

COMPARATIVE ANALYSIS OF PORT COMPETITIVENESS
IN SOUTHEAST ASIA: FROM THE THAI CONTAINER
PORTS' PERSPECTIVE

Dissertation Submitted in Candidature for the Degree of Philosophiae Doctor
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By

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DECLARATION

I hereby declare that the work submitted in this thesis is the result of my own research, except otherwise stated.

I further declare that this thesis has not already been accepted in substance for any degree, and is not currently being submitted in candidature for any other degree.

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Signed

Professor Dr. Daniel S.H. Moon

Supervisor

APPROVAL PAGE

This dissertation which is an original work undertaken by Mr. Mana Chaowarat in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Business Administration is in accordance with the regulations governing the preparation and presentation of dissertation at the Graduate School in Korea Maritime University, Republic of Korea.

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ABSTRACT

The main objective of this thesis is to explore and assess the competitive advantages of Thai container port (with a particular emphasis on Laem Chabang) in comparison with some other container ports in the region. The research concentrates on answering two significant questions: What is the condition of container port industry environment in Thailand in relation to the competitive advantages of Thai container port? What specific criteria are important to the potential competitive advantages of Thai container port in relation to the competitors?

The research needed to find the answers to these questions has been done by both qualitative and quantitative analyses. The field study has been done through questionnaires and interviews, and customer responses have been analyzed to find the level of competitive advantage performance by Thai container port.

The findings indicate that there is a negative environment surrounding the multi-dimensional Thai container port industry, but that the level of competitive advantages could be higher in the future.

ABSTRACT

이 논문의 목적은 동남아 지역에서의 컨테이너항만간 경쟁력 특히 태국의 Laem Chabang 컨테이너항만의 경쟁력을 알아보기 위해 인근의 몇몇 관련 항만들 사이의 경쟁력을 분석하고 평가하는 데에 있다. 이 연구에서는 두 가지 관점에서 연구를 진행하였다. 즉 우선적으로 태국 컨테이너항의 경쟁력 파악을 위해 태국의 컨테이너항만 산업환경에 대해 살펴본 후, 인근 경쟁항만과 관련하여 태국 컨테이너항의 잠재적 경쟁력 제고를 위해서는 어떠한 기준과 방안들이 있는가를 파악하고자 하였다.

이를 위해 이 논문에서는 정성적 및 정량적인 분석 방법을 동시에 사용하였다. 즉 설문 조사, 인터뷰 그리고 현장 조사를 통해 얻은 자료를 이용하여 계량적 분석을 시도하였다. 구체적인 기법으로는 요인분석과 주성분분석 방법을 통해 얻은 항만경쟁력 결정변수를 AHP 기법을 이용하여 인근 항만과 비교를 시도하였으며, 이를 통해 태국 컨테이너항만의 경쟁력 파악 및 이의 제고를 위한 방안을 제시하고자 하였다.

이상의 결과를 요약컨대, 태국 컨테이너항만 산업과 관련하여 여러 면에서 부정적인 요소가 있음을 알 수 있었다. 그러나 분석을 통해 볼 때, 태국 컨테이너항만의 경쟁력은 잠재력이 매우 높으므로 미래지향적임을 파악할 수가 있었다.

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TABLE OF CONTENTS

	Page
Declaration.....	i
Approval Page.....	ii
Abstract.....	iii
Acknowledgements.....	v
Table of Contents.....	vi
List of Tables.....	ix
List of Figures.....	xii
List of Abbreviations.....	xiii
Organizational Chart of Thesis.....	xv

CHAPTER ONE: INTRODUCTION

1.1 International Trade and Container Ports.....	1
1.2 Thailand's Container Ports and International trade.....	3
1.3 Literature Survey and Objective of Thesis.....	5
1.4 Methodology and Structure of Thesis.....	11

CHAPTER TWO: THE ECONOMIC STRUCTURE AND PHYSICAL PERSPECTIVE OF THAILAND

2.1 Geographical Features of Thailand.....	13
2.2 Structure of Thailand's Economy.....	16
2.3 Thailand's International Trade.....	20
2.3.1 Exports.....	20
2.3.2 Imports.....	21
2.4 Structure of Container Industry in Thailand.....	24
2.5 Port Industry of Thailand.....	33
2.6 The Projection of Container Port Service Demand in Thailand.....	40
2.7 Summary.....	41

