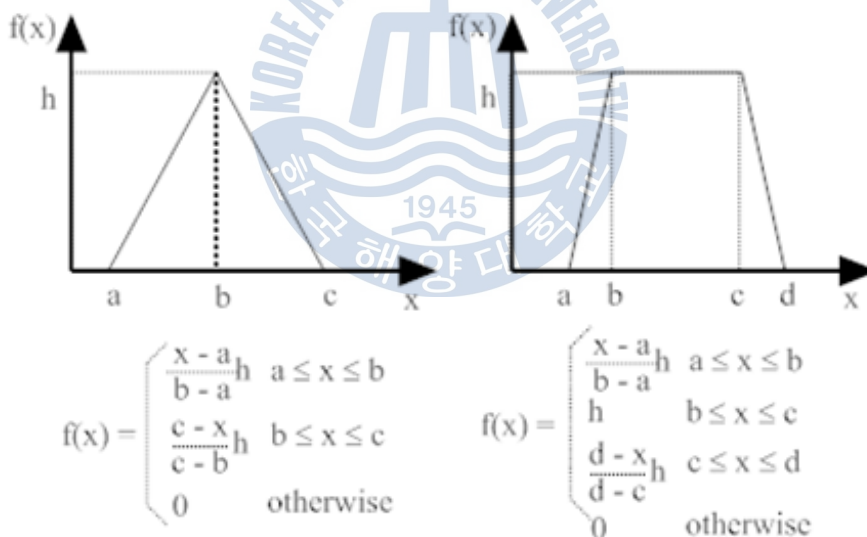


Fig. 3.8: Triangular and trapezoid shapes and their functions

3. Establish fuzzy inference

Fuzzy inference means to “fire” the applicable rules and obtain their conclusions. In the basic fuzzy control theory, the relationship between input and output under

conditions of pre-determined rule i^{th} ($i = 1.. n$) is defined as the following “if-then” formation.

Rule I:

If X_1 is A_{i1} , X_2 is A_{i2} , ... and X_m is A_{im} then Y is B_i , where, $X = (X_1, .., X_m)$ is an input vector, Y is output, A_{ij} is fuzzy subset of input, and B_i is fuzzy subset of output.

If any rule has a degree greater than zero, it would be fired. In order to compute the “strength” of each “fired” rule, the most common fuzzy logic operators *Min* for *AND*, and *Max* for *OR* are used. Then, to combine the conclusion for each “fired” rule, the operator *Max* is usually used.

4. Defuzzify to find the i^{th} customer satisfaction level

The purpose of defuzzification is to convert a fuzzy set representing the overall conclusion obtained in previous step into a real number that, in some sense, best represents fuzzy set. There are various defuzzification methods, where each is justified in some ways. Center of gravity, center of maximum, and mean of maximum are most common ones (as seen on Fig 3.9).

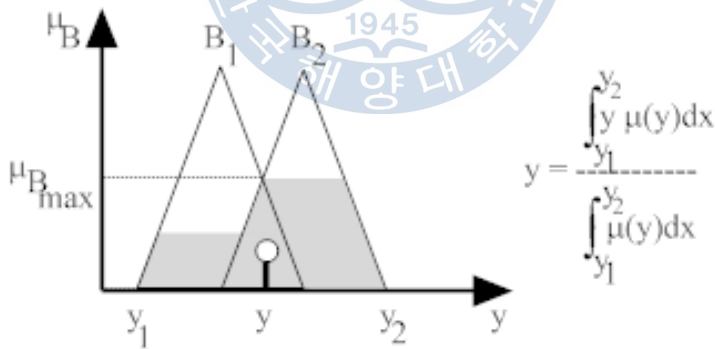


Fig. 3.9: Center of gravity defuzzification method

5. Determine customer satisfaction mean and variance

After determining customer satisfaction levels, it is necessary to find mean and variance of overall customer satisfaction that is computed by using following equations.

$$E[S] = \bar{S} = \frac{\sum_{i=1}^n S_i}{n}; \quad \text{Var}[S] = \frac{\sum_{i=1}^n (S_i - \bar{S})^2}{n-1} \quad (3.1)$$

where, S_i : Satisfaction level of the i^{th} customer.

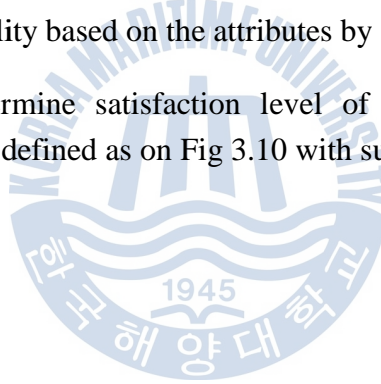
6. Make a report

Acquired results should be reported clearly in order to support decision makers decide an appropriate strategy to obtain customer satisfaction.

3.2.3 A numerical example

In order to illustrate the proposed model, a numerical example is given. Three attributes namely e_1 , e_2 , and e_3 are used. Customers are randomly selected and asked to evaluate port quality based on the attributes by a score from 0 to 100.

Consequently, to determine satisfaction level of the i^{th} customer following membership functions are defined as on Fig 3.10 with supporting of Fuzzy Toolbox of Matlab.



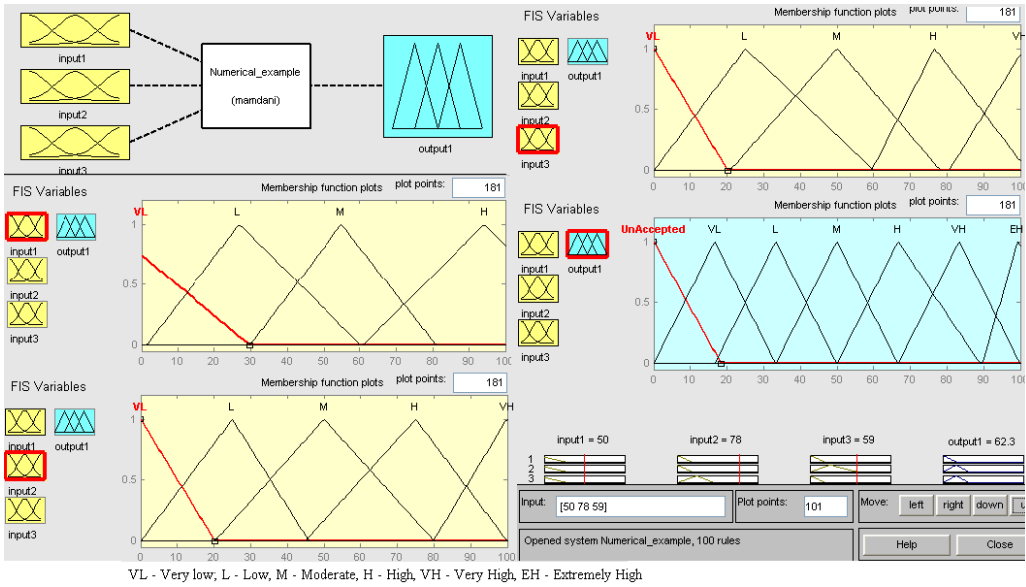


Fig. 3.10: An illustrating example

After building the fuzzy model, by inputting the i^{th} customer evaluation for each attribute to model, the i^{th} customer satisfaction level is obtained. For example, by entering 50, 78, and 59 for evaluation of attribute 1, 2, and 3 respectively, the output is 62.3.

Finally, the overall satisfaction level of all customers would be obtained in terms of mean and variance by applying formulas provided in previous section.

With the support of fuzzy toolbox of Matlab, the supposed model provides a promising way to determine the customer satisfaction. It would help an organization improve its customer service quality, so it could retain and then attract more customers. Consequently, its revenue and position in the market place are also increased. However, for real case application, it is essential to use expert knowledge for determining the attributes, and building the membership functions which best describe considered system in order to achieve most accurate results. It is also obvious that this model is applicable to many service industries and particular port operations.

Actually, there maybe have many better models than suggested fuzzy logic model and it does not totally assure achieving the perfect results, but it could be

considered as an applicable alternative for port managers or researchers. In other words, it would provide a satisficing strategy.

3.3 Containerization and transshipment ports

Containerization has revolutionized cargo handling and shipping. Since first 58 containers were carried by vessel in 1956, annual container volume has been increased dramatically, which reached about 502 million TEUs in 2008 on the world scale (*Source: IAPH, 2008*). This growth is direct consequences of the internationalization of almost all countries' economies, and of the intensive search for efficiency in freight handling and transport. Indeed, the introduction of container had important impacts in operations and strategies of agents involved in containerization process. For instance, it has resulted vast improvements in port handling efficiency, thus lowering costs and helping lower freight charges and, in turn, boosting trade flows.

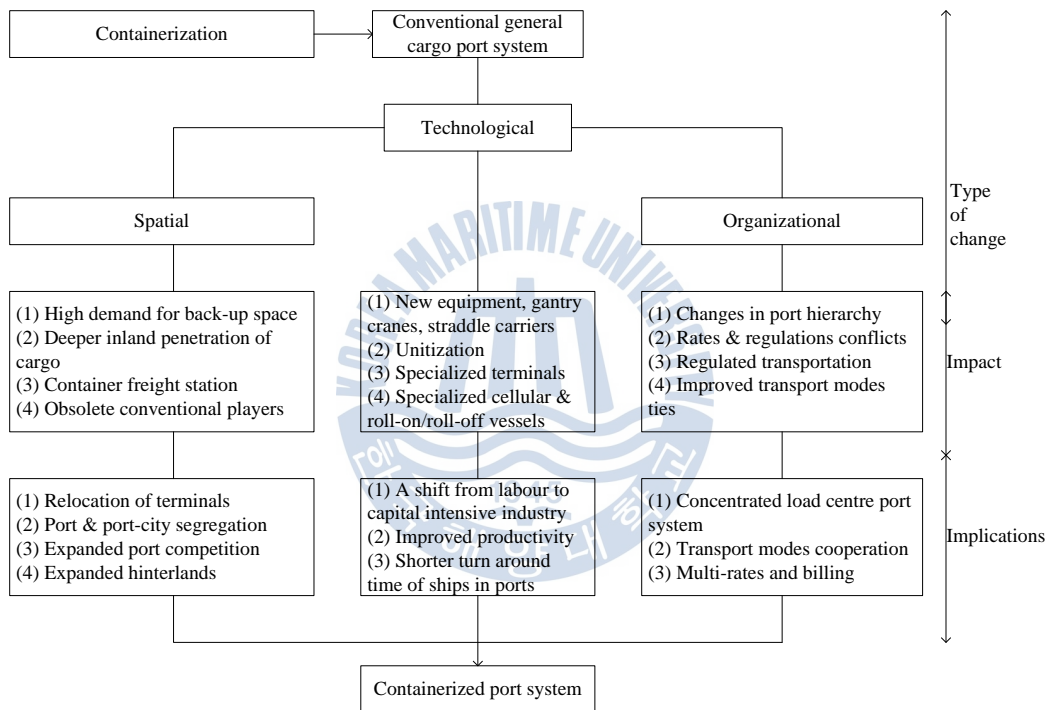
The concept whereby cargo is carried in boxes of standard dimensions allows containers to be handled mechanically transferred from one mode of transport to another efficiently. The containerization could bring many advantages in terms of direct and indirect benefits (UNCTAD, 1991):

- Facilitation of multi-modal transport
- Complete suitability to door-to-door transport
- Ease of transport of cargo on a combined transport bill of lading
- Lower risk of damage, pilferage and loss of cargo during transit, intermediate handling or storage.
- Cargo can be sent in “ready-to-sell” or “consumer-ready” condition
- Speedier cargo handling
- Reduces amount of covered space for storage of cargo in ports and dry ports (mentioned in following sections)
- Increases utilization of land for storage
- Easier inventory control and cargo tracking at terminals
- ...

In addition to direct benefits mentioned above, several indirect ones could be achieved:

- Trade facilitation
- Improved use of transport capacity
- Road congestion alleviation
- Customs facilitation
- Improvement of inland distribution systems
- ...

As a result, containerization greatly impacts on the conventional general cargo port system as shown on Fig 3.11.



(Source: Hayuth, 1987)

Fig. 3.11: Impact of containerization on the conventional general cargo

Several trends can be identified in the maritime container transport industry. Within a few decades, containerization of general cargo became predominant. Obviously, it also impacts on Viet Nam port system as mentioned in previous chapters. Therefore, Viet Nam port development should be paid much attention on developing container ports.

3.3.1 Container volume forecasting

Economic growth fundamentally drives the growth in the container trade. Although the economic relationship between GDP and trade volume is not considered as a sufficient explanation of the growth of container volume, it could be considered usefully in forecasting the development of the container sector. Actually, there are many factors that impact on the volume container imports and exports, including exchange rate fluctuations, changes in economic structure etc. However, for forecasting purposes it is necessary to use very simplified relationships, because many of the causal variables are themselves even harder to predict than container volume. Besides, it is hard to collect data about some factors which might affect to container volume such as the yearly investment in infrastructure, and the impact of government policies.

In extending the forecast period, a very simple method was adopted in general: the average growth rate for the period during which the International Monetary Fund (IMF) projections provided explicit forecasts was applied for the remainder of the forecast period (IMF, 2004). Therefore, an establishment of the relationship between container volume and time in order to estimate or predict the future volume would be founded.

According to Harnett and Horrell (Harnett *et al.*, 1998), there are two basic approaches. The first one is to determine which type of nonlinear equation is appropriate for the investigated problem and find the exact form of that equation that gives the best fit. The second approach to fit an equation to nonlinear data is to transform the data so that they are linear, and then use the linear approach to forecast. In this dissertation, the first approach would be applied.

Container volume forecast would provide expected container throughput volumes as well as transshipment volume in the future, which could assist Viet Nam to plan maritime investment strategies. It could support useful information to estimate required additional containerships, then investment, and additional container berths.

3.3.2 Transshipment ports

Increased use of mega container ships as mentioned in Chapter 1 in trans-ocean is forcing the development and use of large transshipment hubs serving as container distribution and collection centers for large trading areas. Economies of large scale transshipment in mega container hubs are important advantages. The objectives of transshipment are not only to reduce the total cost of collecting and/or distributing the containers carried by a mega mainline container vessel from/to numerous origin and destination ports, each of which only contributes a part of the mainline vessel cargo, but also to Just-In-Time (JIT) delivery of cargo, reduce in transit inventory, and make the total origin to destination movement of containerized cargo more seamless. In other words, the purpose is not just to reduce origin to destination transport and handling or transfer costs but to make the whole supply chain more efficient and more responsive to the ever changing market place (Frankel, 2002).

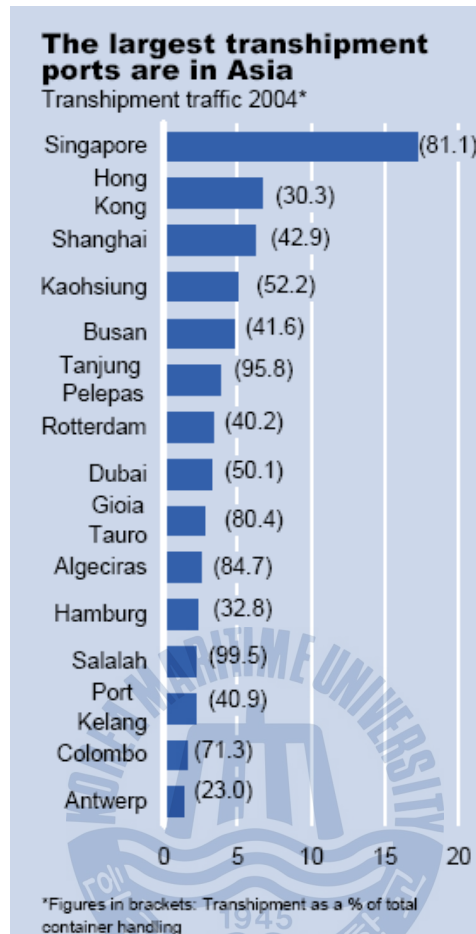
Development of transshipment hub ports is a key competitive strategy in the top container ports in the world. Sixteen of the twenty five largest container ports are in Asia as seen on Fig 3.12. The top five largest transshipment ports were in Asia including Singapore, Hong Kong, Shainghai, Kaohsiung and Busan transshipment ports, as shown on Fig 3.13.

Viet Nam port system meets conditions to build up a transshipment port at least as mentioned in Chapter 2. It has been considered as a key future marine transportation project by Vietnamese government. In this dissertation, essential information on that plan as well as analysis would be given. It could be considered as a competitive alternative for Viet Nam port system.



(Source: Institute of Shipping Economics and Logistics (ISL))

Fig. 3.12: Top 25 global container ports, 2004



(Source: Drewry, Independent Maritime Advisor)

Fig. 3.13: Largest transshipment ports

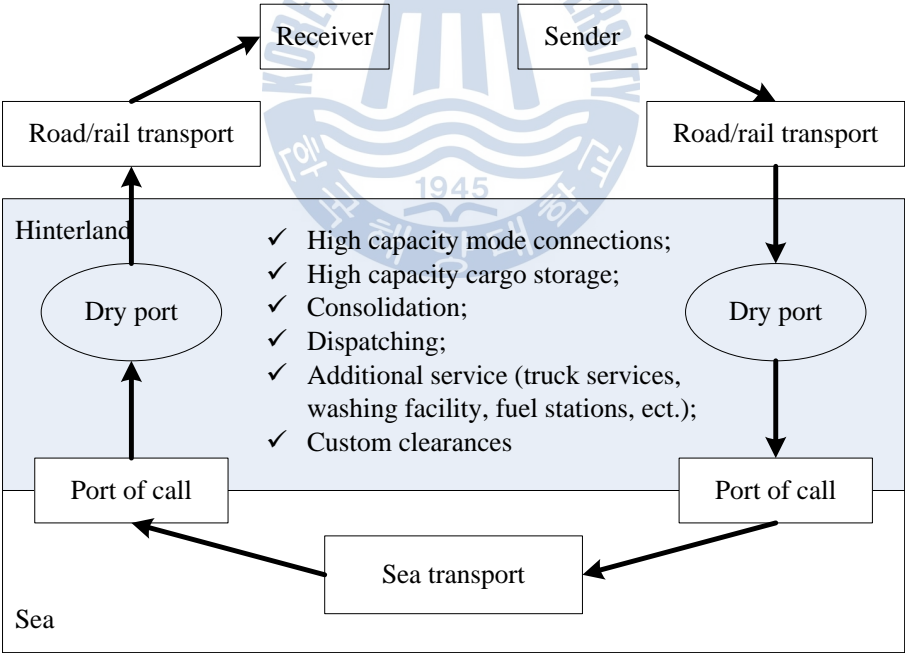
3.4 Dry port system

Dry port system could be considered as an alternative to improve the transportation system in its region. Dry ports could be inland terminals within a country that has a gateway port or they could be located in adjacent land-locked countries in the hinterland of one or more seaports (UNTACD, 1991). Dry port supplies regions with an intermodal terminal or a merging point for traffic modes – rail, air, and truck routes – involved in distributing merchandise that comes from water ports (Roso, 2005). It can operate as an extension to an existing seaport, increasing capacity and efficiency and also moving traffic off the roads and onto rail or inland

waterways, wherever possible. Therefore, it could support port capacity by improving hinterland distribution hubs and looking at the potential of inland port with multimodal connections.

There are many different terms used for an inland terminal facility such as Inland Clearance Depot, Inland Container Depot, Intermodal Freight Centre, Inland Freight Terminal and Inland Port (Thorby, 2004; Jarzemskis, 2007; Roso, 2009). They play as important nodes in the transport network and have gained substantial attention in transportation literature especially in the containerization era.

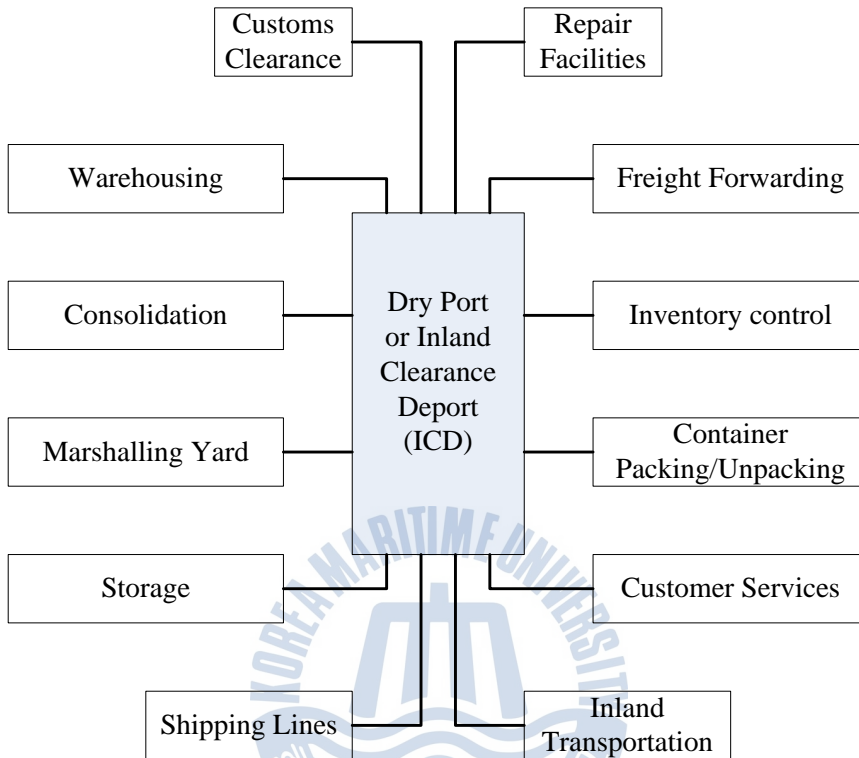
When containerization is impressively increased, ports often face with slack of space for container storage areas. Notably with city ports, the increasing problem of transportation goods to and from the port through the city, together with the expensive costs of establishing new docks have created preconditions to establish hinterland terminals or dry ports that almost can handle all of the port related activities (Bentzen, 2006) as seen on Fig 3.14.



(Source: Jarzemskis et al., 2007)

Fig. 3.14: Dry port in the transport chain

A generalized functional structure of an inland clearance depot or dry port was drawn out as shown on Fig 3.15.