CHAPTER THREE: THEORETICAL AND ALTERNATIVE APPROACHES
TO COMPETITIVE MAESUREMENT OF
CONTAINER PORTS

3.1 Introduction.....	42
3.2 Competitive Advantage Strategy Formulation.....	43
3.3 The Competitive Advantages of Seaports.....	59
3.4 Conceptual Framework of Container Ports’ Competitive Advantage Measurement.....	70
3.4.1 The Process of Analysis Methodology.....	70
3.4.2. Principal Component Analysis (PCA).....	71
3.4.3 The Analytic Hierarchy Process.....	77
3.5 The Field Survey Statement.....	86
3.6 Summary.....	87

CHAPTER FOUR: COMPARATIVE ANALYSIS OF PORT COMPETITIVENESS
IN SOUTHEAST ASIA

4.1 The Environments of Container Ports in Thailand.....	88
4.2 Container Ports’ Environment Quantitative Analysis.....	94
4.3 The Container Ports’ Competitive Advantages Analysis.....	99
4.3.1 The Statistical Results of PCA Analysis.....	101
4.3.2 The Analysis of Potential Competitive Factors.....	105
4.4 Summary.....	121

CHAPTER FIVE: THE COMPETITIVE ADVANTAGES OF
THAILAND’S CONTAINER PORTS

5.1 General Views of Competitive Advantages of Thailand’s Container Ports.....	124
5.2 Thailand’s Container Port Environments.....	125
5.3 The Competitive Advantages’ Implications of Laem Chabang Container Port..	129
5.4 Summary.....	135

CHAPTER SIX: SUMMARY AND CONCLUSION

6.1 Conclusion.....	136
6.2 Recommendations.....	138
6.3 Further Research Suggestions.....	141
Bibliography.....	142
Questionnaire	154

LIST OF TABLES

Page

CHAPTER ONE

Table 1.1 World Trade Development by Maritime Transport.....	2
Table 1.2 Container Traffic via Thailand Container Terminals.....	3
Table 1.3 Twenty Largest Asian Container Ports in 2001, 2002 and 2003.....	4

CHAPTER TWO

Table 2.1 Twelve Fastest Growing Manufactured Exports, 2002.....	17
Table 2.2 Balance of Payment of Thai Economy.....	18
Table 2.3 Thailand's Key Economic Indicators.....	19
Table 2.4 The Proportionate Important of Exports and Imports to GDP.....	20
Table 2.5 Thailand Top 10 Export Markets, 2001-2003.....	21
Table 2.6 Thailand Significant Export Products by Value 2001-2003.....	22
Table 2.7 Thailand's Significant Import Products by Value 2001-2003.....	23
Table 2.8 Thailand Top 10 Imports Market, 2001-2003.....	24
Table 2.9 Distribution of Imports and Exports of Cargoes by Vessel Nationalities and Type of Services.....	29
Table 2.10 Thai Import and Export Volumes of Distribution by Vessel Type and Flag.....	30
Table 2.11 Forecast of Thai Seaborne Trade in Cargo Type and Volume.....	31
Table 2.12 Proportion of Merchant Fleet in Asean Region, 1996.....	32
Table 2.13 Share of Seaborne Trade of Thai Vessels, 1989 – 1997.....	33

CHAPTER THREE

Table 3.1 Productivity Measurements and Factors Affecting Container Terminal Productivity.....	64
Table 3.2 Objectives, Tools and Impact.....	67
Table 3.3 Steps of Factor Analysis.....	76
Table 3.4 The Fundamental Scale of Pairwise Comparison.....	81