(Source: Hayuth, 1987)

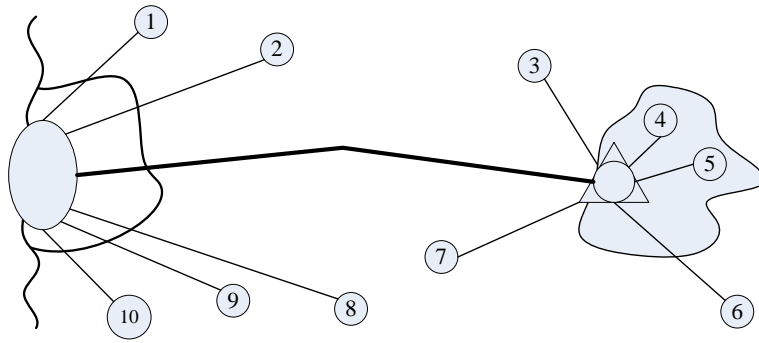
Fig. 3.15: Functional Structure of Dry Ports or Inland Clearance Depots

There are three dry port categories: distant, midrange and close based upon their function and location (Roso *et al.*, 2009) as shown on Fig 3.16. They have their own characteristics and benefits from different users' perspectives such as shipper, forwarder, port operator, rail operator, and transportation planner. The benefits and potential benefits are summarized as followings (UNTACD, 1991):

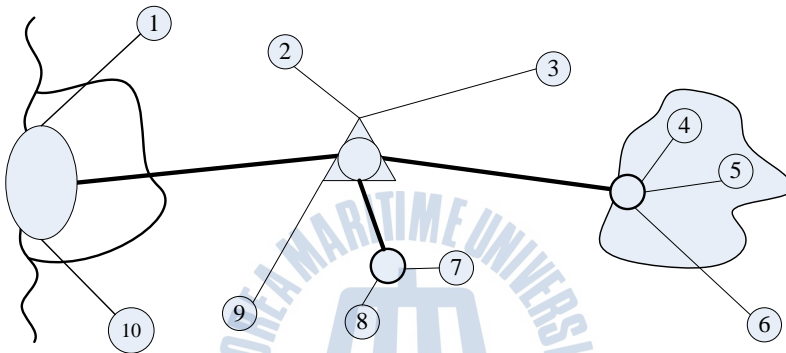
- increase trade flows
- lower door-to-door freight rates: economies of scale in terms of transport distance
- avoidance of clearing and forwarding agents' fees at the sea ports

- avoidance of storage, demurrage and late documentation fees
- possible avoidance of the need to extend the period of marine insurance
- optimal use of road and rail transport
- use national rolling stock
- better utilization of capacity
- greater use of containers
- lower customs staff costs
- benefits of sea ports
- inventory savings
- benefits of unit trains
- improved communications
- ...

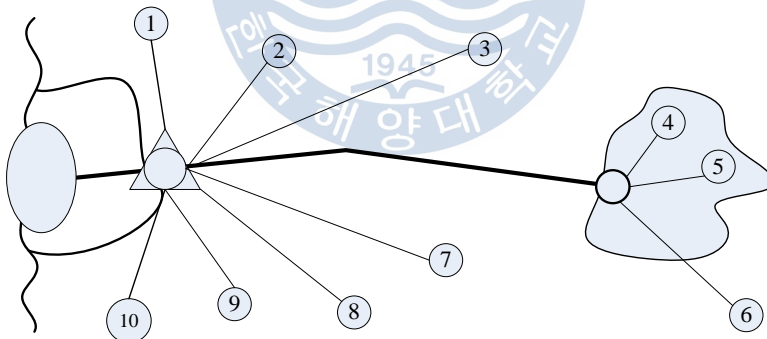




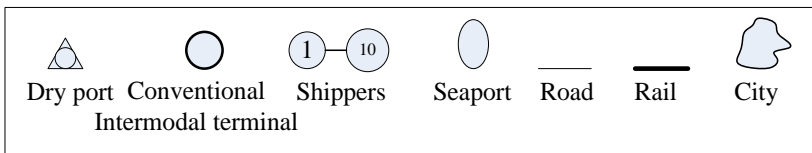
a) A seaport with a distant dry port



b) A seaport with a midrange dry port



c) A seaport with a close dry port



(Source: Roso, 2009)

Fig. 3.16: A seaport with three categories of dryports

Many successful applications of dry ports around the world such as Europe (Notteboom, 2002), India, Asia (Adof *et al.*, 2009), Australia (Roso, 2009), and also Africa (Hoyle *et al.*, 1995) support much confident on developing dry port system in Indochina subregion as an alternative for developing ports of Viet Nam. Although it could not assure Viet Nam port system would become the most competitive one, it could be introduced as an improving solution as a satisficing strategy.

3.5 ZALs, Distriparks, FTZs and FAZs.

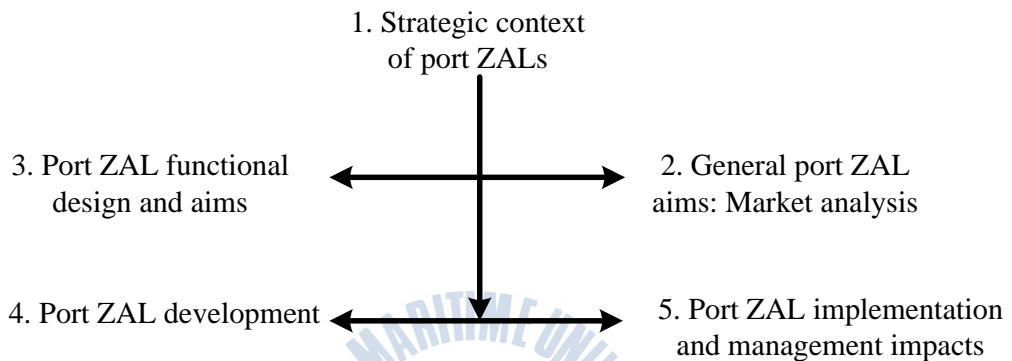
Logistics Activity Zones (ZALs) in ports were first introduced in European ports in the mid 1970s, which usually associated with Duty Free Zones and Distribution Parks (Distriparks) (Llaquet *et al.*, 2003). ZALs have been applied successfully in Germany, Netherland, Hong Kong (China), Spain, and Pusan (Korea). ZALs are where industrial or economic activity takes places that are kept relatively separate from the other port zones and generally dedicated for the logistics of sea-based cargo. The successful ZALs would stimulate progressive customer loyalty in the short term and lead to new demand in the medium and long term, because they would provide integrated and top quality logistics activity. As a result of top quality logistics services, the proactive and competitive ports would be created (Do *et al.*, 2008).

The basic steps for taking decisions and defining port ZALs are simply structured into five major blocks as shown on Fig 3.17, which are temporarily classified into three levels (Llaquet *et al.*, 2003):

- Level 1, a preliminary level, analyses the aspects involved in the economic, logistic and port framework or context prior or complementary to the in-depth and specific analysis of a ZAL;
- Level 2 is analyzed in an interrelated fashion, which determines the analysis and definition required of the market at which the ZAL is targeted and the correlative design and functional and urban planning of the ZAL;
- Level 3 analyzes in an interrelated fashion the choice available of management and development models and the effects of ZAL

implementation on its users on port logistics and on the regional economy in general.

Viet Nam port system plays a vital role in economy, but it could not compete with others in the south-east Asia area. One of reasons is that its service systems were evaluated at the low level (Do *et al.*, 2008). Constructing logistics activity zones in ports (ZALs) is one of the efficient solutions.



(Source: Spanish State Ports Agency)

Fig. 3.17: Structure of development port ZALs

Various competitive strategies have been applied for enhancing the port competitiveness in its region. Opening Distripark(s) is a successful strategy and applied in many leading ports in the world. 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 (ESCAP, 2003). Distriparks would commonly provide:

- a great service,
- value added products
- continual innovation in technology
- ongoing training and development of labor skills
- space for warehousing and forwarding facilities

- a comprehensive range of value-added services to fulfill highly heterogeneous customer demand
- ...

Port of Rotterdam, the largest container port in Europe, has three successful Distriparks which located close to major container terminals and the city with many transport links to the European market. Each distripark has its own characteristics (*Source: Port of Rotterdam Authority*):

- Distripark Eemhaven: specializes on high quality products;
- Distripark Botlek: emphasizes on chemicals;
- Distripark maasvlakte: focuses on containers.

They have an attractive park-like atmosphere and excellent public transport links, provide the best possible service for importers and exporters by customs and attractive tax incentives for foreign companies setting up in the Netherlands and offer a large, well educated and motivated workforce. As a result, there are hundreds of companies specialized in storage and distribution activities, providing logistics services all over Europe and other continents, which are located in Rotterdam.

In Asia where competition is highly severe and container cargoes are quickly increasing, Distriparks are becoming a key tool for the integral development of ports, notably container terminals, representing as they do areas of integrated logistics activity of the highest quality (Lee *et al.*, 2005). As a result, they could attract investment to stimulate their national economies and significantly increase their competition. Several Distriparks have been established at major Asian ports such as Kepple Distripark, Alexandra Distripark and Pasir Panjan Distripark (Singapore), Hong Kong International Distribution Center (Hong Kong, China), Kaohsiung Yes Logistics Zone (Taiwan), and Busan Logistics Park (Korea). Establishing Distriparks for the future planned Van Phong transshipment port could be considered as a competitive strategy for Viet Nam port system.

In 1993, Port of Singapore Authority (PSA) completed the Keppel Distripark (KD) within the Free Trade Zone (FTZ) to serve as a premier cargo consolidation hub and meet other major logistics needs (*Source: Port of Singapore*). Or Korean

government enacted the “Act governing the Establishment and Management of Free Trade Zone” in 2004 as a strategy on the development of world class logistics hub centers in the northeast Asia (Nam *et al.*, 2010). Busan Port and particular Busan New Port seek to become a port and logistics hub linking China, Japan, and both Koreas and Russia. Opening a Distripark within a Free Trade Zone in port is mentioned as one of important promotions.

A Free Trade Zone (FTZ) is a specified area within the territorial jurisdiction of a country where there is either a minimum or no customs control on entry or exit of goods (*Source: International Trademark Association, INTA*). The FTZs at ports (Free Port) facilitate port 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 custom formalities (ESCAP, 2003). The summary of FTZ or FP is shown as in Table 3.3.

The successfulness of Port of Singapore, Viet Nam neighbor country in ASEAN, with six FTZs for seaborne cargo including Keppel Wharves, Tanjong pagar Terminal, Jurong Port, Sembawang Wharves, Pasir Panjang Wharves and Keppel Distripark (*Source: PSA*), urges Vietnamese Government to promote opening them for enhancing Viet Nam port system.

Table 3.3: Summary of a Free Trade Zone

Definition	Enterprise Zone Inducement of foreign investment, trade promotion and international logistics vitalization Tax and rent relief, tariff and VAT exemption for encouraging Logistics and manufacturing
Law	Free Trade Zone Law of Designation and Operation of Free Trade Zone
Purpose	Encouraging foreign investment Trade Promotion International logistics vitalization
Authority	Industrial complex: Ministry of Knowledge Port, Airport, and Hinterland, Ministry of Transport and Maritime Affairs
Required	International Container Service line which handles more than 10 million tons of cargoes. Container Port over a size of 20 kilotons - More than 500,000 square meter of Land and Hinterland
Conditions	Logistics and Manufacturing
Tax	Tariff Exemption VAT with zero rate
National and State Land Rent	Basic rate: Low-price posted rate Lease duration: Maximum 50 years
Ect.	Rule out of hiring duty on the aged and the disabled

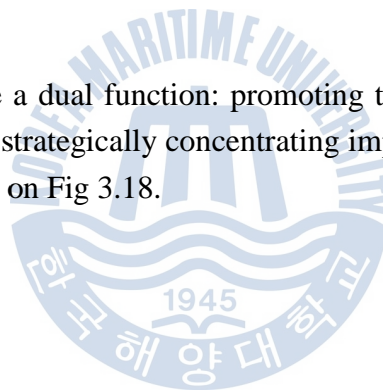
(Source: Nam et al., 2010)

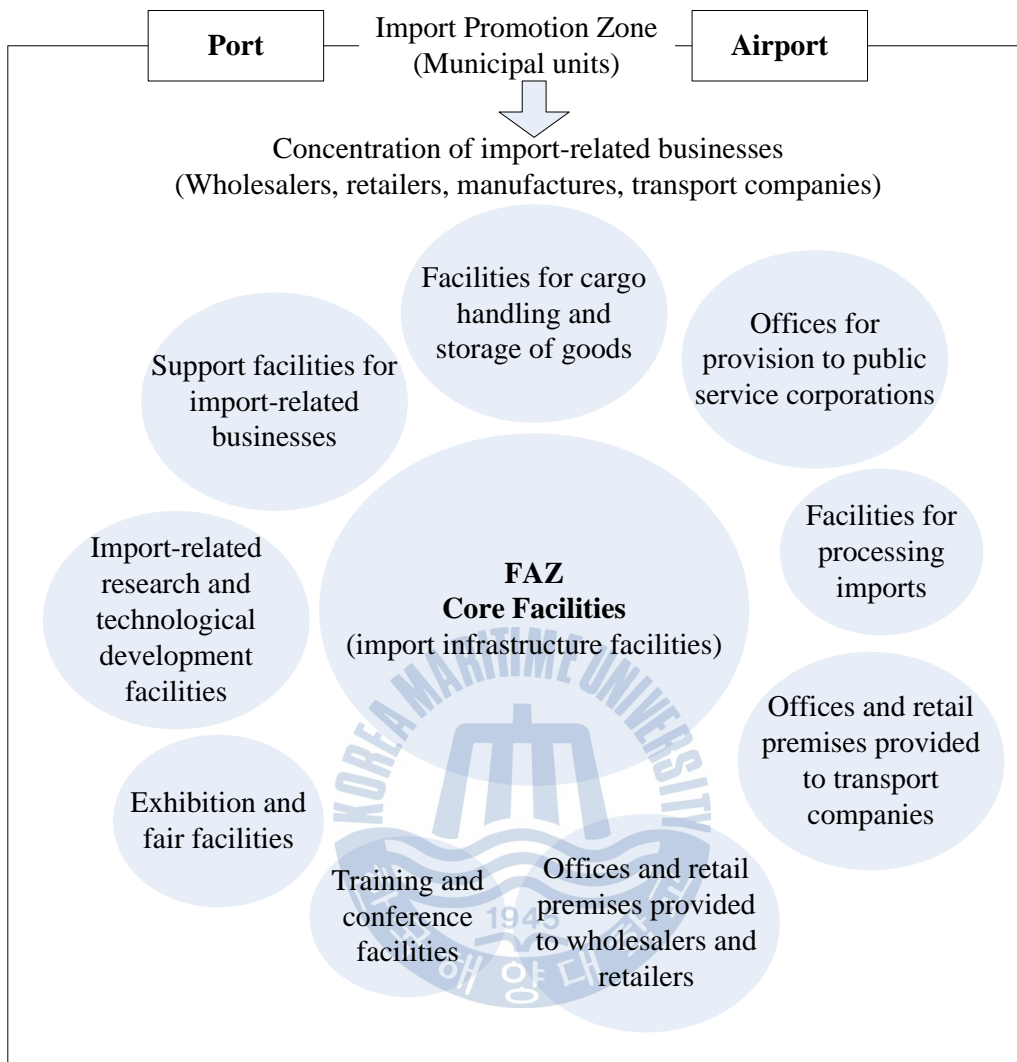
As a part of Japan trade promotion efforts, the Japanese government enacted a special law in 1992 called the *Law on extraordinary measures for the promotion of imports and facilitation of inward investment* to improve the business climate for foreign affiliated companies in Japan and to make a significant force to expand foreign investment and to increase import levels (Source: Ministry of Economy,

Trade and Industry, Japan). The law permitted the establishment of a nationwide network of foreign access zones (FAZs). The companies located in these zones are eligible for benefits including:

- Loans at reduced interest
- Exemption from local taxes – real estate purchase tax and property taxes
- Increased rates of depreciation
- Guarantees from Government funds
- Low-cost distribution
- Efficient handling of imported freight
- Business support
- Financial and tax incentives
- Credit insurance
- Bonded services
- ...

In general, FAZs serve a dual function: promoting the development of import-related infrastructure, and strategically concentrating import-related companies into certain locations as shown on Fig 3.18.





(Source: JETRO, Japan External Trade Organization)

Fig. 3.18: Concept of the foreign access zone (FAZ)

Obviously, developed countries such as USA, Germany, Netherland, Japan, the Republic of Korea, and Singapore have leading developed port systems. They consider that logistics costs are an important factor affecting the competitiveness of both firms and nations. 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

involving in logistics. And the concept of logistics costs was introduced and an overview of the national logistics methodologies of the USA and the Republic of Korea follow, which include (ESCAP, 2003):

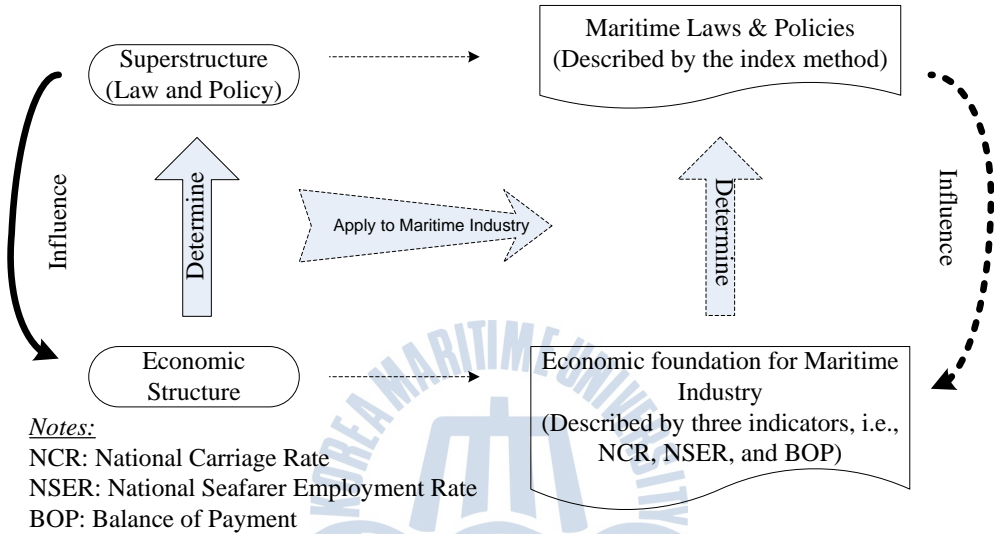
- cost of transport activities, for each mode;
- cost of storage or warehousing activities;
- cost of time value or investment in goods in a logistics system, including the added value of transportation;
- cost of physical form changes required for effective and/or safe transport, storage, and handling;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

Correspondingly, the countries, where exist the developed port systems, usually set up ZALs, Distriparks, FTZs and/or FAZs as a supportive, competitive strategy. It could consider as a suitable and satisficing strategy for the Viet Nam port system development.

3.6 Other strategies

Various useful strategies have been applied for the development of port systems around the world as mentioned previously. In this section, some additional interested strategies would be reviewed and then considered to apply for Viet Nam port development. Actually, each country and particular each port system have their own characteristics. Therefore, formulation of maritime policy should be determined by the nation port system economic circumstance rather than the result of rational decision of policy (Li *et al.*, 2007).

In general, the relation between economy and policy has been central in the field of economics. Consequently, the direction of a national maritime policy is affected by the economic situation of that nation as seen on Fig 3.19, which could be considered as local constraints of a nation port development. Correspondingly, maritime policies or strategies would be introduced to Viet Nam port system by flexible ways.



(Source: Li et al., 2007)

Fig. 3.19: Maritime policy and economic foundation

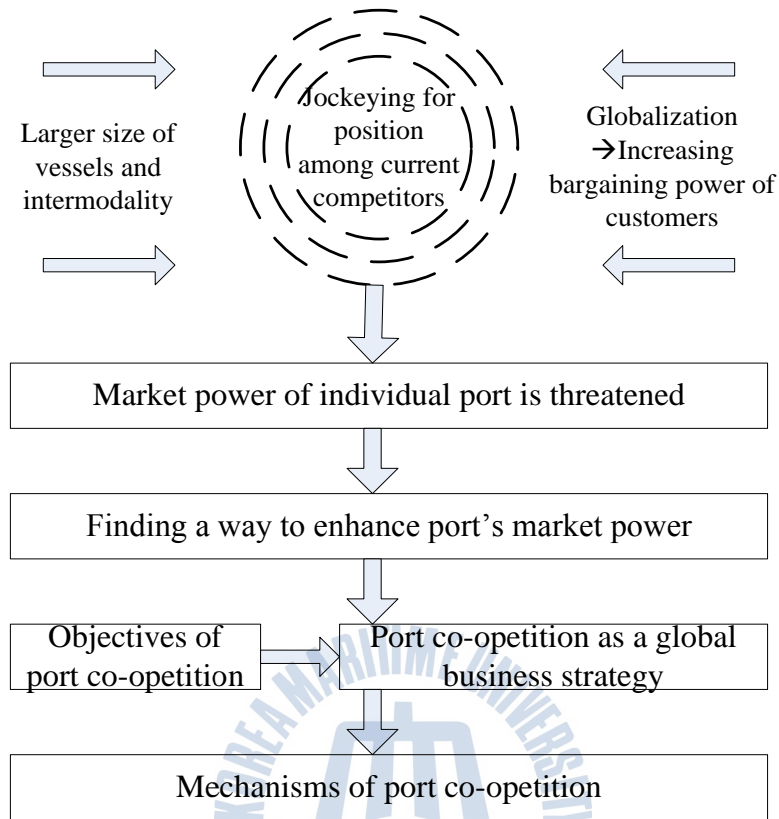
The changed economic situation forces port systems adopt a more cautious assessment of the future prospects. The interests of port authorities and of companies operating terminals in co-operation and competition with other similar enterprises are subjected to similar considerations as relationships between other competitive businesses. The economies of scale and scope may create efficiencies at least to some level of co-operation. Ports and terminals in close proximity often enter into small co-operation agreements with neighbouring facilities. They share more structural co-ordination, joint investments, exchange price information and so on. The co-operation strategy amongst ports authorities might be the answer to the unreasonable demands from shipping companies and alliances for more space and deeper-draught ports (Heaver et al., 2001).