CHAPTER FOUR

Table 4.1 The Forecast of Thai Economic Growth.....	88
Table 4.2 The Forecast of Containerized Cargo of Thailand.....	89
Table 4.3 Forecast of Demand in The World's Container Ports.....	89
Table 4.4 World Container Port Demand Forecast.....	90
Table 4.5 The SWOT Analysis of Laem Chabang Container Port.....	95
Table 4.6 The SWOT Analysis of Klang Container Port.....	96
Table 4.7 The SWOT Analysis of Manila Container Port.....	97
Table 4.8 The SWOT Analysis of Tanjung Prio Container Port.....	98
Table 4.9 The Ultimate Results of SWOT Analysis.....	98
Table 4.10 The Summarization of PCA Field Surveys.....	100
Table 4.11 The Result of Descriptive Statistical Analysis.....	102
Table 4.12 The Rotated Component Matrix.....	103
Table 4.13 Total Variance Explained.....	104
Table 4.14 The Summarization of AHP Field Surveys.....	106
Table 4.15 Compares the Relative Importance with Respect to Criteria.....	107
Table 4.16 Compares the Relative Importance with Respect to Throughput.....	107
Table 4.17 Compares the Relative Importance with Respect to Services.....	108
Table 4.18 Compares the Relative Importance with Respect to Facilities.....	108
Table 4.19 Compares the Relative Importance with Respect to Location.....	109
Table 4.20 Matrix of Pairwise Comparison of Criteria.....	110
Table 4.21 Matrix of Pairwise Comparison of Alternative with Respect to Throughput.....	110
Table 4.22 Matrix of Pairwise Comparison of Alternative with Respect to Services.....	110
Table 4.23 Matrix of Pairwise Comparison of Alternative with Respect to Facilities.....	111
Table 4.24 Matrix of Pairwise Comparison of Alternative with Respect to Location.....	111
Table 4.25 Results of Criteria Level.....	112
Table 4.26 Results of Alternative with Respect to Throughput.....	112

CHAPTER FOUR (Continued)

Table 4.27 Results of Alternative with Respect to Services.....	112
Table 4.28 Results of Alternative with Respect to Facilities.....	113
Table 4.29 Results of Alternative with Respect to Location.....	113
Table 4.30 Summarization of the Hierarchy Analysis.....	114
Table 4.31 The Results of Comparing Container Port Competitive Advantages..	114

LIST OF FIGURES

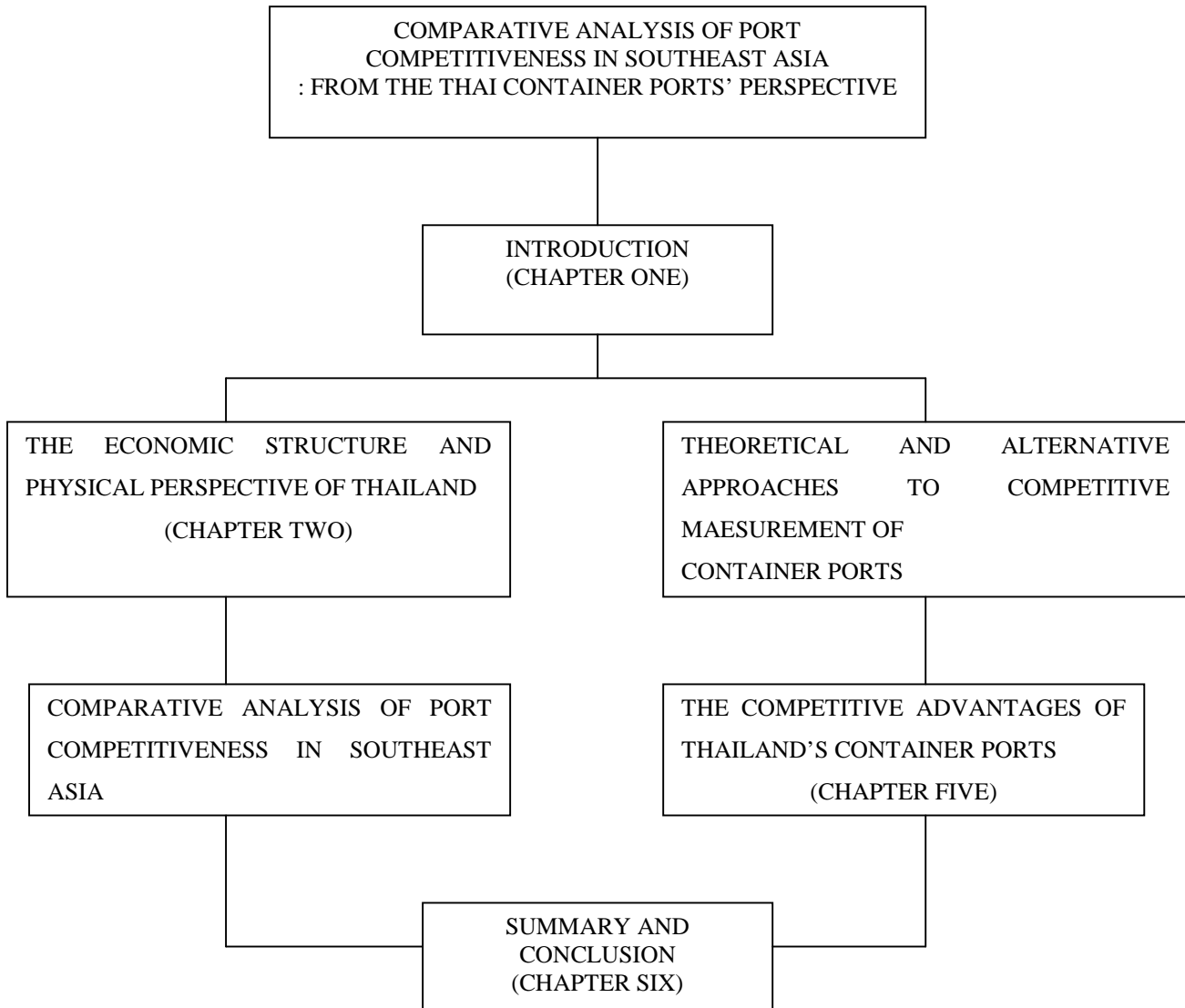
	Page
CHAPTER TWO	
Figure 2.1 Thailand's Geographical Map.....	14
Figure 2.2 Map of Thailand in Regional Perspective	15
Figure 2.3 The Structure of Government Agencies Influencing Transportation...	26
Figure 2.4 Map of Thailand's Ports of Locations.....	34
Figure 2.5 Map of Chao Praya River Ports.....	36
Figure 2.6 Map of Laem Chabang Port.....	37
CHAPTER THREE	
Figure 3.1 External Environments of The Firm.....	45
Figure 3.2 The Value Chain.....	58
Figure 3.3 SWOT Analysis Diagram.....	58
Figure 3.4 The Extended Porter Diamond Applied to Seaport.....	60
CHAPTER FOUR	
Figure 4.1 Hierarchy Structure of Model.....	105
Figure 4.2 The Performance Sensitivity Analysis.....	118
Figure 4.3 The Two Dimensional Sensitivity Analysis Between Services and Facilities.....	119
Figure 4.4 The Two Dimensional Sensitivity Analysis Between Services and Location.....	119
Figure 4.5 The Two Dimensional Sensitivity Analysis Between Services and Throughput.....	120
Figure 4.6 The Dynamic Sensitivity Analysis of Container Ports.....	120

LIST OF ABBREVIATIONS

AHP	Analytic Hierarchy Process
ANP	Analytic Network Process
ASEAN	Association of South East Asian Nation
BSAA	The Bangkok Shipowners and Agents Association
CI	Consistency Index
CR	Consistency Ratio
DMTC	Department of Maritime Transport and Commerce
DWT	Deadweight
EDI	Electronic Data Interchange
ESCAP	Assessment of the Environmental Impact of Port Development
ETO	The Express Transportation Organization of Thailand
EU	European Union
FTA	Free Trade Agreement
GDP	Gross Domestic Product
IAPH	International Association of Ports and Harbours
ICD	Inland Container Depot
ICS	International Chamber of Shipping
IEAT	Industrial Estates Authority of Thailand
IMO	International Maritime Organization
KP	Klang Container Port
LP	Laem Chabang Container Port
MP	Manila Container Port
NESDB	The National Economic and Social Development Board
MMPC	The Office of the Mercantile Marine Promotion Commission
PAT	Port Authority of Thailand
PCA	Principle Component Analysis
RBV	Resource-Based View
RI	Random Consistency Index
SWOT	Internal Strengths and Weaknesses, and External Opportunities and Threats Analysis
SRT	The State Railway of Thailand
TMN	Thai Marine Navigation Co.