In the era of global economy, a port no longer enjoys a natural monopoly. To cope with the globalization trend in many industries nowadays, a certain form of competition and co-operation among ports is necessary so as to provide services that fit into shipping lines' strategies. A new strategic option known as co-opetition, the combination of competition and co-operation for the port industry, was proposed by Song (Song, 2003), as shown on Fig 3. 20.

The co-operation strategy for port system promises to:

- achieve rationalization and, hence, cost savings
- achieve scale advantages
- enjoy the benefit of risk sharing
- facilitate the international expansion of port operators
- get potential competition
- strengthen both partners against outsiders so as to increase the competitiveness of both
- achieve the benefits of increased and spare capacity as well as improved capacity utilization
- result in stronger bargaining powers
- enhance customer service through expanded facilities
- ...

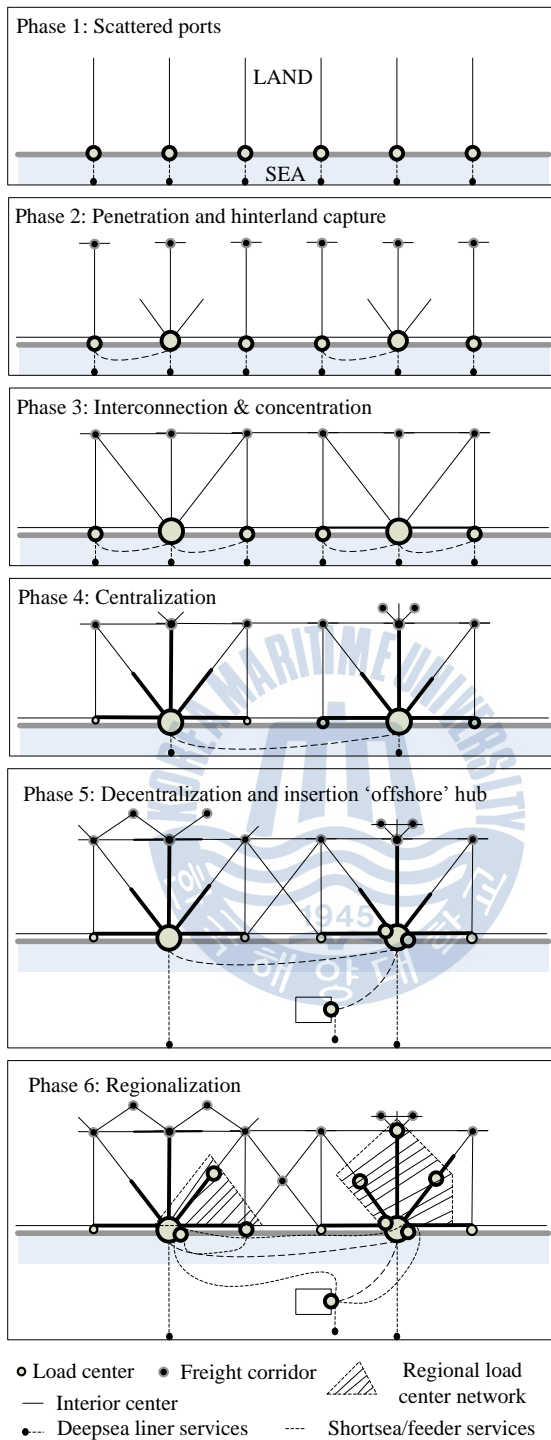
It has been applied for Hong Kong and South China port systems. And it should be considered to apply for development port of Viet Nam as a preferable strategy.



(Source: Song, 2003)

Fig. 3.20: A conceptual model for port co-competition

In addition, inland distribution is becoming a very important dimension of the globalization/maritime transportation/freight distribution paradigm. Naturally, inland accessibility is an important factor of port competitiveness. The port regionalization is the next steps of the evolution of a port identified by Anyport model or Bird model (Bird, 1980) and introduced by Notteboom (Notteboom *et al.*, 2005). It also extends the existing literature on the special development of seaport systems in relation to maritime and hinterland networks as seen on Fig 3.21. The regionalization phase and associated hinterland concepts demand new approaches to port governance and a functional focus that goes beyond the traditional port perimeter. It should be paid a concentration when making a plan for development of Viet Nam port system and the suggested dry port system mentioned previously as a considered alternative.



(Source: Notteboom et al., 2005)

Fig. 3.21: The spatial development of a port system

As a matter of fact, Viet Nam infrastructure development could not catch up with its economic one and it could be considered as a weak point of Viet Nam economy. Clearly, Viet Nam inland transport system could not compare with that of Singapore, Malaysia and Thailand, the neighboring countries in ASEAN, where there are developed and successful port systems. Inland transport system gives a negative effect on Viet Nam port development. Therefore, it should be concentrated on development as a supportive strategy of Viet Nam port system.

Unfortunately, Viet Nam has been facing with limitations of budget for investment in transportation system and in particular port system. Privatization strategy could be considered as a solution for this case. The role of the private sector in ports has been greatly increased. At the world top 100 container ports, privatization is their recent trends (Baird, 2002). The private sector could intervene in:

- port organization,
- port assets including container terminals, bulk terminals and general cargo terminals, and
- port operations comprising port navigation services, stevedoring services and value added services.

Aims of privatization in port are to increase efficiency, achieve lower port costs, expand trade, obtain management know-how, and increase the speed of developing new terminals complying with ports and harbor legislation, developing a public-private partnership and increasing port revenue.

Many methods of privatization have been used by ports such as build-operate-transfer (BOT), joint venture, sale of port land, management contract, concession/lease arrangement for terminal operations, and corporation of terminals. Depending on Viet Nam particular conditions, they should be applied in flexible and suitable ways.

3.7 Conclusions

The systematic ways for development of Viet Nam port system were presented. In each strategy or method, the expected objectives as well as criteria were mentioned. Obviously, although suggested strategies have been applied successfully in many

port systems, they could not totally and directly apply for Viet Nam port system. In addition, they could not assure that their expected targets would be perfectly achieved.

However, each strategy, alternative or solution would expectedly bring its own contribution on development of Viet Nam port system. For example, development of container ports in terms of infrastructure, management, and technology would enhance port's ability to serve for container cargo. Transshipment ports would improve Viet Nam port competitive ability. In addition, a dry port system in Indochina region could support port capacity by improving hinterland distribution, which could operate as an extension to an existing seaport's capacity and efficiency. Supportive and competitive capabilities would be achieved by providing value added logistics activities as an attractive strategy.

Formulations and interpretations of strategy in terms of satisficing side by side with maximizing, minimizing or optimizing can be considered for more meaningful evaluation of its successes. A maximizing strategy statement could take the form of striving either for high achievement or maximum achievement. On the other hand, satisficing means the fixing of a certain level, or achievement of which will be regarded as a satisfactory result. Clearly, maximizing or satisficing makes a difference when it comes to judging the contents and success of policies, strategies or alternatives (Rothschild, 1999). Since the exact value of achievable maxima is normally not known or cannot be realistically reached in a short time it is a matter of interpretation whether a maximizing strategy has been successful or not. With satisficing, there is a clear signpost that distinguishes sharply between success and failure. Once the satisficing target has been reached, success cannot be denied. It could persuade Viet Nam government policy makers to pay an attention on implementing suggested strategies, alternatives or solutions.

With all what mentioned above, a satisficing way as the satisficing strategy to apply enhancing strategies for development of Viet Nam port system was introduced. It promises to bring them become applicable strategies for the practice port system.

CHAPTER 4. SATISFICING STRATEGY IN DEVELOPMENT OF VIET NAM PORT SYSTEM

Obviously, many gravitational forces affect on Viet Nam port system, which force Viet Nam ports have to change, evolve or die. Adjustably, the master plan has been modified to meet up-to-dated requirements. City ports especially in Ho Chi Minh City would be considered to relocate outside to suitable locations. In addition, strategies to enhance them would be studied and implemented, in which container ports should be paid much attention. Development of Dry Port system, transshipment ports and/or logistics activity zones such as ZALs, Distriparks and/or FTZz is considered as efficient and effective alternatives. Furthermore, other successful and interested strategies applying in developing port systems in the world would be studied and implemented for Viet Nam port system. Particularly, a cooperation strategy between Viet Nam with other partners or countries such as the Republic of Korea, which have developed port systems, to get experience, technology, management system, and budget from them, would be analyzed.

This chapter would study and present contents mentioned above. It hopes giving useful ideas or alternatives to enhance and develop Viet Nam port system.

4.1 Impacts of economic development on port system and the new strategic master plan

Viet Nam economy has been impressively developing after executing the “revolution policies” in 1985 especially focusing on economic development. As a result, freight import/export has been changed in synchronously. It could be classified into three temporary stages as shown on Fig 4.1. Before being accepted to become a member of ASEAN in 1995, its value was less than US\$10 billion. After that, because of being affected by Asia monetary crisis in 1997, it was slightly increased. In the third stage, in simultaneously with the boom in economic development, it has been grown so impressively.

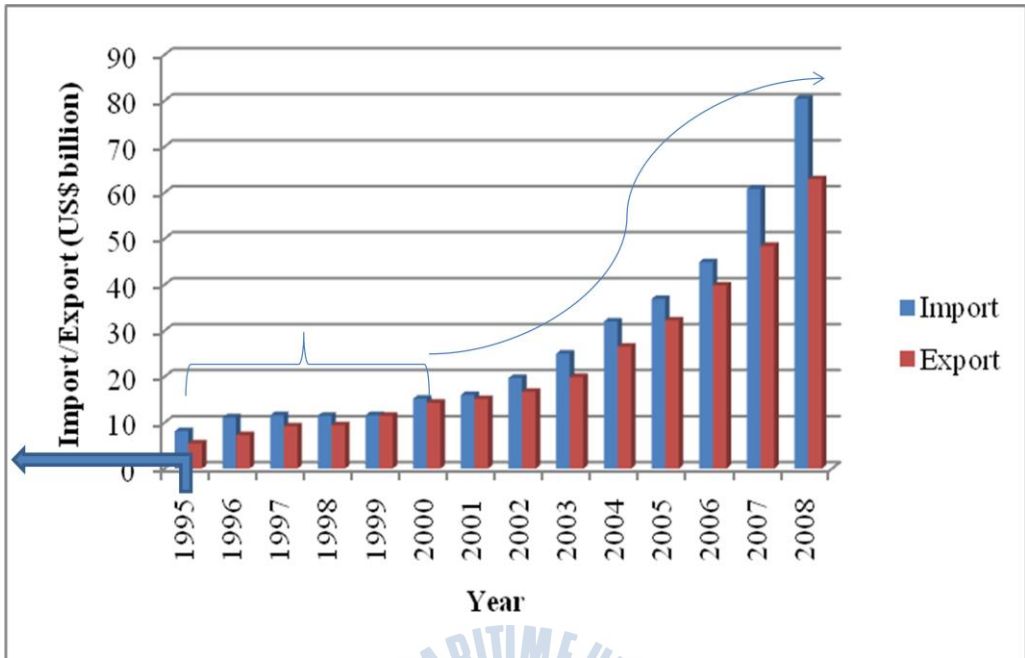


Fig. 4.1: Three temporary growth stages of Viet Nam freight import/export

As mentioned above, port system plays an important role in Viet Nam economic development. It has to change and evolve to catch up with increase of freight transport demands. Depending on economic development, it could be categorized into fourth stages in simultaneously, in which the three past stages are shown on Fig 4.2.

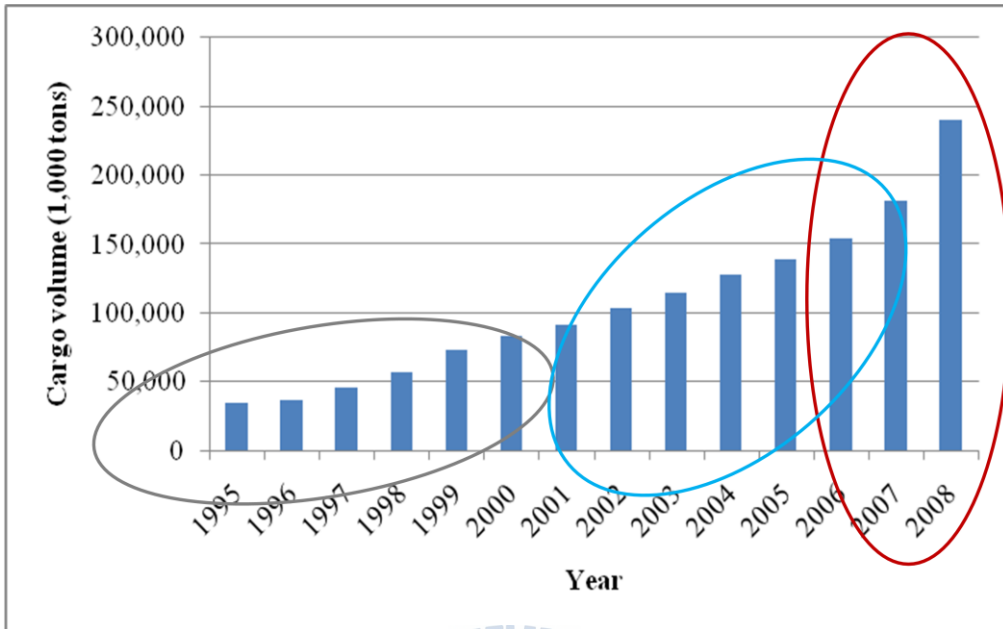


Fig. 4.2: Three past temporary development stages of Viet Nam port system

In the first stage, port system was abundant in capacity or deficient in cargo. In the second one, it could manage to serve the freight transport demand but nearly in full capacity and some congestion signals in ports were occurred. Recent years, it could not fulfill requirements in marine transport. Congestion problems usually happened especially in the Viet Nam south ports serving for the biggest national economic center, Ho Chi Minh City.

Viet Nam has joined ASEAN in July 1995, and it could be considered as the second cornerstone after implementing the revolution policies in 1985. At that time, Viet Nam had total 85 ports including river- and sea-ports, which served around 35 million tons in 1995. Actually, most ports were city ports serving for important economic centers including Ho Chi Minh City, Da Nang and Ha Noi. The requirements, gravitational forces from the affected factors, on port system were not high, so it was easy to manage to fulfill the demands. The geographic location factor made a strong force on development of ports as shown on Fig 3.3, and they, therefore, usually located nearly main cities. As a master of fact, Viet Nam port

system was evaluated at under-developed level, low competition, low service required as well as provided, and not much contribution on economic development.

In the second stage, around 5 years from 1995 to 2000, some important economic events such as jointing APEC in December 1998, establishing the national freight forwarding association VIFFAS and jointing FIATA, and signing the ASEAN Framework Agreement on Facilitation of Goods in Transit and adoption of the ASEAN Framework Agreement on Multimodal Transport between ASEAN member states were brought off. As a result, requirements or gravitational forces on port system were increased as shown on Fig 4.3. To fulfill the increase of demands in cargo transport in terms of general cargo and container volume, expansion of existing city ports had been done. The first specialized port, container port (VICT), was also built and has been operating. The serviced cargo volume reached 56 million tons in 1998 and increased to 106 million tons in 2000. In generally, they could manage those demands, but some congestion signals happened in the south ports.

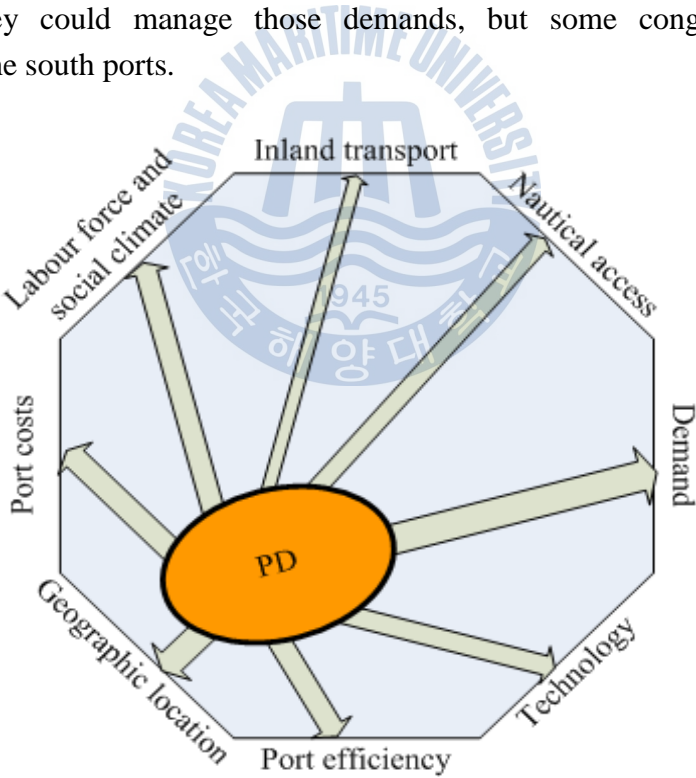


Fig. 4.3: Gravitational forces on port system in the second stage

Therefore, the master plan for development of Viet Nam port system was issued in 1999 as mentioned above. Until 2010, Viet Nam has had around 266 ports varying in size, in which only one could serve large ship, SPPSA international port, and other 9 ones could serve medium ships up to 3,000TEU or 50,000DWT. Obviously, demands on port system fast increased and limitations became critical though ports could meet the requirements as shown on Fig 4.4. Some problems happened in port system. The unbalance among ports has been occurred, where they served for 25-30 percent of cargo volume in the north, up to 10 percent in the central and mainly cargo volume in the south of Viet Nam. Therefore, ports in the south have been overloaded, while they are still abundant in other groups, although the forecasted demand to 2010 looked seemly exactly, 200 million tons in comparison with 198 million tons. The expansion strategy is not efficient due to limitations of deep water, public land for existing city ports and unbalance among ports as mentioned above.

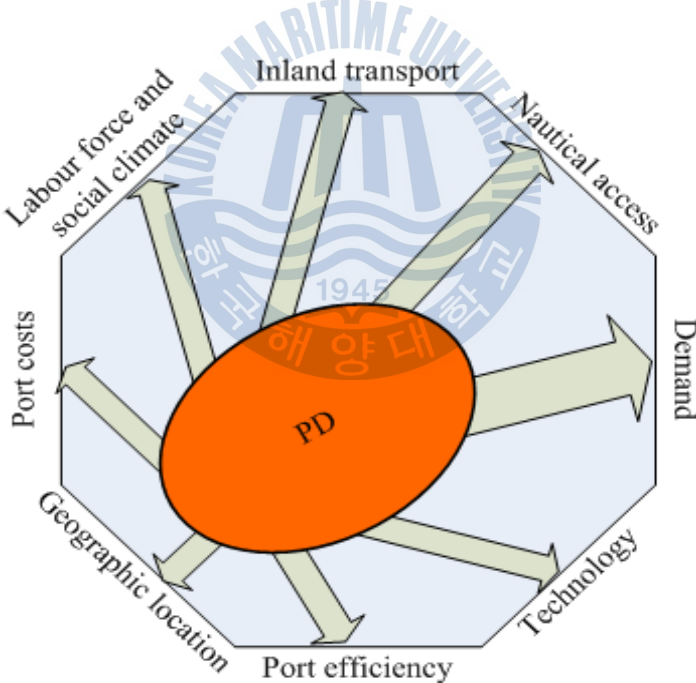


Fig. 4.4: Gravitational forces on port system in the third stage

Correspondingly, the new master plan for developing Viet Nam port system just issued in 2009 and has been implemented for the future stage. The upgraded port

system could serve an expected import/export cargo volume around 500 to 600 million tons a year in 2015, increasing around 900 to 1,100 million tons a year in 2020 and expecting to achieve 1,600 to 2,100 million tons in 2030. Priority is given to develop deep water ports that could serve large ships. The International Transshipment Port located in Khanh Hoa province would serve the largest ships, the six generation of container ships or tanker ships around 300,000DWT to 400,000DWT; other ones located in Hai Phong and Ba Ria – Vung Tau would serve the fifth generation container ships. Other ports would have their scale suitable with regional demands. Besides, the infrastructure at ports would be up-to-dated to achieve the efficiency, effectiveness and competitiveness with neighbouring ports.

In the new master plan, Viet Nam port system would include six instead of eight main groups as in the previous plan, in which the group of ports in Ho Chi Minh City, Dong Nai and Ba Ria - Vung Tau and the group of ports in Con Dao would be renamed as the group of ports in western south of Viet Nam, and group of Mekong River Delta ports and the group of ports of islands in the western south of Viet Nam would be renamed as the group of Mekong River Delta ports.

The new plan indicated that the development of port system should be done in simultaneously with that inland transportation infrastructure. Especially, future ports should be linked with national and regional transport networks such as rail way and highway network. In addition, a movement of city ports out to suitable places would be focused. In the next section, a case study of this plan would be presented.

4.2 New stage for city ports in Ho Chi Minh City and satisficing strategy

The role of ports has been changed over decades in synchronously with development of technology, national, regional and global economy, and demands on them. Nowadays, the increase in size of ship and far greater traffic volumes force seaports be upgraded, especially city ports in Ho Chi Minh City, the biggest and most dynamic economic center of Viet Nam, where ports handle more than 60 percent of cargo volume in general and around 75 percent of container volume in particular of the total cargo volume transported by water way.

Viet Nam economy is impressively and consistently grown over the last several years (the second fastest one in Asia, after China), which has made Viet Nam become more and more visible on the global map, and attracted multinational corporations looking for an outsourcing and factory-relocating destination.

Together with low labor force costs, Viet Nam also attracts investors by a safety investment environment with welcome and clear political policies. Becoming 150th member of WTO is a big opportunity to develop Viet Nam economy in general and port system in particular. As a result of economic development, more demands of import/export cargo require on ports.

Following the report about congestion in ports of Viet Nam, demands of cargo transport via ports at Ho Chi Minh City area have been gotten higher than their capacity from 2007. Therefore, congestion at ports has been happened more frequently. Correspondingly, an updated plan to develop these ports is one of important projects in the future.