TP	Tanjung Priox Container Port
TDRIT	Thailand Development and Research Institute
UNCTAD	United Nations Conference on Trade and Development
VCA	Value Chain Analysis

ORGANIZATIONAL CHART OF THESIS



CHAPTER ONE

INTRODUCTION

1.1 INTERNATIONAL TRADE AND CONTAINER PORTS

Seaports and container shipping traffics are part of the global transportation system. Nowadays, they play an increasingly important role in international trade, and this, in turn, is indispensable for economic growth and a higher standard of living for the world's population. Hence, international trade is very important for all countries. However, trade between countries cannot succeed without the services of transportation, particularly the port services rendered.

Sea transport is still conventionally accepted as the principal mode of cargo movement between partners in global trading. Thus, to fulfill international trade purposes, the economic benefits and efficiency of sea transport is required.

Economically, the world trade statistics of goods transported by ship are shown in Table 1.1. From 1985 to 2003, the rate of cargo movement has increased every year. Significantly, the dramatic increase from 4,050 million tones in 1991 to 7,740 million tones in 1999, an increase of more than 90 percent, is very remarkable. Consequently, as far as international trade is concerned, container terminals are recognized as the most significant node for handling and moving cargo through both outbound and inbound traffic. This is based on the fact that "containerization has grown to a point where trade without it now seems unimaginable. Its simplicity, standardization, cost effectiveness and fortunes are inextricably linked to that of world trade."¹ Paul further assumes that container port management needs to understand the behaviour of the shipping lines that dominate containerized trade who aiming to provide shippers with something more than just a port-to-port service.

¹ P. Avery, Strategies for Container Ports: a Cargo Systems report, (London: IIR Publication Ltd, 2000), p.13.

TABLE 1.1
WORLD TRADE DEVELOPMENT BY MARITIME TRANSPORT
(Unit : Million Ton)

YEAR	LIQUID CARGO	DRY CARGO	TOTAL	GROWTH RATE %
1985	1459	1923	3382	0
1986	1514	1945	3459	2.28
1987	1506	1999	3505	1.33
1988	1587	2105	3692	5.33
1989	1692	2199	3891	5.39
1990	1755	2253	4008	3.01
1991	1750	2300	4050	1.05
1999	2068	5672	7740	91.11
2000	2163	5872	8035	3.81
2001	2174	5891	8065	0.37
2002	2129	5948	8077	0.14
2003 ^c	2203	6168	8371	3.64

Source: United Nations Statistics Office, 2002.

In considering, the role of container port in servicing international trade, it is necessary to contemplate the intense competition of global business. Thompson and Strickland III believe that business organizations, in expecting a high return on economic investments, realize that winning business strategies are grounded in sustainable competitive advantage². A company has competitive advantage whenever it has an edge over rivals in attracting customers and defending against competitive forces. There are many routes to competitive advantage, but the most basic is to provide buyers with what they perceive as superior value – a good product at a low price, a superior product that is worth paying more for, or a best-value offering that represents an attractive combination of price, features, quality, service, and other attributes buyers find attractive.” From the theoretical perspective mentioned above, therefore, container terminals are a key business organization of international trade and are facing the intense pressure of the international environment.

² A. Thomson and J. Strickland III, Business Strategy; theory and practice, (New York: McGraw-Hill/Irwin, 2004), p.149.

1.2 THAILAND'S CONTAINER PORTS AND INTERNATIONAL TRADE

Thailand's economic growth, as with other countries, is based on international trade. Presently, Thailand is an efficient agricultural and manufacturing products exporter. Also, it is an importer of energy and capital products such as crude oil and machinery. Therefore, international trade is very important for the Thai economic system. As of late, Thailand's imports and exports of containerized cargo is increasing remarkably. The importance of container terminals in Thai international trade is demonstrated in Table 1.2. These statistics indicate that the amount of goods passing through Thailand's container terminals has increased by an average of more than 10 percent per year from 1998 to 2004. This implies an increasing reliance on the use of containers in transporting cargo in and out of Thailand.