There are many requirements for the new port system. It could at least serve country's industrialization and modernization process, meet the entire flow of sea-borne import-export cargoes in the future, as well as take advantages of nature and shipping potentials to develop ports for better serving economic areas, industrial zones.

In addition, a combination of resources including supportive government policies, ample investment, and well thought out operations and information technology along with location and a natural deep harbor to help create a sustainable advantage for the port determines a high quality seaport system. It promises to achieve a sustainable competitive advantage. Relative to its location, a new port should has a good natural with a superb sheltered harbor and significant costs including infrastructure, well educated, and hard working labor forces.

Actually, there are more than one alternative for developing a new port system in terms of serving for transportation demands of Ho Chi Minh City. And there are many factors or criteria used to determine which better one is. It is really hard or impossible to determine a perfect solution. Therefore, in this case, a verification of satisficing strategy would be applied. They are mentioned in following sections.

4.2.1 Criteria used to determine a new port location

A new port system location is the first important decision, which is usually determined by “where the ports are, where the market is, where the domestic freight is, where the international freight is, where the road system, rail system, or airport is, and where the labor is”. The trade-offs between freight and labor cost and required speed of delivery should be analyzed. It is better if the new port location locates nearly a major highway and railroad, which allows trucks carrying containers from ports to access at different levels. In addition, it would get many advantages if it was settled close to the markets, population centers. Moreover, public land available at reasonable prices allowing expansion in the future, and educated young workforce are other important factors.

The major functions of port systems are to facilitate trade, so they need to offer and maintain high levels of efficiency at reducing cost. Nowadays, a dramatic increase in size of containership that generates massive economy of scale effects and hence even lower transport costs requires attentions from ports. Besides, local environment issues should be considered. Unfortunately, they could not be satisfied in simultaneously. Therefore, a satisficing solution is expected to be identified through a verification of the satisficing strategy as following section.

Some considered factors are summarized as in Table 4.1.

Table 4.1: Proposed criteria for selecting a new port location

Criteria	Description
Natural water depth	A good location is where could be used to build deep-water ports in order to accommodate large vessels.
Existing transportation infrastructure/ superstructure network	The nearer highways and railroad, the better. It is more convenient to access to ports so that easy to expand port hinterland.
Labor forces	High local labor skills and available number of young labors are required for the new up-to-date port system. Value-added logistics activities at ports need many requirements on labor forces in both quantity and quality.
Land	Available land in terms of area for expansion and suitable land costs is refered. Besides, opportunity land costs as an investment in estate should be also put into considerations.
Distance to economic centers	Short distance to main economic centers would bring many advantages for new ports.
Environment effects	Effects on surrounding environment
Distance to international transport networks	Short distance to international sea routes is an advantage for ports to attract shipping lines.

4.2.2 Verification of the satisficing strategy

Satisficing strategy is considered as a decision-making strategy in this case, which attempts to determine a solution meeting criteria in terms of adequacy among them rather than to identify an optimal solution.

A visual view of the verification of satisficing strategy is shown on Fig 4.5.

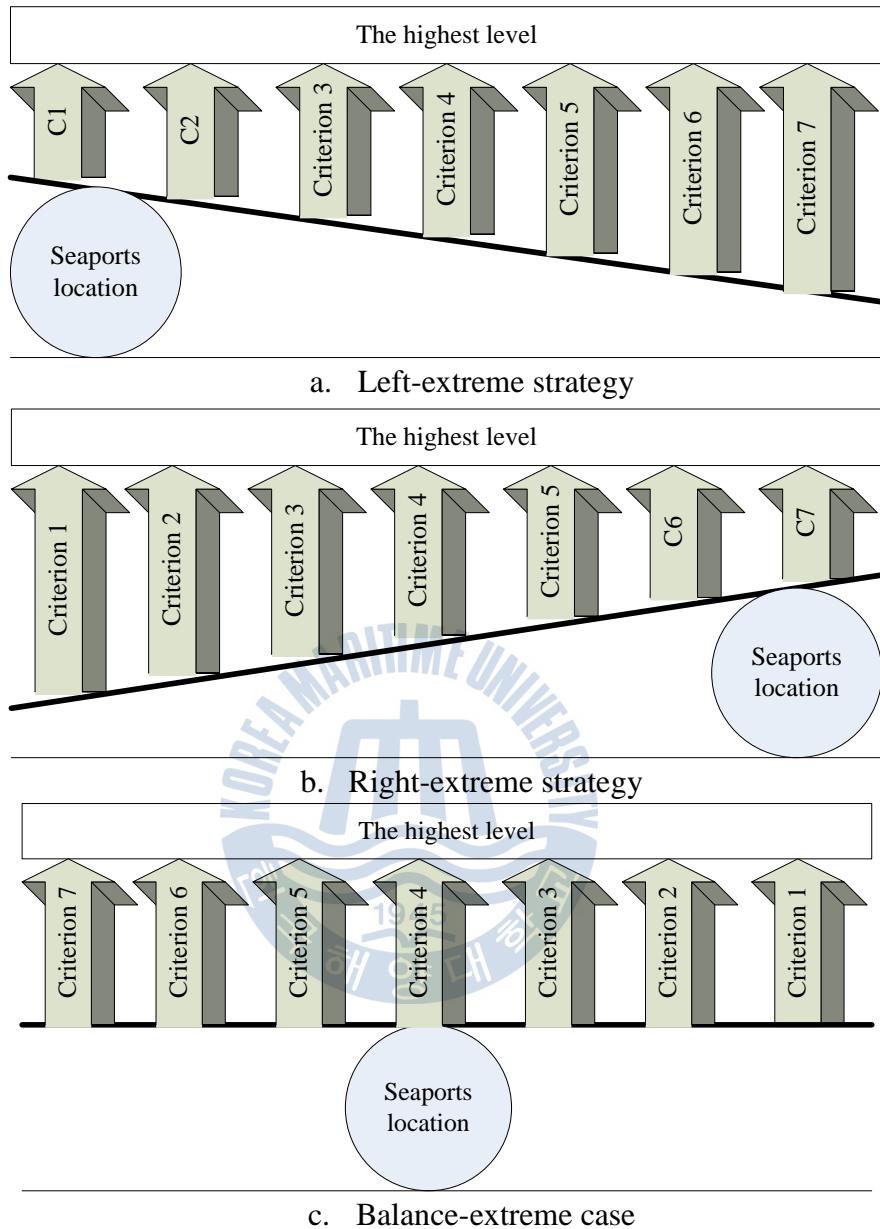


Fig. 4.5: Verification of the satisficing strategy

Each factor has a force on decision of new port location, and conflictions commonly happen among them. Therefore, it is really difficult to achieve a perfect solution in terms of satisfying all requirements at the highest levels. There are three extreme cases as shown on Fig 4.5. An alternative should meet criteria at the

satisfying levels as well as sacrifice them at the accepted levels. An alternative for developing Ho Chi Minh City new port system is mentioned as a case study.

4.2.3 Satisficing solution for Ho Chi Minh City new port system

As mentioned above, the south port system, particularly Ho Chi Minh City ports, has been facing with congestion problems at ports as well as inland transport. Therefore, a new port system that could meet the increase of demands in marine freight transport as well as those in economic development is required. Moreover, it is expected to operate at acceptable efficient and cost effective levels.

There are many solutions that could be considered for developing a new port system serving mainly for Ho Chi Minh City market. However, some possible dominated solutions would be mentioned.

Actually, the existing ports have been city ports and located in urban or semi-urban areas. They are classified as small ports able to serve ships up to 30,000 DWT, and most of them slack in up-to-date. Therefore, an expansion of them in terms of capacity and technology is considered. Most of them are located along rivers and inner city. They bring many advantages for city ports regarding city infrastructure, quality labor, and distance to the market center. Moreover, if this alternative was selected, natural environment would be changed at minimum level in comparison with other ones.

However, the city port system is recently facing with some disadvantages. Limitation of water depth so that they cannot accommodate large vessels is easily recognized. In addition, development of infrastructure has not cached up with demands, so inland transport is now seriously considered. As a result, they could not increase their hinterland and get effective as well as efficient in operations. Besides, public land for city port expansion is not available and expensive. Therefore, a displacement or movement of city ports outside the urban has been considered.

Many locations in Viet Nam are suitable for building deep-water ports as mentioned above, in which Cai Mep area in Ba Ria – Vung Tau and Van Phong bay in Khanh Hoa are considered as dominated alternatives in comparison with others.

Van Phong bay has 25 meters in depth, which suites for developing deep seaports accommodating for the large ships up to the six generation ships as mentioned above. Natural conditions and government welcome policies are its advantages. It locates on the southern central area in Viet Nam, so the new port system could directly serve the southern center provinces lasting from Binh Dinh to Binh Thuan as well as economic centers in the south of Viet Nam. Besides, these ports could also serve the northeastern Cambodia and northeastern Thailand via national highways 19 and 24, and play as a transit location between southern China and ASEAN countries. Moreover, large public land is available for developing ports and its price is still low.

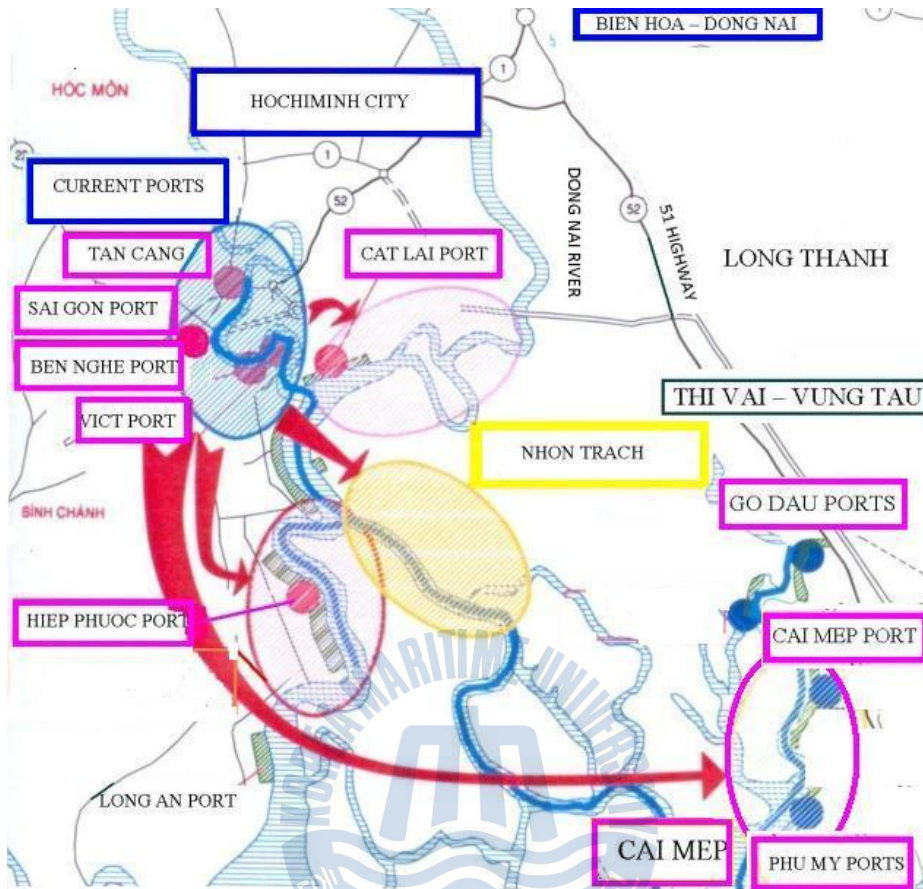
On the other hand, it locates far from Ho Chi Minh City around 400 kilometers, so it takes a long time for inland transport of cargo from/to Ho Chi Minh City. Van Phong bay has not had existing infrastructure/superstructure for seaports, so it needs much investment in developing them. Labor force is not available or do not meet requirements. Because the new seaports system is constructed on the natural areas in this case, environment effects should be considered seriously. However, the successfulness of Busan ports of the Republic of Korea, which serves the biggest Korea economic center, Seoul capital, could persuade investors pay an attention on Van Phong bay.

Ba Ria – Vung Tau is a province known for its advantageous geographical location, where Cai Mep – Thi Vai area is a good candidate for relocating the port system from Ho Chi Minh City. The new port system if constructed could accommodate large vessels with draft of up to 14 meters. Moreover, it is still available public land for developing ports, and the land cost is not too expensive in comparison with inner Ho Chi Minh City. It requires not much investment in infrastructure/superstructure, because Ba Ria - Vung Tau meets basic requirements. Especially, the distance from/to Ho Chi Minh City is around 90 kilometers. With a good road system, it takes approximately 1.5 hours for travel time by trucks. Because it locates not too far from Ho Chi Minh City, labor force might be interested in working for. If city ports are relocated in this place, congestion in ports or by ports would be improved essentially in Ho Chi Minh City. Besides, natural environment effects are not serious problems.

As results of its advantages, 26 investment projects to build ports along Thi Vai River system have been licensed. Of those, five projects have been completed and are in use. The other projects have been underway with the new container port, Cai Mep, and Ba Son shipyard. Ben Dinh – Sao Mai complex port is one of the key national projects for development under the national master plan for seaports. The complex port would provide oil, gas and container handling services and has a shipyard and a petroleum depot. In addition, the new port system would have six container wharfs capable of handling 100,000 DWT vessels and around 50 million tons of goods annually. As mentioned above, the first container deep water port, SP-PSA container port, has been in operations from 2010.

The removable plan of Ho Chi Minh City ports to Ba Ria – Vung Tau area is shown on Fig 4.6.





(Source: Saigon Port)

Fig. 4.6: Ports Removal Plan from Ho Chi Minh City to Ba Ria-Vung Tau

Some requirements for developing new seaports system should be paid attentions. A clear, effective and transparent financial framework should be established; Relations with port service providers should be managed; Operational bottlenecks that hamper port efficiency need to be solved such as infrastructure capacity, technical-nautical services provided, cargo handing service and port labor, administrative bureaucracy, controls and inspections, and inefficiencies in hinterland transport; The sustainable development of port and port related capacity should be ensured about environmental legislation, positive contribution of ports, and stronger focus of resources on hinterland connections.

Obviously, each considered alternative has its own advantages along with disadvantages and none of them could be considered as a perfect solution. In order to determine a suitable solution, a satisficing alternative would be suggested in term of combination of advantages from previous solutions.

The expansion of existing city ports should be done regarding to technology and productivity. These ports could be considered as local ports serving mainly for Ho Chi Minh City market in the short-term. In the mid- and long-term, they would be responsible for a part of demands in the future and become feeder ports. Value-added activities should be focused as an attractive shipping line solution.

The new ports in Thi Vai-Cai Mep, Ba Ria – Vung Tau, area could become the regional gateways serving not only for Ho Chi Minh City, but also for the south of Viet Nam. They could be considered as a main project in the mid-term and also long-term. Some special ports such as container ports, and oil ports, which could accommodate large ships, should be focused. They would become the key ports of Viet Nam in the future to compete with neighbor port systems in ASEAN region.

And the key future Viet Nam port system project is Van Phong port system, where meet conditions to build the international transshipment ports in the future. In particularly, they could become hub ports for Ho Chi Minh City feeder ports as mentioned above. This individual alternative would be specified in more detail in following sections.

A new stage of developing seaports system in Viet Nam should be considered. It requires lower transports costs and extendible global reach of megacarriers, so at least seaports locate on deep-water that could serve large ships. Major required respects of new seaports system include facilitating development of adequate port capacity, maritime access and hinterland connection to allow ports to fulfill their role, fostering the provision of competitive and efficient services in ports, and stimulating the wider community responsibility of ports. Therefore, they need to make a closer co-operation instead of more competition each other.

Besides, most Viet Nam ports are complex or multifunction ports so they are difficult to get effective and efficient in their operations. As a result, they could not compete with neighbor port systems and they have been considered as feeder ports.

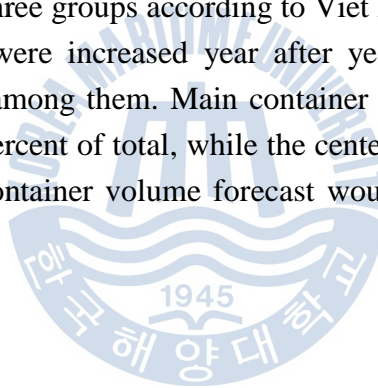
Containerization has made the revolution in marine freight transport. Actually, it has been affected on Viet Nam port system as mentioned in next sections.

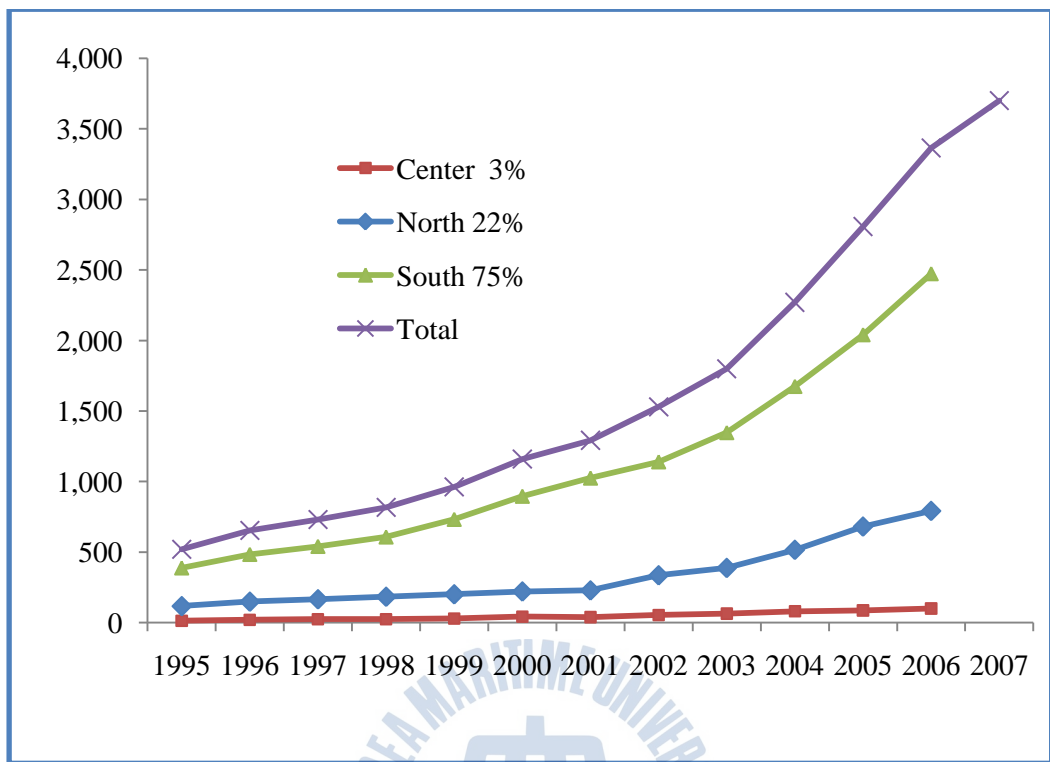
4.3 Enhancement of container ports

In this section, some important aspects of Viet Nam container ports would be studied. First of all, container volume forecast would be identified, which is important information to orient a suitable developing plan for container ports. After that, a SWOT (Strength, Weakness, Opportunity and Threat) analysis would be done. It promises to give general information about Viet Nam container ports. Consequently, some alternatives enhancing them would be presented.

4.3.1 Container volume forecast

Container volume via ports of Viet Nam is summarized as on Fig 4.7, which is temporarily divided into three groups according to Viet Nam geography. Obviously, their container volumes were increased year after year. However, it is easy to recognize the imbalance among them. Main container cargo was served by south ports, approximately 75 percent of total, while the center group only served around 3 percent. Therefore, a container volume forecast would be particularly done for the south port group.





(Source: VINAMARINE)

* 2007: preliminary data

Fig. 4.7: Container Volume via Ports of Viet Nam (1,000 TEUs)

As mentioned in Chapter 3, a relation between container volume and time in order to estimate or predict the future volume would be analyzed. Data were fitted into four nonlinear equations including exponential equation, power equation, polynomial equation of degree 2 (quadratic form), and one of degree 3. For each equation, the multiple coefficient of determination, R^2 , is calculated to measure how fit the equation is. According to the R^2 rule, the higher R^2 , the better fitted equation. Then, MAPEs (Mean Absolute Percentage Errors) are calculated for each equation in order to find which type of nonlinear equation is the best one. Similarly, they follow the MAPE rule that the smaller MAPE, the better fitted equation. A summary is shown as in Table 4.2.

Table 4.2: Trend equations and R² & MAPE values

Equation	R ²	MAPE
$y = 435.1\text{Exp}(0.164X)$	0.992	3.8591
$y = 356X^{0.779}$	0.862	29.041
$y = 25.12X^2 - 88.11X + 704.1$	0.991	6.404
$y = 1.028X^3 + 2.325 X^2 + 50.81 X + 505.5$	0.995	3.424

y: Forecasted Container Volume; X: time variable, X = 1... n.

Both R² and MAPE values show that the last equation is the best fit. Therefore, it would be used to forecast the future container volumes as on Fig 4.8.

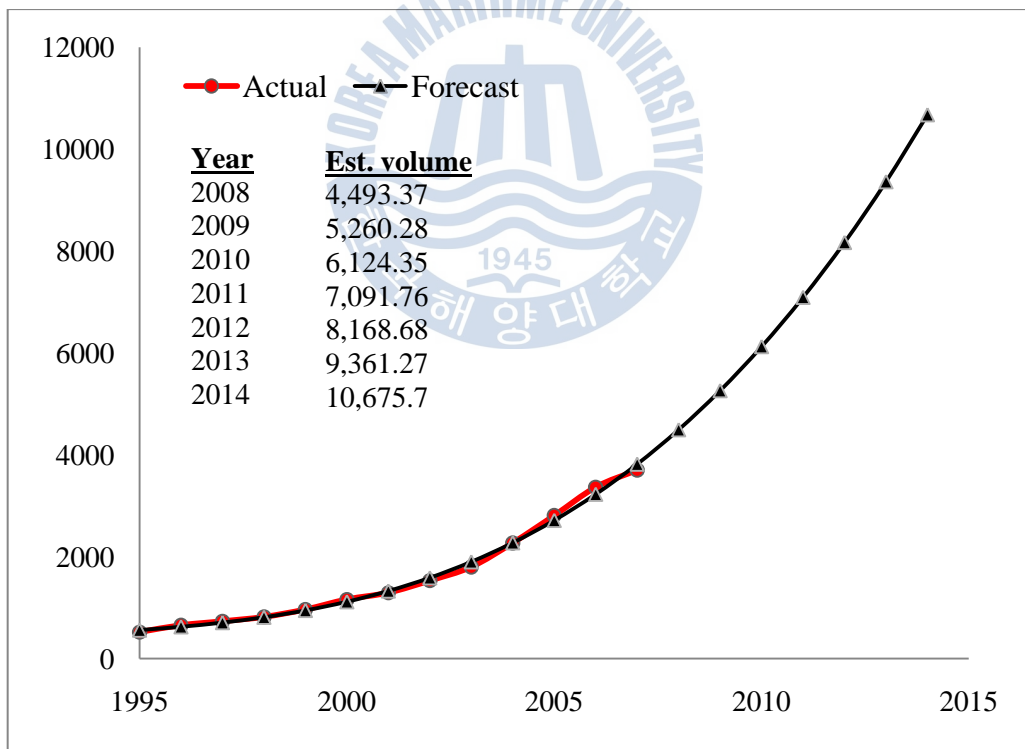


Fig. 4.8: Forecasted Container Volumes via Viet Nam ports (1,000 TEUs)

Similarly, the best fit equation was determined to forecast container volume through south ports as:

$$y = 328.2e^{0.163X}$$

$$R^2 = 0.996, MAPE = 2.9502$$

where:

y: forecasted container volume

X: time variable

The forecasted result was summarized as on Fig 4.9.

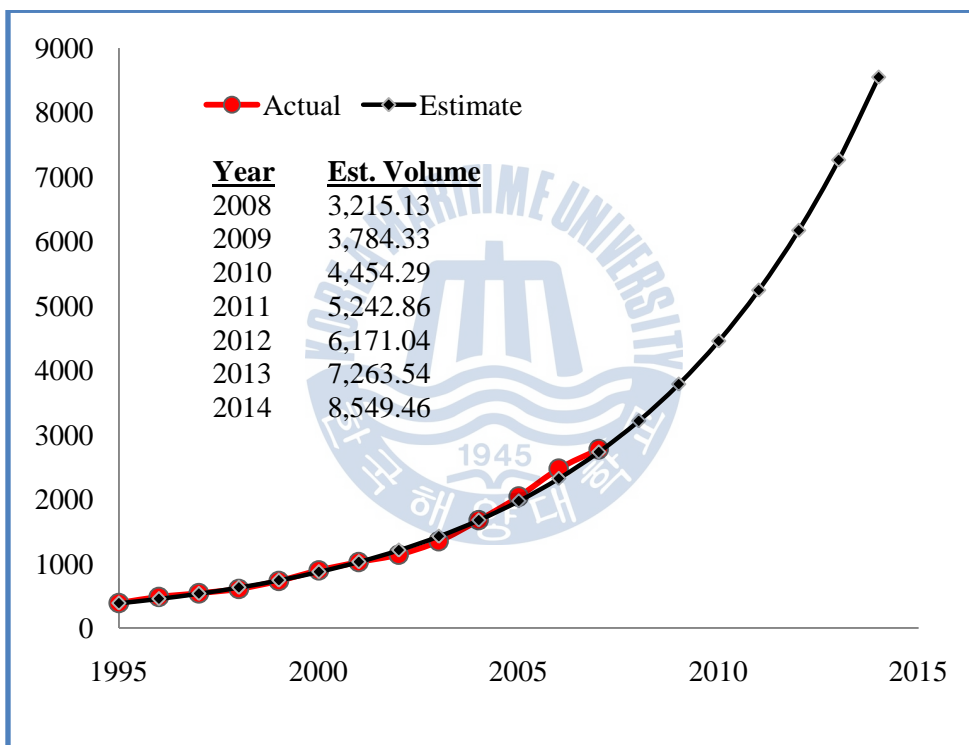


Fig. 4.9: Forecasted Container Volume via south ports (1,000 TEUs)

According to forecasted results, the container volumes via Viet Nam ports in general and Ho Chi Minh City ports in particular would be increased dramatically with the average growth rates of 15.8 and 17.7 percent in respectively.

Actually, there have been existing ports as well as in planning ports that could handle container cargo, as shown in Table 4.3.

Table 4.3: Current & expected capacities and expected surplus/deficit of south ports

(1,000 TEUs)

Port	2006	2007	2008	2009	2010	2011	2012	2013	2014
Saigon	240	300	300	300	-	-	-	-	-
Saigon New	1,400	1,570	1,640	1,830	2,130	2,130	2,130	2,130	2,130
Ben Nghe	190	200	200	200	-	-	-	-	-
VICT	450	550	750	900	900	900	900	900	900
ICD Phuoc Long	250	250	250	250	-	-	-	-	-
Hiep Phuoc P&O Ports *			200	400	800	1,000	1,200	1,200	1,200
Cai Mep, ODA *						525	1,050	1,050	1,050
Cai Mep, SSA *					250	525	1,050	1,050	1,050
Cai Mep, APMT *					525	1,050	1,050	1,050	1,050
Cai Mep, New Port *				300	500	750	1,000	1,250	1,500
Cai Mep, PSA *					250	500	1,000	1,000	1,000
Cai Mep, Gemadept *							500	1,000	1,500
Total Capacity	2,530	2,870	3,340	4,180	5,355	7,380	9,880	10,630	11,380
Forecasted Volume	2,473 **	2,780 **	3,215	3,784	4,454	5,243	6,171	7,264	8,549
Surplus/Deficit	57	90	125	396	901	2,137	3,709	3,366	2,831

‘-’ Ports will be removed.

‘*’ Ports are being constructed and expected to be operated at mentioned points of time

‘**’ Actual volume

(Source: Capacities (Rasmussen, 2007))

According to this scenario, if the plan for developing container ports was implemented and finished as the expected progress, their capacity could meet the growing demand on container cargo segment. In order to give more information, SWOT analysis would be presented.

4.3.2 SWOT analysis of container ports

In this section, a SWOT analysis would be performed in order to determine internal/external factors that are helpful and/or harmful to the container port development.

a) Strengths

Thank to geographical advantages, Viet Nam has a long coastline and many good harbours suitable for developing deep-water ports and they are located nearly at the important international marine lines, linking current eventful economic centers of the world. Distances from Viet Nam ports to ports in North America, and Northeast Asia are shorter than those from ports in other Southeast Asia countries, as shown on Fig 4.10.



Fig. 4.10: Viet Nam ports and international main marine routes in ASEAN region

Due to Viet Nam geographical characteristics, historical data show that approximately 90 percent of the import/export volume has been carried by waterways, and inland waterway transport accounts for about 34.5 percent of the domestic cargo transport volume in the past few years as mentioned previously.

In particular, container volume via ports of Viet Nam has increased continuously. As shown on Fig 4.8, the container volume increased more than 700 percent over the period of 1995-2007. Currently, some container ports have been constructed and in operations with modern equipments and deep water, which could serve large container ships as mentioned above. In addition, Vietnamese government recognized importance of container ports, so welcome and supporting policies for developing them have been issued.

b) Weaknesses

Actually, Viet Nam port system in general and container ports in particular could not compete with ports of Singapore, Thailand or Malaysia in ASEAN region due to some weaknesses. First, infrastructure and superstructure of most ports in Viet Nam are very old and need to be improved. Few of Viet Nam's major ports are equipped with the modern and specialized facilities and equipments, but still in limited quantity which leads to the low handling productivity as shown in Table 2.6. For instance, although VICT throughput rate is 25 boxes per hour per crane, its capacity is about 600,000 TEUs annually. Moreover, in most conventional ports facilities are used for both break bulk and container cargo. Besides, information technology and operating systems are also lack up-to-date and value-added activities could not meet demands.

In addition, while the container volume has increased rapidly, development of dedicated container ports seems lagging behind. Ports in Ho Chi Minh City are now run almost in full capacities, while capacity of other ports in the Center and North are expected to be adequate for short and medium market needs. For examples, in 2006 the container volume via ports in Ho Chi Minh City reached 2.5 million TEUs while total capacity is 2.53 million TEUs, the figures in 2007 were 2.78 and 2.87 million TEUs for actual volume and capacity respectively as seen in Table 4.3.

Third, although Viet Nam port costs have decreased continuously since the year 2001, it is still higher from 20 to 30 percent than those of other ports in the region according to some foreign shipping companies. For examples, the port cost of Hai Phong port was higher than those of similar ports in China and Thailand about 21 percent in 2007 due to the obsolete of infrastructure and superstructure, and the inefficiency of the port management that lead to longer time to release vessels. For each day delayed, the ship owner would be fined around US\$ 8,000. Moreover, the ports charge includes many types of fee that lead to the high total fee, while most ports in the region only charge port dues depending on the vessel's GRT (Gross Registered Tons) (Runkel, 2006).

Besides, most major Viet Nam ports have been located along rivers and inner big cities such as Saigon, Saigon New, Ben Nghe and VICT ports, although there is a removal plan to displace them out of city. The city ports get potential advantages in terms of utilization of city infrastructure and superstructure, and short distance to industrial and economic zones and market center. However, they recently show weaknesses such as limitation of depth so that they cannot accommodate large sized vessels, limitation of hinterland, and terrible traffic jam problems at big cities.

For instances, due to the shallow draft conditions, city ports in the South could only handle small vessels up to 1,500 TEUs, while this figure is about 600 – 800 TEUs for the ports in the North. However, as a matter of fact large vessels will reduce cost due to economy of scale.

c) Opportunities

Viet Nam economy has been impressively and consistently grown over the last several years (ranked as the second highest growth rate in Asia after China), which has made Viet Nam more and more visible on the global map. In pursuing of lower costs regarding to labor force cost and raw materials price, many foreign companies have looked to Asia for outsourcing and Viet Nam is one of preferable destinations.

As a result of economic development, the import/export cargo is increased dramatically. Consequently, demands on ports increase in simultaneously, but as

mentioned previously existing ports recently are operating nearly in full their capacity. Particularly, container ports have just paid attention on development.

Therefore, many foreign investors are interested in investing in Viet Nam ports. Viet Nam port system and particular container ports would become attractive, effective, efficient and competitive in near future.

d) Threats

Viet Nam transportation infrastructure relative to ports such as roadway and railway system, and information technology has been still considered as underdeveloped level, and actually it could not compared with that of other countries in the ASEAN such as Singapore, Thailand and Malaysia.

Poor road conditions between main arteries and port maybe hamper the development of ports. The rail system has been not much contributing on inland freight transport, which currently is lack up-to-date, and not directly connected to ports. Therefore, the development of transport infrastructure in step with port development is essentially required.

Besides, although industrial parks are strategically located near ports, most of them are small ports as mentioned before. The economy of scale in marine transport is difficultly achieved.

According to expected capacity and demands on container volume, Viet Nam port system could meet the market requirement until 2014. However, as in SWOT analysis, demands for modern port facilities, especially dedicated container handling equipments in order to meet the demand for speed and safe cargo handling are required. Moreover, new investments in both ports and landside infrastructure and superstructure are critical requirements. The soonest availability of port facilities to absorb new volumes and transport infrastructures are key to Viet Nam ability to meet growth targets and to ensure flow of foreign investments continues. In other words, the development of ports could boost the national economy.

In order to solve the capital problem on super- and infra-structure investment, as well as improve competitive ability of Viet Nam ports, suitable and promotive

strategies for port development in the region as well as in the world should be studied and implemented depending on Viet Nam characteristics.

Van Phong port as shown on Fig 4.11, for example, locates on the farthest east of Indochina region, which is the closest point of the international marine lines, ASEAN-Manila-Guam-Honolulu-San Francisco, Victoria or Panama. In comparison with Hong Kong and Singapore Port, the shortest marine line transporting to America is from Van Phong Port (Chu, 2002). Besides, it has good natural conditions required for developing ports and a welcome for investment from Vietnamese government.



Fig. 4.11: Van Phong bay

Unfortunately for the ports, shippers are flexible in deciding which ones they would be served. Furthermore, due to accompany the continued growth of containerization and the globalization of production and consumption, shippers and carriers are showing less loyalty to specific ports. Therefore, ports should focus on

what the shipping lines require. In evaluating port competitiveness, a consideration has been given to the accessibility of individual container ports to the wider maritime container transportation network. Improvement of throughput is significant and efficient way to increase ports competitiveness and then attract shippers.

In order to respond to the container needs of shippers, ports have to provide necessary at least and up-to-date infrastructure to handle containers, which consists of facilities on land (road, rail road), water (dredged channels, aids to navigation), as well as the actual terminal interface with gantry cranes, yard cranes, mobile cranes and container storage areas, and increasingly an EDI system to track the containers. To operate and manage those workforces have to be trained, as a result, hard working and efficient.

Furthermore, container volume throughput at ports depends on demand for shipping cargoes for containers, which presents the health of the economy. The development of Viet Nam ports in particular and ASEAN ports throughputs depends on that of the world economy, especially in ASEAN, Northeast Asia, Middle East Asia, United States and Europe. The demand for the containerization services is optimistically increased in the future by ports, inland transportation companies and also shipping lines.

Some Viet Nam ports, especially Van Phong port, have a good natural harbor and deep water approaches. To become major ports, another main requirement for ports to achieve success is a strong traffic generating location. It would become central to not only the Indochina region but also in the Southeast area and on the way to economic centers.

4.4 Dry port system

Dry ports are intermodal transport hubs in the inland, which operate as centers for the transshipment of sea cargo to inland destinations. They could make the import and export easier and increase trade. This research considers conditions to construct them in Indochina area including three countries Viet Nam, Lao People's Democratic (Laos) and Cambodia. Accordingly, general characteristics of dry ports and conditions to develop them would be reviewed. Transportation systems in the

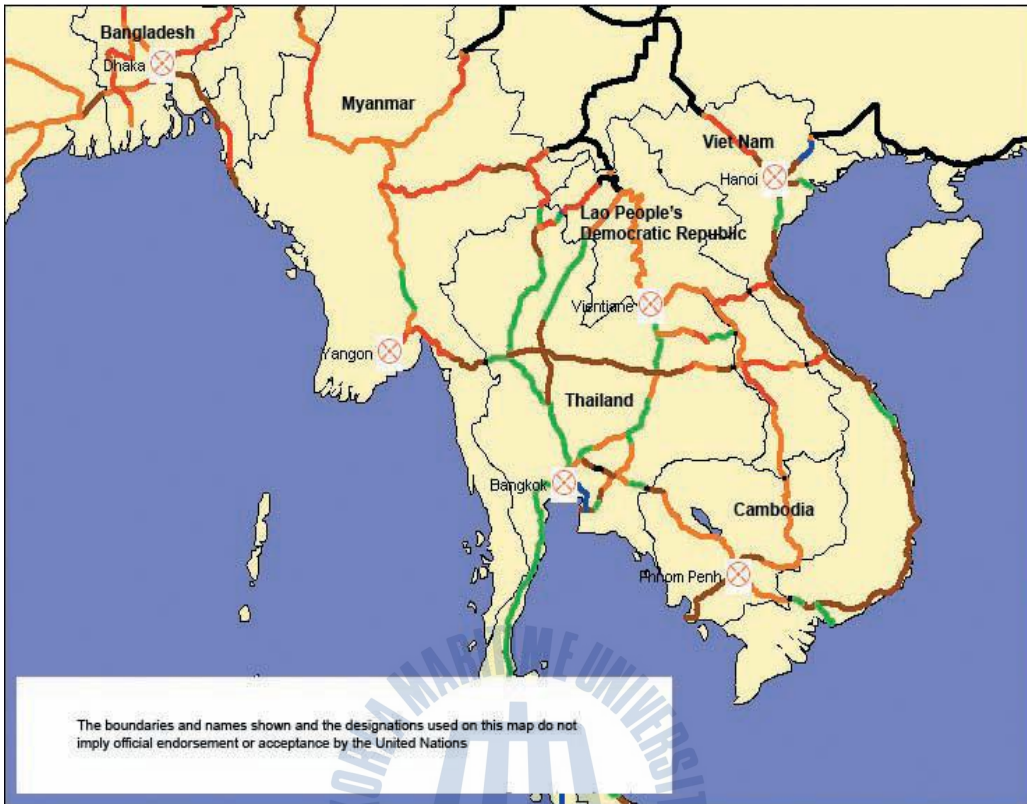
Indochina area would be then analyzed. Consequently, a suggested dry port system would be presented, which promises bring many benefits for Indochina region. Finally, some conclusions and suggestions would be presented.

4.4.1 Conditions for developing a dry port system

The economic cooperation program started by the Asian Development Bank attempts to facilitate economic cooperation not only through hard infrastructure development but also through cross border transportation agreements among countries. Viet Nam, Laos, Cambodia, Thailand and other Asian countries concluded an agreement for facilitation of cross border transport of goods and people in 1999 (JICA and ALMEC, 2007). It gives many advantages on development of cross border transport infrastructure and facilitation of border crossing procedures not only in Indochina region but also in Asia. It, therefore, promises to improve investment environment and develop new logistics route and result in growth of trade development of regional economy.

The Asian Land Transport Infrastructure Development (ALTID) project comprising of the Asian Highway and the Trans-Asian Railway network as well as facilitation of land transport was endorsed by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) in 1992 (UNESCAP, 2006). It could promote regional cooperation, maximize use of existing infrastructure and make a coordinated plan for development. Indochina subregion transport network is a part of this project.

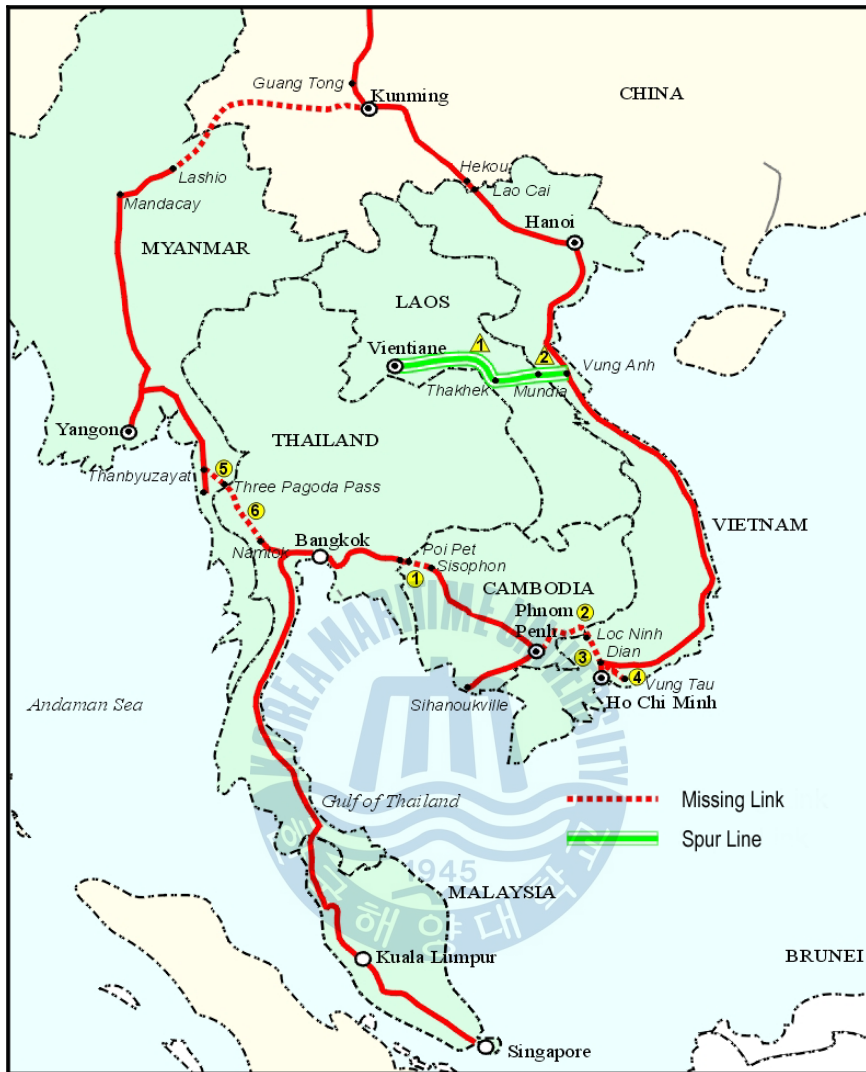
Viet Nam, Laos, Cambodia and other countries are comprised in the South-East Asian subregion which has more than 23,400 km of Asian Highway (UNESCAP, 2006) as on Fig 4.12. The total Asian Highway length in Indochina area is only 6,396 km or approximately 27 percent. It connects primary economic centers and national roads. Therefore, it could contribute in the international transport network not only of this region but also of Asia.



(Source: UNESCAP, 2006)

Fig. 4.12: Part of Asian Highway in South-East Asia

Besides, in 2006, a transportation agreement by 18 transport ministers in connection with the Trans-Asia Railway Network (TAR) was reached, which started off the United Nations project to connect the Far East to Western Europe by rail link (UN, 2006). The Singapore-Kunming Rail Link (SKRL), as seen on Fig 4.13, is a sub-project in the South-East Asia, which spans around 5,000 km from Singapore through Indochina area to the Kunming City, China. It is a very efficient and most economic mode of cross-border cargo transportation (UN, 1996). There are six alternative routes to link Singapore to Kunming as shown in Table 4.4. Route 1 connecting Viet Nam, Laos, Cambodia and China is evaluated at its high social and economic impact by the ASEAN Transport Ministers (ASEAN, 2007). Laos, a landlocked country, could access to world's markets through TAR or efficient rail links to international ports.