TABLE 1.2 CONTAINER TRAFFIC VIA THAI CONTAINER TERMINALS

(Unit : TEUs)

Year	Bangkok Port		Laem Chabang Port		Total		Grand Total	Growth Rate (%)
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound		
1998	531693	582063	698071	726631	1229764	1308694	2538458	0
1999	498867	553699	850661	905206	1349528	1458905	2808433	10.6
2000	512414	561103	1033287	1071975	1545701	1633078	3178779	13.2
2001	508030	561530	1148724	1163715	1656754	1725245	3381999	6.4
2002	516690	593871	1317910	1338741	1834600	1932612	3767212	11.4
2003	537338	636648	1541997	1505372	2079335	2142020	4221355	12.1
2004	630894	687509	1767863	1762080	2398757	2449589	4848346	14.9

Source: Public Relations Division, The Port Authority of Thailand.

Additionally, among Asia's twenty largest of Asian container ports in the period from 2001 to 2003, the United Nations reported that Thailand's Laem Chabang container port has been ranked 12th in Asia and 19th in the World. This ranking has supported the perception that Thailand's container terminals have become more important for the nation's trade. Table 1.3 shows in detail the rank of the twenty largest container ports in Asia from 2001 to 2003.

TABLE 1.3 TWENTY LARGEST ASIAN CONTAINER PORTS IN 2001,
2002 AND 2003

(Unit: 1000 TEUs)

Rank	Port	Country	2001	2002	2003	Percentage	
World	Asia		TEUs	TEUs	TEUs	growth	
						2002/2003	
1	1	Hong Kong	China	17900	19144	20450	6.82
2	2	Singapore	Singapore	15520	16941	18100	6.84
3	3	Shanghai	China	6330	8612	11370	32.03
4	4	Shenzhen	China	5079	7614	10650	39.87
5	5	Busan	Republic				
			of Korea	8073	9453	10368	9.68
6	6	Kaoshiung	Taiwan	7540	8493	8844	4.13
11	7	Dubai	United Arab				
			Emirate	3502	4194	5152	22.84
12	8	Port Klang	Malaysia	3760	4533	4840	30.65
14	9	Qingdao	China	2639	3410	4230	9.45
16	10	T. Pelepas	Malaysia	2049	2669	3487	15.68
17	11	Tokyo	Japan	2750	3028	3314	25.42
19	12	Laem	Thailand				
		Chabang		2367	2749	3180	15.68
21	13	Tianjin	China	2011	2408	3020	25.42
22	14	Ningbo	China	1213	1859	2772	49.11
23	15	Guangzhou	China	1628	2173	2760	27.01
24	16	Jakarta	Indonesia	2222	2398	2758	15.01
26	17	Manila	Philippines	2296	2462	2561	4.02
28	18	Yokohama	Japan	2304	2365	2503	5.84
29	19	Xiamen	China	1295	1754	2330	32.84
30	20	J. Nehru Port	India	1462	1946	2269	16.6

Source: Review of Maritime Transport, 2004, United Nations.

Note: Singapore includes PSA Corp and Jurong port. Shenzhen includes Chiwan, Shekou and Yantian.

These phenomena, the sharp increase of containerized cargo movement and the presence of several large seaports within the Asian region, demonstrate the niche of market opportunity for each container port as they compete to gain a more advantage.

This situation will, in part, lead to a higher barriers for container terminal providers who need to sustain and increase their market shares in the sea transport industry. Furthermore, if container terminal providers of a specific country can succeed in increasing containerized cargo traffic, it will contribute to economic growth and a

higher standard of living for people in the country. Hence, the strategies that port managers need to reach their business objectives are the main concern.

Economical and efficient container terminals are necessary in the development of Thailand's international trade. This involves the efficiency of both the Port Authority of Thailand and other government bodies such as the custom department and container terminal operators.

1.3 LITERATURE SURVEY AND OBJECTIVE OF THESIS

Firstly, the entire fundamentality and background on container port competitive performance should be examined. As this study is related to the performance of container port competitiveness, it is worthy to extend in more depth on the historical researches on seaport performance. There are many existing publications in measuring the port economic services. However, these studies are varying in the purposes and methodologies employed.