(Source: Association of Southeast Asian Nations)

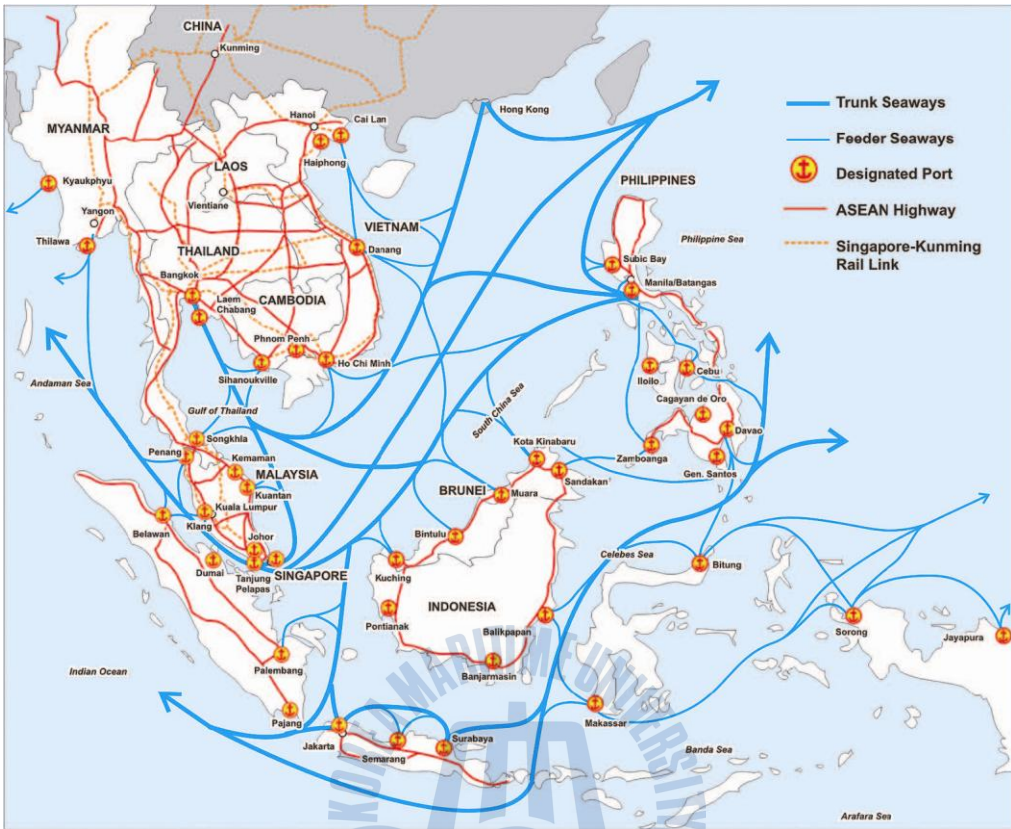
Fig. 4.13: Singapore-Kunming Rail Link network

Table 4.4: Route alternatives for SKRL project

Study Route	Total Capital Outlay (US\$ Billion)	Route Distance (km)	Missing Links (km)	Countries Involved
Route 1	1.8	5,382	431	Cambodia, Lao PDR, Viet Nam
Route 2	6.0	4,559	1,127	Myanmar, Thailand, China
Route 3	1.1	4,259	531	Lao PDR, Viet Nam
Route 4	5.7	4,164	1,300	Lao PDR, China
Route 5	1.1	4,481	616	Lao PDR, Viet Nam, Thailand
Route 6	1.1	4,225	589	Lao PDR, Viet Nam, Thailand

(Source: Association of Southeast Asian Nations)

Similarly to highway or railway network, the ASEAN-wide port system was proposed in 1999, which consisted of 47 ports as shown on Fig 4.14. It is easy to recognize that Indochina's ports could not compare with neighbor ports in ASEAN region, such as Ports of Malaysia, Thailand, Indonesia and Philippines. Although it has a long coast, mainly in Viet Nam, and locates near international maritime transport network, there is not any hub port in this region. However, seaports' roles can shift from one to the other depending on the growth of the world trade carried in containers, the shipping pattern, the bargaining powers of the port users and port service providers as well as competition itself in the region (ALMEC, 2002), and therefore whether seaports in Indochina area could become hub port(s) or international transit port(s).



(Source: ALMEC Corporation)

Fig. 4.14: ASEAN Port Network System

4.4.2 Seaport systems

As mentioned above, Laos is a landlocked country, so transportation of freight or people directly by maritime way is impossible. It has exported and imported mainly through Leam Chabang Port in Thailand, so Thailand becomes the biggest trading partner of Laos. An alternative route that could serve as access from Laos to ports of Viet Nam is possible to handle its export or import. Because of the bilateral agreement with Viet Nam (Laos *et al.*, 1999), there is no need for transshipment at the border.

Cambodia has three main international ports, in which Sihanoukville is its main deep seaport. Its capacity is estimated around 1 million tons a year. Because of

rocky outcrops in the channel, the entrance to the port is restricted to vessels with a draft of less than 8.0-8.5 m, which could accommodate ships of 10,000-15,000 DWT (*Source: Sihanukville Autonomous Port of Cambodia*). Although it is the key Cambodian port, it could not become a hub port for Indochina region.

Thank to geographic conditions, Viet Nam has many deep water seaports located on the long coast, approximately 3,200 km, in which Hai Phong, Da Nang and Ba Ria-Vung Tau ports have been considered to develop as international maritime gateways and especially the Van Phong-Khanh Hoa port has been developed to become the international transit port not only for Viet Nam but also for Indochina and ASEAN region (Vietnamese president officer, 2009). Their main characteristics are summarized in Table 4.5.



Table 4.5: General characteristics of four main Vietnamese ports

Port	Accommodated ship
<i>Hai Phong</i>	
Lach Huyen	50,000 – 80,000 DWT or 4,000 – 6,000 TEU
Dinh Vu	20,000 – 30,000 DWT
Cai Lan	50,000 DWT or 3,000 TEU
<i>Da Nang</i>	
Tien Sa, Son Tra	30,000 – 50,000 DWT or 4000 TEU
Lien Chieu	50,000 – 80,000 DWT or 4,000 – 6,000 TEU
<i>Ba Ria – Vung Tau</i>	
Cai Mep, Sao Mai – Ben Dinh	80,000 – 100,000 DWT or 6,000 – 8,000 TEU
Phu My, My Xuan	50,000 – 80,000 DWT or 4,000 – 6,000 TEU
Long Son	30,000 DWT
<i>Van Phong, Khanh Hoa</i>	
Dam Mon	9,000 – 15,000 TEU
South Van Phong	400,000 DWT
West Van Phong	50,000 – 100,000 DWT

(Source: Vietnamese president officer)

However, all ports in Indochina region have been considered as feeder ports as shown on Fig 4.14, although some ports, especially Vietnamese ports, meet required conditions to become international hub ports or transit ports.

As mentioned previously, Van Phong port, for example, locates on the farthest east of Indochina region, which is the closest point of the international marine lines, ASEAN-Manila-Guam-Honolulu-San Francisco, Victoria or Panama. In comparison with Hong Kong and Singapore Port, the shortest marine line

transporting to America is from Van Phong Port (Chu, 2002). Besides, it has good natural conditions required for developing ports and a welcome for investment from Vietnamese government.

4.4.3 Dry port system as an improvement alternative

Although Indochina region has been participated in Asian Highway, Railway Links Network and ASEAN-wide Port System project, its transportation system is not considered as an effective and efficient one. It is essential for effective regional integration and efficient supply chain if an effective and efficient transport network is set up. Significant progress has been made in improving connectivity and intermodal facilities such as ports and dry ports or Inland Container Depots (ICDs) not only in Indochina but also in Asia-pacific region. The region has realized the importance of such improvements, as evidenced by the efforts being undertaken to connect the different modes to each other and to improve their capacities.

Dry ports play an important role in integrating modes of transport, reducing border crossing and transit delays, facilitating the use of energy efficient and lower emission means of transport, and creating new clusters of economic growth and job creation in local area (UNESCAP, 2009). A dry port is a hinterland intermodal freight transport hub, typically providing valuable space for logistics and onward distribution activities (Notteboom, 2009). Potential benefits of dry ports would be brought if they are applied successfully.

Depending on a specific transportation system where the necessary supporting infrastructure such as roads and railways is assured and the regulatory and institutional systems are properly designed to optimize the involvement of both the public and the private sector, a suitable dry port is designed and applied. Accordingly, considerable dry ports fitting into the Indochina region are suggested as shown on Fig 4.15.



(Source: Do et al., 2011)

Fig. 4.15: Suggested dry port system for Indochina region

There are three dry port categories: close, midrange and distant (Roso, 2009), based upon the function and the location. Each of them has its own benefits defined from the perspectives of actors involved, such as seaports, rail and road operators,

shipping lines, shippers, local authorities and society. There are already good dry ports in Indochina region, which could consider as models for others. For example, a dry port located next to the Phnom Penh capital city near the national highway and the railroad is an ideal cargo staging area and distribution point. As most forwarders, importers and exporters are located in Phnom Penh, the transportation cost and time are drastically reduced in this dry port instead of Sihanukville Autonomous Port which is 230 km away from. Another example is the close dry port system in Ho Chi Minh City Ports of Viet Nam, such as Tan Cang-Song Than ICD, Transimex ICD, Tanamexco ICD, and Ben Nghe ICD. Recently, they serve for Ho Chi Minh Port as close dry ports, but in the near future when the city ports move away to Ba Ria-Vung Tau they could be considered as midrange dry ports for them.

Most existing dry ports are domestic ones that serve for local ports. It is possible to enhance this system and to set up suitable dry ports at international gateways. They promise to generate a good transportation system for region in order to enjoy benefits of intermodal transportation. Especially, importers or exporters to/from Laos would be attracted due to advantages from this system. Distant dry ports could be constructed at Laos' economic centers such as Vientiane and linked directly to Vietnamese seaports by railways. As a result, Vietnamese seaports would have an extended hinterland.

Indochina dry ports could make a strong connection to gateway regions. As a result, increase in trade flows, lower door-to-door freight rates, avoidances of clearing and forwarding agent's fees and sea ports, storage demurrage and late documentation fees and need to extend the period of marine insurance, optimal use of road and rail transport and national rolling stock, better utilization of capacity, greater use of containers, lower customs staff costs, benefits to sea ports, inventory savings, benefits of unit trains, improved communications and additional benefits could be brought by the dry port system.

In addition, ASEAN has an ambition to construct a freely across the borders transportation network, so containers promise to get much benefits from that project. For example, there will be not any impingement on containers entering one country ports and passing into the other. Vietnamese ports should increase

integration of ports into the transport network, grow recognition of a port as a natural focus for industrialization and value addition, and develop port related logistics activities taking account of corporate commercial strategies, technological developments and market forces.

4.5 ZALs, Distriparks, and FTZs

Although Viet Nam meets advantageous conditions for developing a vital port system in ASEAN region, actually there is not any port that could compete with others such as Laem Chabang (Thailand), Pelabuhan Tanjung Pelepas – PTP (Malaysia) and Singapore (Singapore) port system. Therefore, development of logistics value-added activities in ports as the Logistics Activity Zones in Ports (ZALS) is a necessary and possible alternative to increase their competitive ability.

In this section, a study of developing ZALS for Viet Nam port systems would be done. Consequently, an analysis on demands of logistics activities would be presented. Correspondingly, a design for ZALS functions and goals would be suggested. Finally, some conclusions and suggestions would be proposed.

4.5.1 Demands of logistics activities in Viet Nam port system

Logistics functions in ports are varied, which depend on serving cargo, equipment, and transportation modes for both water and inland transports. According to economic sectors, logistics chains are classified into sixteen types as shown in Table 4.6.

Table 4.6: Correlation between economic sectors and logistics chains

Economic Sector	Logistics Chain
Oil and gas	Crude oil Liquefied natural gas
Coal	Coal and raw ores
Chemicals	Fertilizers, potashes and phosphates Chemical products
Iron & steel and metallurgy	Iron and steel products
Automotives	Motor vehicles
Cement and Clinker	Cement and Clinker
Construction materials	Coal and raw ores
Agriculture and livestock	Bulk grain
Food and drinks	Fruit and Vegetables Fresh fish Frozen fish
Manufactured goods	General Ro-Ro and container goods
Paper	Pulp and paper Wood and cork

(Source: Spanish State Ports Agency, 2003)

Actually, only specific logistics chains would be analyzed, which could be considered as illustrative demands in Viet Nam ports. Other ones could be done similarly and necessarily.

Viet Nam, Thailand and India are the top three countries exporting rice in the world. Since 1989, Viet Nam total export rice volume has been increased continuously with average rate 5% a year (around 1 million tons per year). Rice export has been contributing around 30% of total agriculture export and approximately 15-17% of total rice export in the world. In the first nine months of the year 2010, Viet Nam exported nearly 5.4 million tons of rice worth over US\$2.2 billion. As an expectation, the total export rice volume in the year 2010 would reach 6.6 million tons (Source: VOV News).

As a matter of fact, because of Viet Nam geography characteristics and rice product, marine transport is a main way for exporting. Correspondingly, it is essentially necessary to develop ZALs serving for export rice, which would provide comfortable conditions for export rice logistics chain as shown on Fig 4.16.

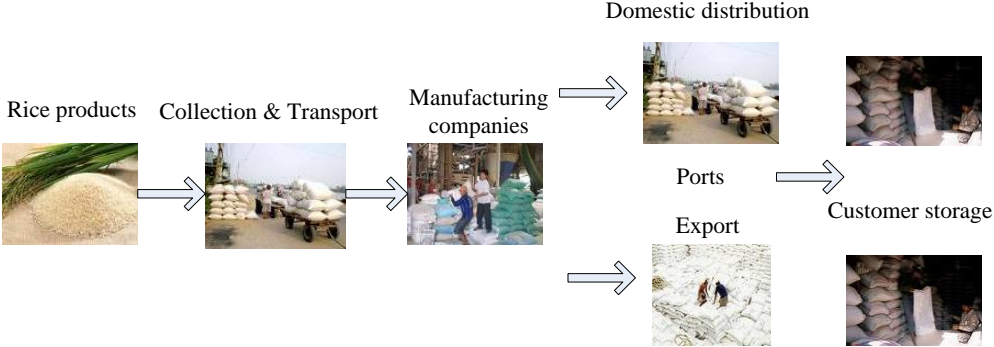
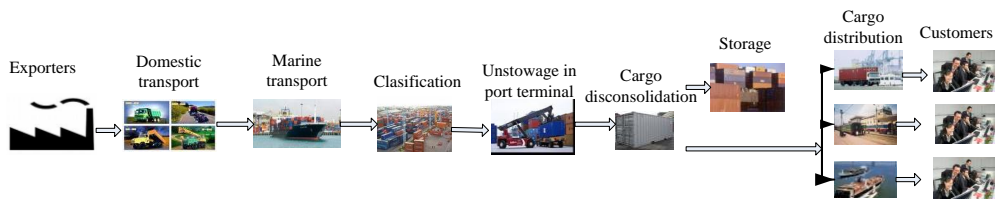


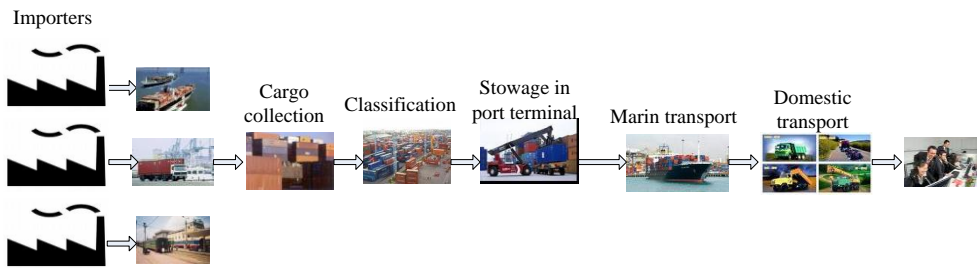
Fig. 4.16: Rice export logistics chain

As mentioned above, container cargo is another important served product of Viet Nam port system. The increase of container volume through port system in recent years is impressive as shown on Fig 4.7. In addition, its demand would increase in simultaneously with development of national economy. Obviously, the port system will provide much contribution on Viet Nam economy.

Unfortunately, Viet Nam container port system has been facing with many disadvantages as mentioned in previously. Actually, it could not compete with other container ports in region, so development of logistics services in ports should be considered as an enhancing solution. An example of logistics chain for import/export container cargo is shown on Fig 4.17.



a) Logistics chain for import



b) Logistics chain for export

(Source: Society of Psychologists in Management - SPIM)

Fig. 4.17: Import/export logistics chains

How to keep loyal customers, to maintain and develop relations with not only traditional customers but also with new and potential ones are goals of developing ZALs. In synchronously with its advantages, Viet Nam port system would attract more customers due to its competitive costs and service quality. It would provide basic services for customers such as commercial services, transport equipment and modes, or personal services.

4.5.2 Functions and goals of ZALs

Development of ZALs functions depends on many factors. Depending on degree of integration with a particular port area, ZALs could be port activity areas as integrated logistics centers, port adjacent activity area, near port activity areas, or/and remote activity areas as logistics centers; Depending on ZALs location, they could be intraport activity areas or/and extraport activity areas; According to the role in logistics centralization of served hinterland, regional/metropolitan, national or/and supranational ZALs could be their functions; Depending on interaction with

intermodality, ZALs with integrated, adjacent, nearby or/and remote intermodality could be developed; And depending on other factors such as degree of physical space concentration, degree of strictly port-related logistics specialization, degree of sectoral multifunctionality or specialization, and internal administrative organization involved, ZALs suitable functions could be considered to develop. Finally, ZALs functional system and form would be determined.

There are three basic functional areas including logistics areas, intermodal areas and service areas for a particular ZAL, which involve basic logistics requirements. They include parking/unparking or loading/unloading cargo, warehousing for common cargo and special cargo such as fruit and vegetable, dangerous products, car, and custom services, intermodal areas serving for rail-road, air-road, and water land system, service centers, personal service areas, commercial & trading services.

A particular ZAL could be a single function or specialized area, also a multifunction with dynamic operations one. ZAL space should meet individual basic requirements for its operation areas, but it could be a general area for all its functions. However, specialized areas for individual ZAL functions should be considered due to efficiency and ability to expand them in the future. Table 4.7 is an example how to determine function areas for a ZAL.

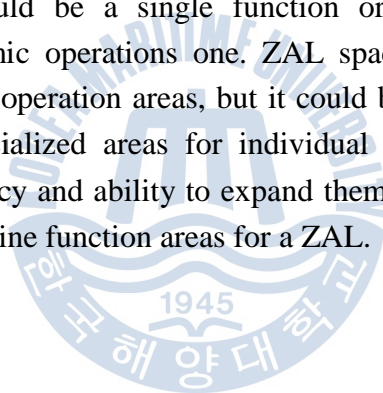


Table 4.7: Definition of functional areas for a ZAL

Functional area	Type of activity	Direct services	Offered Facilities	Requirements
1. Central service area Area that includes general service activities, excluding cargo handling.	<ul style="list-style-type: none"> - Personal service center - Vehicle service center - Business service center - Common service center 	Hotel, restaurant, trading companies, freight transport services ...	<ul style="list-style-type: none"> - Space for overall operators - Buildings for lease and concession - Other areas 	Required from beginning. The existence or not of a transport center decides its size
2. International transport and transit center	<ul style="list-style-type: none"> - Center for haulage company services - Vehicle service center - Optional small logistics center 	Including users of the central service area such as business service firms, transport firms and business associations	<ul style="list-style-type: none"> - As previous offered activities - Sheds for sale and/or rent 	Depending on the formation of collective agreements with the sector
3. Multifunctional logistics area	<ul style="list-style-type: none"> - Stuffing and stripping cargo and warehousing center - Storage and distribution areas (distriparks) 	Cargo handlers, storage/distribution firms, logistics operators, logistics centers for industrial companies	<ul style="list-style-type: none"> - Land for medium and large companies - Modular offer 	Basic offer as stage 1 of the ZAL
Other areas: Mono-functional logistics area, intermodal area, logistics and processing area, and single customer areas				

(Source: Developing a Logistic Activity Zone in the Campo de Gibraltar, SPIM)

Viet Nam has replaced city ports such as Ho Chi Minh City ports to surrounding areas such as Cai Mep – Thi Vai area (Ba Ria – Vung Tau province), and developed deep water ports in natural advantageous locations such as Van Phong – Khanh Hoa as mentioned above. It is a good opportunity to study and develop ZALs for Viet Nam port system.

ZALs would affect on port system in general and on port space, services, and freight transport system within ports in particular. The centralization of logistics activities would be an alternative to utilize port space and reduce requirements of space for ports. They would attract as well as encourage private investments for developing ports.

Ports would orient customers through logistics functions of ZALs. They would provide value added activities, so customer requirements on quality of services could be met. As a result, Viet Nam port competitiveness could compare with neighbor ports. Ports and their ZALs could share as well as contribute freight transport services as a function of ZALs in ports. The quality of services could be improved, so customers would be easier in optimizing their logistics activities and then could get more customers.

4.5.3 Transshipment port and Viet Nam Distriparks or/and FTZs

Development of Distripark, an area of land efficiently laid out for distribution activities close to ports or terminals with good hinterland connections, is a favorable alternative. It would provide modern logistics services, distribution functions designed for operational efficiency, on-site logistics management and good international links. It also could share required investment on required container facilities with ports such as temporary storage space and cargo consolidation and deconsolidation. It promises to attract major shipping companies, especially on the ASEAN-Middle East, Asia-Northeast Asia, Asia-USA and Asia-EU routes, which concentrate their distribution through single port outlets and subcontract their logistics and distribution to specialized logistics providers. Construction of a gateway logistics park would provide storage and value added facilities at ports, which include storage, consolidation, break bulk, modal interchange and assembly processing. Districenter could be considered as another

alternative form of logistics aggregation facility but smaller scale in comparison with Distripark.

As mentioned above, many benefits would be brought to Viet Nam as well as ASEAN if there is at least a container transshipment port in Indochina region. With the advantages of traffic position, Van Phong port system would be the most important joint in transportation and trading and it could take part in transport services as in Singapore, Thailand and Hong Kong ports. Lying between Hong Kong and Singapore, Van Phong port could share trade and transportation services of Singapore and Hong Kong port. Besides, project for a canal in North - East of Thailand and KRA canal (Keovimol S.) in Malaysia would bring ports of Viet Nam a lot of advantages. After transferred to China, Hong Kong organized naval activities better but because of bad weather often occurs there, Van Phong is considered to become the best position in the area. Moreover, Van Phong – Manila – Hong Kong lie at three peaks of an equilateral triangle, so cargo vessels from center and Northern Philippine to Europe that use Van Phong port could save more time compared with using Hong Kong port. Van Phong is also the best place for vessels from Far East to America follows the route of Van Phong – Manila – Guam – Honolulu in the distance of 5,446 nautical miles, instead of 5,453 miles of the route of Hong Kong – Manila – Guam – Honolulu.