UNCTAD introduced the performance indicators that underlie productivity and effectiveness of port performance including: financial indicators (tonnage worked, berth occupancy revenue per ton of cargo, cargo handling per ton of cargo, labour expenditure, capital equipment expenditure per ton of cargo, contribution per ton of cargo, total contribution); operational indicators (arrival late, waiting time, service time, turnaround time, tonnage per ship, fraction of time berthed ships worked, number of gangs employed per ship per shift, tons per ship-hour in port, tons per ship-hour at berth, tons per gang hours, fraction of time gangs idle).³

³ UNCTAD, Port performance indicator, TD/B/C.4/131/Supp.1/Rev.1, United Nations Conference on Trade and Development, (New York: 1976).

Quantitative analysis of port competition has been done by, among others, Bardi, Foster, Slack, Hanelt and Smith, and D'Este and Meyrick.⁴ The results have not always been identical, but the authors often suggest that service related factors were more important than price factors, and that factors within the control of port authorities were often less important than those beyond port control.

The scheduling of carrier vessels has also been the subject of many researches. Kenyon and Al-Kazily explored the development of a carrier's maritime network.⁵ Foggin and Dicer and Slack evaluated the effects of load centers.⁶ Helmick sought quantitative evidence of the formation of load centers but suggested that other factors, e.g. the presence of tramp lines in routes abandoned by major carriers, prevented confirmation of carrier rescheduling.⁷ Lago and colleagues concluded that the rescheduling of vessels by carriers was not drastic but did differ between corridors. They showed how the level at which scale economies were exploited in oceanic transit differed between corridors.⁸

⁴ E.J. Bardi, "Carrier selection from one mode", Transportation Journal, Vol. 13, No. 1, 1973, pp.23-29; T. Foster, "Ports: what shippers should look for", Chilton's Distribution World Wide, Vol. 77, No. 1, 1978a, pp.41-43; T. Foster, op. cit., 1978b, pp.44-48; T. Foster, "What's important in a port", Chilton's Distribution World Wide, Vol. 78, No. 1, 1979, pp.32-36; B. Slack, "Containerization, inter-port competition and port selection", Maritime Policy and Management, Vol. 12, 1985, pp.293-303; R.L. Hanelt and D.S. Smith, "The dynamics of west coast container port competition", Journal of the Transportation Research Forum, Vol. 28, No. 1, 1987, pp.82-91; G.M. D'Este and S. Meyrick, "Carrier selection in a Ro/Ro ferry trade: Part 1. Decision factors and attitude", Maritime Policy and Management, Vol. 19, No. 2, 1992a, pp.115-126; G.M. D'Este and S. Meyrick, "Carrier selection in a Ro/Ro ferry trade: Part 2. Conceptual framework for the decision process", Maritime Policy and Management, Vol. 19, No. 2, 1992b, pp.127-138.

⁵ J.B. Kenyon, "Elements in inter-port competition in the United States", Economic Geography, Vol. 46, No. 1, 1970, pp.1-24; J. Al-Kazily, "Choice of technology for containerized shipping-a study of interaction between vessels and ports", Dissertation submitted to the University of California at Berkeley, 1979.

⁶ J.H. Foggin and G.N. Dicer, "Disappearing hinterlands: the impact of the logistics concept on port competition", Journal of the Transportation Research Forum, Vol. 26, No. 1, 1985, pp.385-391; B. Slack, "Shipping lines as agents in the port industry", Maritime Policy and Management, Vol. 23, No. 3, 1996, pp.289-300.

⁷ J.S. Helmick, "Concentration and Connectivity in the North Atlantic Liner Port Network, 1970-1990", Dissertation submitted to the Department of Management and Logistics, University of Miami, 1994.

⁸ A. Lago, M. Malchow and A. Kanafani, "An analysis of carriers' schedules and the impact on port selection", Presentation at 2001 International Association of Maritime Economists Conference, Hong Kong: 2001.