The incentive provided by globalization and global sourcing forces ports to adapt and develop in order to stay competitive as a port and to allow the supply chains within which they operate to stay competitive. Van Phong International Container Transshipment Port should be developed as a node in global supply chains and the provision of logistics facilities should be set up. It promises to become an important element of the global as well as ASEAN transportation network as shown on Fig 4.18.

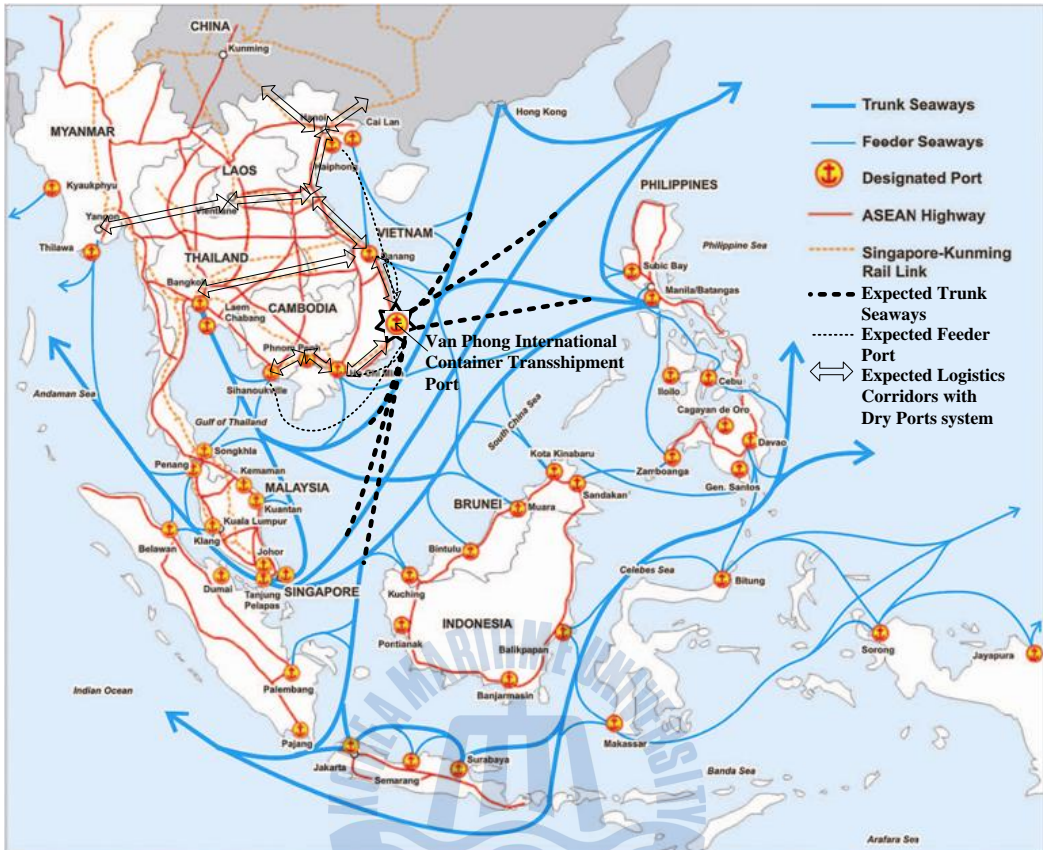


Fig. 4.18: Expected ASEAN transportation network

Nowadays, logistics activities are becoming increasingly important. Particularly, a prominent value-added service provided by many container ports in the world is the Free Trade Zone. Free Trade Zones promise to bring economic benefits and also used to attract investment into a port area in order to establish a critical mass that will be self sustaining and attract further business investment and shipping cargo (UNESCAP, 2005).

Van Phong Container Transshipment Ports have been planned to become a port and logistics hub not only serving for ASEAN region but also linking ASEAN, China, Korea, Japan, and other important economic regions in the world. Opening a Free Trade Zone (FTZ) or Free Economic Zone (FEZ) is one of important promotions, so benefits or support by the government can be ensured.

Aims of FTZs are to induce international logistics companies and establish supporting facilities such as ICDs as well as high-tech manufacturing and research and development facilities. Tenant companies in the FTZs will be offered benefits such as tax-free, tax reduction and low lease. In addition, higher value-added port throughput such as stevedoring, warehousing, shipping, processing, and assembling are created. The successfulness of FTZs in Asia such as Singapore, Busan, and Shanghai is a driving force for applying to Van Phong International Container Transshipment Port. It is believed that by developing Free Trade Zones, it would become the international logistics hub port and higher value-added cargo creating port from a transshipment-center port.

4.6 Consideration of other strategies

Many researches on developing port systems have been carried out and applied successfully around the world. In this section, however, some remarkable strategies would be introduced to enhance Viet Nam port system.

4.6.1 Co-operation strategy

Actually, competition exists not only among ports but also among terminals within a port. In the globalization environment, it makes Viet Nam's weak port system become weaker. Actually, ports in the center of Viet Nam could serve large ships up to 400,000 DWT (Van Phong Port) and still abundant in capacity, but they locate far from the main biggest market, Ho Chi Minh City, around 400 kilometers. On the other hand, ports in Ho Chi Minh City could only handle the small size vessels up to 1,500 TEUs and become overload, though they locate nearly the market. Alternatively, they could make a co-operation to enhance their competition ability and get solutions for their problems.

In addition, the integration of ports with inland transport services, with shipping lines, with other ports such as Ports of Korea, Ports of Japan, and Ports of USA, the co-operation between private ports and public ports within Viet Nam's ports are the considered ways to increase ports' competition ability.

In section 4.7, a co-operation strategy in maritime industry between Viet Nam and the Republic of Korea (Korea) would be presented as a case study of this

strategy. As a result, their competition ability would promise to increase if it is applied successfully.

4.6.2 Co-opetition

This strategy was suggested by Song, 2003, which is a certain form of competition and co-operation among ports to provide services those fit into shipping lines' strategies. Viet Nam's ports could achieve rationalization and cost savings within limitations of resources. They could share risk, investment and become stronger in negotiations. They could consider developing Viet Nam port system instead of individual ports in Viet Nam. Van Phong port, for example, could become the international transshipment port, so other ports could consider as the feeder ports in the seaport system. It could meet requirements from shipping lines such as greater operational coverage and scale economies, differentiated services, and concentration and rationalization.

Actually, globalization and shipping alliances, larger size of vessels and intermodalism, and intense port competition are driving forces for port competition and co-operation. Song (2003) used a co-opetition concept, which is mixture of competition and co-operation strategy or win-win strategy, for port management. It searches new co-operation solutions via co-operation with the competitors, and is actually a collaborating alternative to compete. Most Viet Nam ports have been operating separately, so natural competition among them is existed. To compete with other foreign ports, one of useful ways is the co-operation alternative. Belong to geography, groups of ports should be established, which operate in co-opetition principles. With specific geography, ports of Viet Nam should focus on developing three groups of ports as clusters locating in the south, middle, and north of Viet Nam.

From the national point of view, port is regarded as a unit under a national level administration and competes or cooperates with other ports. Increase of horizontal and vertical integration is a result of international logistics of manufactured goods. Integration of ports with inland transport is an alternative of organizations to enlarge their roles in logistics services. Based on effects of mergers and alliances on international shipping and port competition, which could control significant good flows on the major routes, container ports of Viet Nam could share benefits

from container traffic market. Levels of co-operation are adjusted through distance among ports and their potential to serve a common hinterland. Co-operation alternative could create efficiencies with neighbor facilities due to the economies of scale and scope. With terminal operations, mergers on the horizon provide high quality local service levels at very competitive prices while fitting into the global requirements of large lines and shipping alliances, immediate expansion and a stronger negotiating position, and greater flexibility in supplying.

4.6.3 Privatization

Increase of private participation occurs in ports of most countries, but it is rare in full privatization. Although public sector has important roles, significance of private sector role in seaports is enlarged. Among worlds' top-100 container ports, with port organization there are only 7 percent of ports which were owned by private companies; with port assets there are 22 percent of ports with container cranes owned by private companies. Contribution of private sector mainly focuses on port operation (Baird, 2002). They mainly participate in port navigation services, stevedoring services, and added value services.

Most Viet Nam ports have been administrated by public sectors. Although some advantages could be gotten under their management, inflexibility, inefficiency, high costs, and low service quality could be disadvantages through this way, so they could not compete with others. Privatization through terminal concessions and leasehold arrangements are common methods used by ports to facilitate private sector intervention. Other useful methods can be applied such as Build-Operate-Transfer (BOT), joint venture, outright sale of port land, and corporatization of port authority.

Baird (2002) indicated the privatization trends at the world's top-100 container ports as recent trends. It could reduce restrictions of Viet Nam seaports in terms of budget, technology, and labor skill. Actually, the role of public sector agencies remains significant. The private sectors could participate in port services such as warehousing, cargo handling equipment, stevedoring services and port value added services.

4.6.4 Regionalization

Viet Nam has six groups of ports that could be considered as its advantages. However, the unequal location of seaports makes the expansion strategy become inefficient as mentioned above. The next phase, regionalization, and associated hinterland concepts demand new approaches to port governance and a functional focus (Nottebom *et al.*, 2005). City ports in Viet Nam could not make expansion anymore because of critical limitations such as deep-water, public land and inland transportation and also had a plan to move them outside the cities. They could focus on development in the deep-water area such as Hai Phong and Cai Lan in the north, Van Phong in the middle, and Ba Ria-Vung Tau in the south of Viet Nam, and develop freight distribution centers to make stronger links with their hinterland.

Inland distribution is a vital important dimension of globalization or maritime transportation. Port-hinterland relationships have to be paid special attention to develop Port of Viet Nam. Regionalization makes a stronger link, and higher geographical scale is its characteristics. It encompasses an explicit integration of “off shore” hubs on island location. By this way, greater depth, land for future expansion, inland investment, and labor costs tending to be lower are its requirements. Ports in the south of Viet Nam are planned to remove from Ho Chi Minh City to Vung Tau province which meets required conditions. Together with distributing freight, many operations to add value to cargo should be considered. Constructing Free Trade Zone or logistics zone is one of alternatives. For instance, a suitable logistics network could be established among Vung Tau province, Binh Duong province, Ho Chi Minh City, and Mekong River Delta area, which operates as logistics pole, in which Vung Tau province can be considered as a primary logistics zone and others as secondary logistics zones.

Another expansion of port is incorporation of inland freight distribution centers and terminals as active nodes. Lack of available land, diseconomies as local road and rail systems, environmental constraints, and local opposition, which are local constraints, and global change through global production and consumption as well as distribution requirements are its reasons. Based on Viet Nam’s geography, Hub-ports could be constructed. They not only serve for distribution freight to Viet Nam and north-east area, but also participate in transportation networks in the world.

4.6.5 Specialization

Most of ports of Viet Nam are multi-functional ports which can serve many types but small ships, so they operate inefficiency. Although Viet Nam has a container port, Viet Nam International Container Terminal (VICT port), the most efficient one, it is still a small port. Actually, it cannot compete with other neighbor ports in area. To improve competitive ability of Viet Nam container ports, specialization container ports should be considered, which can serve large size container vessels. As a matter of fact, top container ports in the world can serve large and extra large sized container vessels. Obviously, relationship between efficiency and scale of a container port can summarize shortly as the larger scale container port is the higher efficiency it has. Correspondingly, VPA has projects to construct deep water container ports as gateway ports located in the North, Center and South of Viet Nam. One of them, SP-PSA International Container Terminal located in Cai Mep – Thi Vai, Ba Ria – Vung Tau, just has been in operations in 2010, which could accommodate up to the fifth generation of container ships.

In addition, with specialization container ports, modernization in ports is more easily carried out. It is considered as an important factor to compete. Busan port, for example, is known as a modern port where its productivity was reported at one HPH-managed container terminal with 182 boxes per handled on a vessel using four cranes and twin-lifting devices in June, 2005 (UNCTAD, 2006), so it ranks the third container port traffic at that year. Besides, by focusing on container ports, to improve port performance, optimization of container port systems could be reached through making optimizing scheduling plans for ships, and labor crews; optimizing inventory systems; and so on.

4.6.6 Infrastructures development

Viet Nam locates in the South East Asia region where there are many developed port systems and also infrastructures. Singapore that has the world's largest container port has one of the largest cargo airports in the world. Thailand that has container port ranked on the top ten has road networks evaluated good, which connect to main industrial areas. Its new International Airport was equipped with modern technology, and rail network is extensive and connects with Malaysia's national system, providing direct linkages down to Singapore. Malaysia, one of the most efficient economies in the region, has Malaysia biggest airport, a

transportation hub for all major rail transport networks, as well as well-maintained highways linking major centers to seaports and airports. All of them have good infrastructures which are critical requirements to develop or support ports.

The further development of transportation and logistics services is critical to Viet Nam's continued economic expansion in general, and to improve competitive ability of Viet Nam ports in particular. The non-existent or crumbling infrastructure threatens to put constraints on development. To ameliorate inland traffic, new airports for both domestic and international traffic have been built such as Long Thanh International Airport, the biggest airport in north-west area, located nearly Ho Chi Minh City. Only approximately 19 percent of Viet Nam's roads are paved (*Source: Viet Nam General Statistics Office*), so constructing, maintaining, and improving the road networks are urgent requirements. Besides, rail systems are worst than roads and rarely used for shipping. Modernizing and expanding rail, road and also information technology networks should be done.

A summary on benefits of each alternative is presented as in Table 4.8. Actually, they should be studied more before being implemented to develop Viet Nam port system. Depending on particular situations and conditions, variations on strategies would be considered and applied in flexible ways.

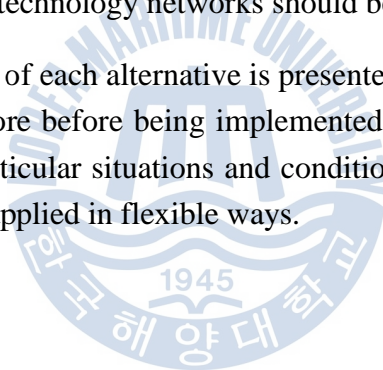


Table 4.8: Summary on benefits of alternatives

Alternative	Benefits
Co-opetition	<p>Cost saving</p> <p>Shared investment, so risk sharing</p> <p>Port expansion, thus easily in geographical market penetrating</p> <p>Improved and utilized capacity</p> <p>Stronger bargaining power</p> <p>Enhancing customer services</p> <p>Increasing profits</p> <p>Contributing to welfare of the economy</p>
Privatization	<p>Lower port costs</p> <p>Sharing investment</p> <p>Reduce cost to public sector</p> <p>Increasing port efficiency</p> <p>Speed of development of new container terminals</p> <p>Expand trade</p> <p>Increasing revenue</p> <p>Management expertise</p>
Regionalization	<p>Enhancing logistics integration</p> <p>Reducing logistics costs</p> <p>Broadening hinterland</p> <p>Shorter transit time</p>
Specialization	<p>Increasing efficiency</p> <p>Easy to modernization</p> <p>Optimized ship schedule plan</p> <p>Optimized labor plan</p> <p>Optimized inventory and warehouse system</p>
Infrastructure development	<p>Ameliorating inland traffic</p> <p>Broadening hinterland</p> <p>Improving port competitive power</p>

4.7 Co-operation strategy in maritime industry: Viet Nam – Korea case study

After meeting between two nations' leaders in 2007 in Cheong Wa Dea, the relationship between Viet Nam and the Republic of Korea (Korea) has been remarkably increased. As a result, many cooperation projects have been carrying out. In particular, this dissertation focuses on the cooperation strategy between both countries in marine industry. Obviously, most projects have been invested in Viet Nam, where in recent years is considered as an attractive investing location in ASEAN as well as in the world. Consequently, reviews of economic development in general and marine industry in particular of Viet Nam and economic relation between both countries would be presented. Based on them, a cooperation strategy in some main marine elements as well as its promising benefits would be studied and shown. Finally, some conclusions and suggestions would be proposed.

4.7.1 Background

Globalization is considered as a development of an increasingly integrated global economy market especially on free trade, free flow of capital and tapping of cheaper foreign labor market. As a result, Korean companies increasingly invest in Viet Nam and also Viet Nam welcomes foreign investors to boost his economic growth.

The meeting between two nations' leaders in 2007 in Cheong Wa Dea is noted to expand an economic and cultural cooperation. This relationship has been increased gradually. Both countries intend to develop the relationship to strategic cooperation partners and also Korea would become the largest investor in Viet Nam.

Transportation in general and marine transport in particular are key ingredients in fostering globalization. Thank to geography, Viet Nam has a long coast and also government focuses on developing marine industry. The Republic of Korea is a peninsula, has a developed marine industry and intends to expand trade with ASEAN. Consequently, it promises to increase horizontal and vertical integration on setting up multinational industries and to corporate geography of investment strategies.

In the transportation and logistics industry, cooperation is becoming even more critical than competition (Midoro *et al.*, 2005). Therefore, a cooperation strategy between Korea and Viet Nam in marine industries is considered.

4.7.2 An overview of Viet Nam economy and particular marine industry

As mentioned above, Viet Nam had set a target GDP growth of 6.5% for 2010 and reached 6.78% in that year. The Asian Development Bank and International Monetary Fund have generally affirmed Viet Nam's target through their estimates of 6.5% and 6.0% (though 6.5% is possible), respectively, while the World Bank forecasts that high income countries will grow by 1.8%. Viet Nam grew at a slower pace in 2009 compared to 2008, but the fall in growth from 2008 to 2009 is less drastic than from 2007 to 2008, which can imply a recovery in process as shown on Fig 4.19.

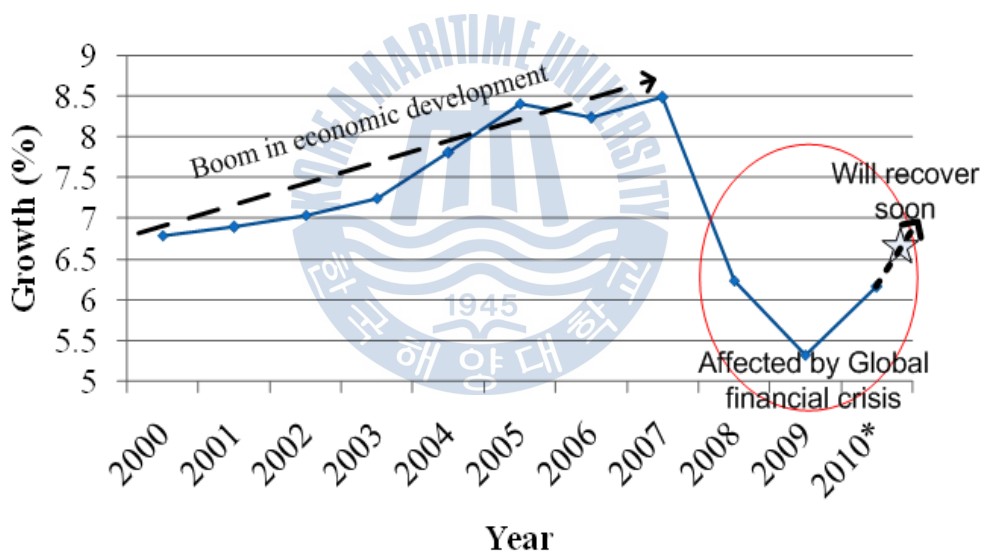


Fig. 4.19: Viet Nam GDP growth rate

Furthermore, Viet Nam's growth rate is the highest among CIVETS countries and behind only to China among BRIC countries as shown on Fig 4.20. Its average annual growth rate is fastest in comparisons with others in CIVETS group and faster than average GDP annual growth rate of the BRIC group.

Real GDP Annual Growth											
Country	Year										2000-2009
	2000A	2001A	2002A	2003A	2004A	2005A	2006A	2007A	2008A	2009A	Average
BRIC											
Brazil	4.3%	1.3%	2.7%	1.2%	5.7%	3.2%	4.0%	5.7%	5.1%	0.1%	3.3%
Russia	10.0%	5.1%	4.7%	7.4%	7.1%	6.4%	7.7%	8.1%	5.6%	(7.9%)	5.4%
India	4.0%	5.2%	3.8%	8.4%	8.3%	9.4%	9.7%	9.1%	6.1%	6.5%	7.0%
China	8.4%	8.3%	9.1%	10.0%	10.1%	10.4%	11.6%	13.0%	9.0%	8.7%	9.9%
Average	6.7%	5.0%	5.1%	6.7%	7.8%	7.3%	8.2%	9.0%	6.4%	1.9%	6.4%
CIVETS											
Colombia	2.9%	2.2%	2.5%	4.6%	4.7%	5.7%	6.9%	7.6%	2.5%	(0.1%)	3.9%
Indonesia	4.9%	3.6%	4.5%	4.8%	5.0%	5.7%	5.5%	6.3%	6.1%	4.5%	5.1%
Vietnam	6.8%	6.9%	7.1%	7.3%	7.8%	8.4%	8.2%	8.5%	6.2%	5.3%	7.3%
Egypt	5.4%	3.5%	2.4%	3.2%	4.1%	4.5%	6.9%	7.1%	7.2%	4.7%	4.9%
Turkey	6.8%	(5.7%)	6.2%	5.3%	9.4%	8.4%	6.9%	4.7%	0.9%	(5.6%)	3.7%
South Africa	4.2%	2.7%	3.7%	3.1%	4.9%	5.0%	5.3%	5.1%	3.1%	(1.8%)	3.5%
Average	5.2%	2.2%	4.4%	4.7%	6.0%	6.3%	6.6%	6.5%	4.3%	1.2%	4.7%

Source: World Bank for 2000-2008 and Central Intelligence Agency for 2009.

Fig. 4.20: Viet Nam GDP growth rate in comparisons with BRIC and CIVETS countries

One of important investment budgets known as FDI fund in Viet Nam would recover soon in simultaneously as shown on Fig 4.21. It has four stages including gradually and rapidly increasing stages, recession stage and recovering one in the near future.

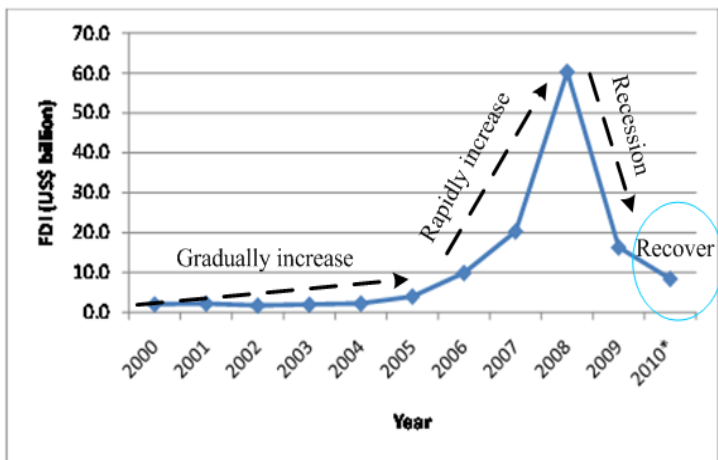


Fig. 4.21: Four stages of FDI growth in Viet Nam

Although Viet Nam economy has been developing so impressively, it could not compare even with neighbor countries in ASEAN group as shown in Table 4.9. And other important factors were evaluated at a little bit lower than average levels as shown in Table 4.10. However, Viet Nam is still considered as an attractive place for investment. Consequently, annual freight marine transport volume has been increased year after year and recently varies around 200 million tons and would expect reaching 900 to 1,100 million tons in 2020 and 1,600 to 2,100 million tons in 2030 as mentioned in the government master plan.

Correspondingly, with weak marine industry, Viet Nam has been looking for cooperating with foreign investors who have developed ones. And Korea is one of potential investors in Viet Nam.

Table 4.9: Viet Nam and other ASEAN countries in top importer and exporter group

Top Importer in the world 2008	Top Exporter in the world 2008
<ul style="list-style-type: none"> ✓ Viet Nam: Rank 48 , with total import revenue: 51.95 billion \$US 	<ul style="list-style-type: none"> ✓ Viet Nam: Rank 49 / 225 countries, with total export revenue: 49.99 billion \$US
<ul style="list-style-type: none"> ✓ Thailand: 29 / 121.90 	<ul style="list-style-type: none"> ✓ Thailand: 27 / 143.1
<ul style="list-style-type: none"> ✓ Malaysia: 27 / 132.70 	<ul style="list-style-type: none"> ✓ Malaysia: 23 / 169.9
<ul style="list-style-type: none"> ✓ Singapore: 17 / 273.00 	<ul style="list-style-type: none"> ✓ Singapore: 16 / 317.6
<ul style="list-style-type: none"> ✓ Indonesia: 34 / 86.24 	<ul style="list-style-type: none"> ✓ Indonesia: 33 / 118.4
<ul style="list-style-type: none"> ✓ Philippine: 46 / 53.96 	<ul style="list-style-type: none"> ✓ Philippine: 51 / 48.38

(Source: CIA world fact book 2008)

Table 4.10: Other evaluated important factors

Factor		Rank in 2008
Global competitive index		70/134
Risk Analysis	Exchanges risk	54.9%
	Asset Manager	54.1%
	Banks Risk	54.5%
Environmental Performance Index		76/149
Global Peace Index		35/121 (2007)

(Source: Summarized from many sources)

4.7.3 Economic relations between Viet Nam – the Republic of Korea (Korea)

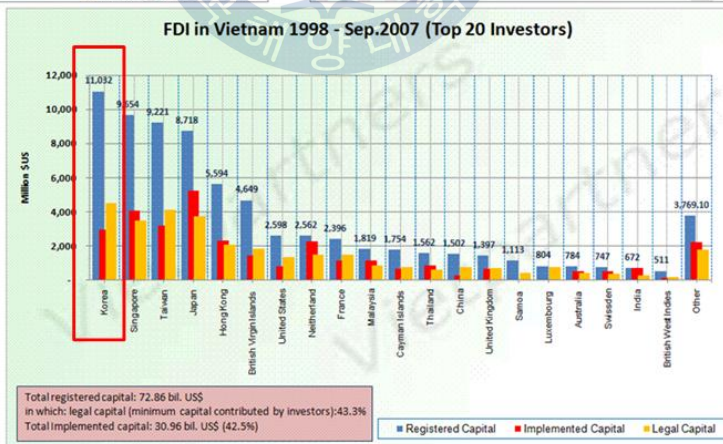
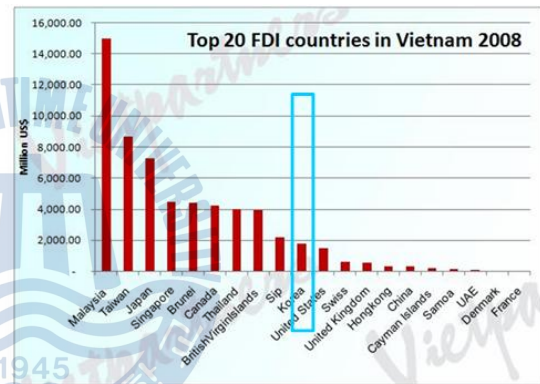
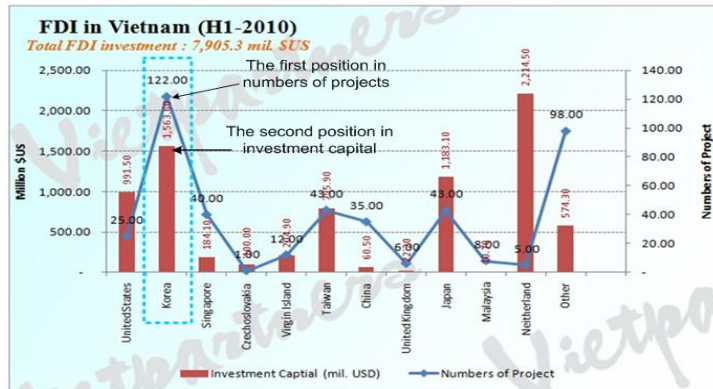
Korea purposefully increases the cooperation with ASEAN and vice versa. According to the ASEAN organization, economic cooperation between ASEAN and Korea continues to grow with bilateral trade increasing from US\$46.4 billion in 2004 to US\$90.2 billion in 2008. Both partners have an ambition to set up the ASEAN-Korea Free Trade Area in 2018 and also achieved the ASEAN-Korea agreements on Trade in Goods and Trade in Services.

Officially, Viet Nam has become a member of many international organizations such as ASEAN, APEC, ASEM and especially World Trade Organization in early 2007. Therefore, Viet Nam truly opens, warmly welcomes and is considered as an important partner for many friendly partners in the world.

In particularly, after the meeting between two nation leaders in 2002, both Viet Nam and Korea have agreed to expand economic and cultural cooperation. Consequently, Viet Nam has provided comfortable conditions for Korean companies to participate in Viet Nam development projects. And Korea has had an ambition to become the largest investor in Viet Nam.

As a result, bilateral trade between Korea – Viet Nam significantly increased from around US\$500 million in 2002 to US\$9.5 billion in 2009. And the turnover of two-way trade has been expected to reach US\$ 20 billion by 2015.

Korean companies have been kept top FDI investors in Viet Nam as shown on Fig 4.22.



(Source: Le et al., 2010)

Fig. 4.22: Top FDI in Viet Nam from 1998 to 2010

Obviously, Korea is one of the biggest foreign investors in Viet Nam with around 2,300 projects in operation worth US\$20 billion and creating about 400,000 jobs for Vietnamese. And according to the report by Ministry of Finance and Economy, Korea, in 2007, Viet Nam ranked the 3rd destination for Korean investors after China and USA. Viet Nam was received the large financial aid from the Economic Development Cooperation Fund (EDCF) with US\$ 985 million invested in 30 projects by the end of the year 2009.

Many important cooperation projects relative to marine industry between Viet Nam – Korea have been implemented. For examples, the shipping line services joint venture Hyundai Merchant Marine (Viet Nam) Co., Ltd: provide shipping line services with a new Intra Asia Service connecting HCMC to Pusan and Shanghai, and the best transit time from Viet Nam to Korea and the US west coast, and expects to serve customers with direct calls of 6,000 or 8,000 TEU ships or larger (*Source: SGT*).

Korea Line Corp., South Korea fourth largest shipping company has established a joint venture with state run Saigon Shipping Co., which will serve as a stronghold to complete the company Asia-wide networks (*Source: Viet Nam Investment Review*).

Hanjin Shipping Company introduced service to Viet Nam in 2003, launched a local company in Viet Nam in January 2005 and then signed deal to set up joint venture with Saigon New Port for constructing dedicated terminal in Ba Ria – Vung Tau, Launched Viet Nam – U.S. West Coast direct service, CKYH to start direct service from Viet Nam to U.S. West Coast (*Source: Hanjin Shipping Web*).

According to Korea Logistics Network (KL-Net), the Republic of Korea promises to support Viet Nam build a one-stop-shop mechanism for seaport customs, thus strengthening international trade cooperation and monitoring the circulation of goods globally. And Viet Nam has gradually completed a process for an e-customs declaration procedure to facilitate goods circulation through seaports. KL-Net also helped Viet Nam implement the Convention on Facilitation of International Maritime Traffic, minimize time and costs for enterprises and boost the competitiveness of the maritime sector (*Source: VN business news*).

And also many projects have been and will be implemented in the near future. The cooperation strategy is considered as an important, efficient and effective strategy between Korea and Viet Nam, particularly in maritime industry.

4.7.4 Viet Nam – Korea cooperation strategy in marine industry

Cooperation is a relation between two or more parties with compatible or additional interests or aims where the relationship is foreseen to be of reciprocal advantage (Donselaar, 2010). ASEAN and Korea have witnessed a remarkable development of the friendly and cooperative relationship. Particularly, the friendly and cooperative relationship between Viet Nam-Korea develops not only on the bilateral level but also on the regional and inter-regional level (*Ambassador of Viet Nam in Korea*).

Because of the strategic behavior of shipping companies and the increased transport efficiency, port authorities have changed their behaviors. The motivation of port authorities to cooperate has increased. They form links in the global logistics network, and achieve improvements in logistical efficiency by cooperation.

The cooperation between port authorities should focus on how the governments can further encourage cooperation between seaports in terms of port authorities; how cooperation between port authorities can contribute to social welfare; and what role the national governments can play in promoting this cooperation.

The purposes of cooperation strategy among port authorities are to active commitment on solutions for hinterland accessibility, create optimum conditions in the field of customs authorities and legislation, make the investments that are in the interest of all port users and that do not come about spontaneously and exam and stimulate possibilities for more efficient land use.

They could make cooperation between seaports in vertical Asia Pacific geographical corridors from the North to South East Asia as well as Pusan main port and ports of Viet Nam as a satellite function as shown on Fig 4.23. In addition, if possible to set up a dry port system for Indochina region, cooperation with it is a good way to improve the efficiency of the logistics network. As a result, cooperation between Viet Nam and Korea ports could improve efficiency as well because it could make the costs of transshipment as low as possible.

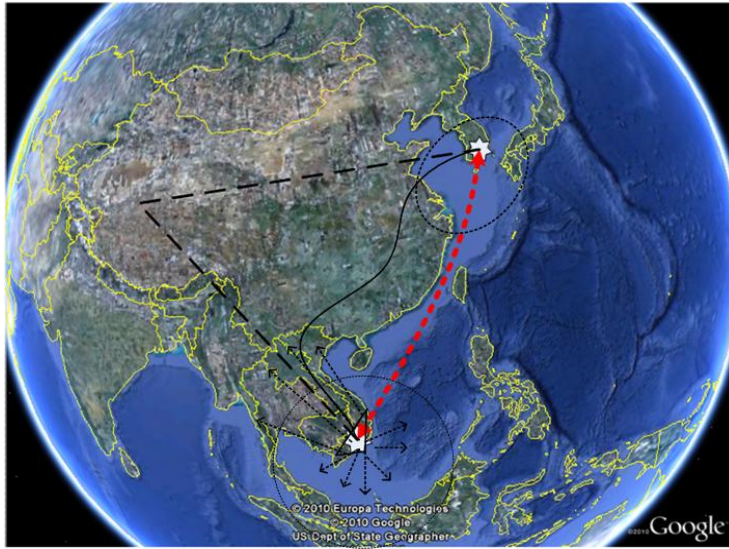


Fig. 4.23: Geography cooperation in maritime industry

There are various types of cooperation as well as their promising benefits in simultaneously as summarized in Table 4.11.

Table 4.11: Some cooperation forms and their promised benefits

Type of cooperation	Benefit
Bundling/redistribution of flows at terminal and hinterland infrastructure Joint ventures in hinterland links and/or terminals Joint research and development, purchasing, marketing, waterway facilities, IT, standardization of procedures, safety and security Ports specialize particularly in cargo types or services	<u>Direct benefit:</u> Lower production and/or consumption costs Less impact on the environment, safety and space
Cooperation to offer countervailing power to shipping companies and stevedores Joint services lead to a more attractive product and in turn to greater demand Higher rates based on market power	<u>Indirect benefit</u>

(Source: Donselaar et al., 2010)

Vietnamese government intends to facilitate growth in flows of marine freight transport within the limits of sustainable conditions such as budget and competition with neighbor port systems. Actually, development of an effective and efficient seaport system has been considered as a key sector of economic developing plan. Therefore, an optimal deployment and efficiency of investments have been expected to carry out. Cooperation strategy between port authorities of both countries could contribute to those objectives. As a result, it could help Korea ports achieve the geographical market due to facilitating the expansion of international port operators.

Naturally, private investment in port terminals has been accelerated in recent years and vertical integration between global carriers and terminal operators has happened. Viet Nam Port Authority recognized that Viet Nam port system could not compete effectively without access to capital provided by private or foreign investors. Therefore, welcome policies investing in ports have been issued and many cooperative marine projects have been planned as well as implemented. The SP-PSA International Port, for example, is the first deep seaport of Viet Nam in operating, which could serve the fifth generation of container ships up to 11,000 TEUs. It is a cooperation project between Saigon Port and Port of Singapore Authority.

Obviously, Korean marine companies expect to expand their business in ASEAN and Viet Nam is considered as an attractive location. Hanjin, as mentioned above, a global carrier, decided to integrate their liner activity by managing container terminal facilities and Viet Nam was chosen as a vertical integration between Korean global carrier and Vietnamese terminal operators. As a result of cooperation with Viet Nam port system, the shipping lines could rationalize their itineraries by reducing the number of port calls, creating load-center port in ASEAN region by expansion of port hinterland.

Viet Nam follows an open-market economy and recognizes that development of its economy depends to a large extent on international trade and integration to global supply chain. With a long coast, its marine transport plays an important role to national economy especially for freight import and export. Particularly, Viet Nam ports have been developed and up-to-dated to accomplish a new role in the

logistics era in the context of operating as parts of integrated global supply chain systems.

ASEAN is a dynamic economic zone with the high economic growth rate and locates on one of the busiest seaways. It attracts extra companies invest in region and Viet Nam in recent years has ranked as one of the most attractive investing locations for investors. As a result, marine transport demands have been increased and it becomes an important node in global supply chain. Korean companies figure out that the higher the degree of integration across the supply chain the better a firm performs. Therefore, investing plan in ASEAN and particular Viet Nam is their important competitive strategy.

To be efficient and effective in marine and particular port integration in supply chains, they in individual and/or both should increase use of technology for data sharing, make relationships with shipping lines, focus on value added services, expand relationships with inland transport providers, increase transport mode integration, as well as implement channel integration practices and performance.

Correspondingly, both countries have agreed to develop the relationship to strategic cooperation partners, contributing to their development. They would focus on increasing cooperation in areas of information – technology and other high tech industries, and also cooperation in Korea key sectors of shipbuilding, steel, chemicals, automobiles, infrastructure development and construction.

They recognize that their competitiveness positions especially of port competitiveness would be increased if they achieved a large extent on the ability to integrate in global supply chain through making a successful cooperation.

The cooperation strategy promises to bring many benefits for both countries. They have supporting policies especially in marine industry for increasing the cooperation. As a result, many relative projects have been doing and contributing on national economic development.

However, due to some reasons such as unbalance national economies, bilateral trade, and different in negotiations, it requires both countries be more trying their best to achieve the goals of cooperation strategy not only in economy but also in society.

4.8 Conclusions

Viet Nam port system has been developed in simultaneously with its economic development. Obviously, development of port system is a dynamic progress and affected by many gravitational forces and also it is very difficult to find out perfect alternatives to develop it. Therefore, a satisficing strategy was introduced.

Three satisficing locations, for example, were suggested for new stages developing ports of Ho Chi Minh City, the biggest most economic center in Viet Nam. In addition, container port issues were mentioned and then alternatives to enhance them were suggested, which promise to bring many benefits to them. However, to compete with other successful neighbor ports in region, much endeavour would have to be done.

Alternatively, a dry port system was proposed, and a successful one could support Indochina seaport capacity by improving hinterland distribution hubs and looking at the potential of inland ports with multimodal connections. Consequently, it could help change the situation better not only of regional seaports with ambitions to become international hub port(s) and transit port(s) in the shortest possible time but also of regional effective and efficient transportation system.

In developing an efficient intermodal transportation, member countries should continue to invest in upgrading roads, modernizing ports and constructing dry ports as well as the provision of sufficient cargo/container handling equipment and the streamlining of clearance procedures. The development of the intermodal facilities and networks requires large investments. Government resources are often not sufficient to meet such requirements. Therefore, countries need to explore different funding options including public-private partnerships, development assistance and loans from financing institutions.

In addition, other strategies were suggested and each of them would bring essential and competitive benefits if applying successfully.

CHAPTER 5. CONCLUSIONS AND SUGGESTIONS

This chapter would summarize the studied contents of the dissertation. It would conclude as well as mention noted Viet Nam port system conditions and enhancing ideas. Consequently, suggestions to improve as well as develop an efficient and effective port system would be proposed. Finally, some relative future research would be recommended.

5.1 Conclusions

The study presented an overview on Viet Nam port system and also suggested enhancing alternatives. Obviously, transportation and port system significantly impacts not only on Viet Nam economy but also on regional economies. Therefore, Viet Nam has considered the development of a modern, effective, efficient and competitive port system as a key project in the future.

A prospect of Viet Nam port system gave essential information on its conditions. Obviously, it interacts with other players in ASEAN region and in the world, so developing strategies should be suitable with world general trends. A classification of Viet Nam ports provided potential aspects to managers and researchers. It presented that Viet Nam has convenient conditions to develop a competitive, effective and efficient port system although it is still a cumbersome system. Particularly, container ports have been paid much attention. Their updated conditions were reviewed, which presented their capacities, challenges, and opportunities. Obviously, they have been still weak ports and limited contribution on Viet Nam economy. Therefore, they would be the vital projects and require much investment on development.

Correspondingly, enhancing strategies were introduced, which suggested the effective, efficient and competitive ways to develop Viet Nam port system. Actually, it is very difficult or impossible to find out a perfect strategy or solution for development of Viet Nam port system. Therefore, a general satisficing strategy to apply them was suggested.

As a master of fact, many gravitational and dynamic forces impact on development of Viet Nam port system. Obviously, the development of port system

is in synchronously with that of economy, so the government strategic master plan was updated. City ports have been overloaded, so new stages for developing them were suggested. There are three suitable locations that were mentioned for the future ports. Each of them has its own characteristics, so a satisficing strategy should be considered.

In addition, some key issues to enhance the container ports were studied. Container volume forecast was done, which shows that if the container port system would be executed as planning, it could handle the container demands until to 2014. Consequently, a SWOT analysis gave detail information of Viet Nam container ports and explained why they still a little bit contribute on its economic development.

Correspondingly, a dry port system to strengthen the seaport system and particularly container ports was studied and proposed. The system was suggested on Indochina region conditions with existing as well as future infrastructures such as highway, rail network and seaport system. It would generate a link network in region for freight transport, help Viet Nam ports extend their hinterland and promise to bring much more contribution if applying successfully.

In addition, value - added logistics activities at ports were suggested as attractive, supportive and competitive strategy through setting up ZALs, Distriparks and FTZs. The study shows that Viet Nam has a good natural condition to develop transshipment ports. They promise to bring international trunk seaways to Viet Nam ports.

Furthermore, useful strategies on development of port system were introduced, which could be considered as referred ideas for persons who are responsible for and interested in developing Viet Nam port system. Moreover, a case study of co-operation strategy between Viet Nam and the Republic of Korea on maritime industry was also presented as an efficient and effective way.

5.2 Suggestions

This research just did a study on developing Viet Nam port system. Actually, it is still a long distance to implement it in the practice system. Each idea should be

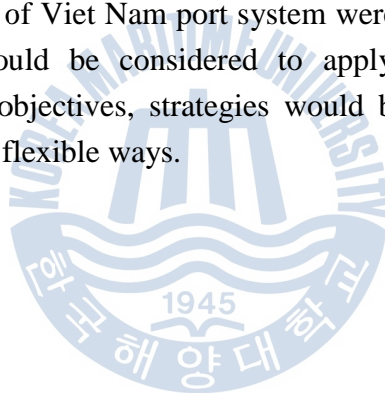
studied in more detail and more specific and need more contribution from partners such as researchers, shipping lines and managers.

Construction of Van Phong International Transshipment Port should be paid high priority according to advantageous conditions and essential national requirement. In addition, value added logistics activity zones should be set up to enhance it. And a dry port system for Indochina area should be studied and implemented.

Actually, much budget is necessary to develop Viet Nam effective, efficient and competitive port system. Therefore, government should issue warm welcome policies for both domestic and foreign investors.

5.3 Future research

Obviously, not all aspects of Viet Nam port system were studied and there are still many other strategies could be considered to apply. Depending on specific conditions and expected objectives, strategies would be deeply studied in more detail and implemented in flexible ways.



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