Notteboom studied the development of a container port system in relation to forelands, hinterlands, and the technology environment. He concluded that the future development of the European container port system would primarily be influenced by the technological and organizational evolutions in the three dimension of foreland-port-hinterland and the outcomes of some current (trans) port policy issues.⁹

Marcadon confirmed that inland links are a key element in port competition.¹⁰

Shipowners consider profitability from the perspective of the entirety of their operation, from door to door. Comtois presented the factors linked with the transformation of the Pacific Rim transport environment resulting from increase container trade. The article was concluded that the ability a port to attract and serve international traffic depends increasingly on: (1) geographical conformity of port site to a shipping line's fleet and market strategy; (2) quality of intermodal tertiary service notably logistics systems; (3) availability of local cargoes; and (4) intermodal links to major production and consumption markets.¹¹

Tongzon studied the efficiency of four Australian and twelve other international container ports by using two output and six input measures of port performance as the factors of measurement. The output measures are cargo throughput and ship working rate. The inputs are land, labor and capital.¹² Song examined the possible competition and co-operation of the adjacent container ports in Hong Kong and South China from a strategic perspective. He concluded that potential competition could be co-opted by forming a strategic alliance with the competitor.¹³

⁹ T. Notteboom, "Concentration and local centre development in the European container port system", Journal of Transport Geography, Vol. 5, No. 2, 1997, pp.99-115.

¹⁰ J. Marcadon, "Containerization in the ports of Northern and Western Europe", Geo Journal, Vol. 48, 1999, pp.15-20.

¹¹ C. Comtois, "The integration of China's port system into global container shipping", Geo Journal, Vol. 48, 1999, pp.35-42.

¹² J.L. Tongzon, "efficiency measurement of selected Australian and other international ports using data envelopment analysis", Transportation Research Part A, Vol. 35, 2001, pp.107-122.

¹³ D.W. Song, "Regional container port competition and co-operation: the case of Hong Kong and South China", Journal of Transport Geography, Vol. 10, 2002, pp.99-110.

De and Ghosh developed indicators of port operation are composed of three groups: (1) operation performance including ship turnaround time, pre-berthing waiting time, and percentage of idle time at berth to time at working berth; (2) asset performance including output per ship berth day, berth throughput rate, and berth occupancy rate; (3) financial performance including operating surplus per tone of cargo handled, and rate of return on turnover.¹⁴

Marlow and Paixao Casaca (2003) measured lean port performance and sustain the subsequent development of agile port by suggesting a set of new port performance indicators. The indicators compose of: (1) the multimodal process; (2) interface performance measurement; (3) transport performance measurement; (4) infrastructure performance measurement.¹⁵

Turner, Windle and Dresner made a measurement of seaport superstructure productivity growth in North America and explored the theorized causal relationships between infrastructure productivity and industry structure and conduct. They found that between other factors the longstanding relationship between seaports and the rail industry appears to remain a critical determinant of container port infrastructure productivity. The independent variables of infrastructure productivity are: seaport industry structure; port authority conduct; ocean carrier conduct; situation factors; and control variables (longshore labour actions).¹⁶

These publications are focusing on partial productivity factors, which might not prove to be helpful to the port authorities for policy making in the long run. Also most shipping lines are concerned with the overall productivity of the port rather than partial productivity. For example, a container terminal can be very efficient in container handling rate per hour but this does not necessarily imply that all the production factors have been employed efficient.

¹⁴ P. De and B. Ghosh, "Causality between performance and traffic: an investigation with Indian ports", Maritime Policy and Management, Vol. 30, No. 1, 2003, pp.5-27.

¹⁵ P.B. Marlow and A.C. Paizao Casaca, "Measuring lean ports performance" International Journal of Transport Management, Vol. 1,2003, pp.189-202.

¹⁶ H. Turner, R. Windle and M. Dresner, "North American containerport productivity: 1984-1997", Transportation Research Part E, Vol. 20, 2004, pp.339-356.

Furthermore, Tongzon conducted examination the port choice on relating to the perspective of shipping lines.¹⁷ Malchow and Kanafani investigated the port selection by the choice-model approach. They examined the assignment to ports for exports of various commodity-types as a function of geographic location, port characteristics, and characteristics of vessel schedules. They concluded that the most significant characteristic of a port is its location. Noteworthy, those of articles are focused on other shipping industry area of the world.¹⁸

There was no research specific to studies on Southeast Asian container transportation. Nonetheless, Singapore as a container mega hub has been the subject of previous research and studies. Also on the approaches of container port's competitive analysis, the former results are not integrated the perspectives of shipping lines and shippers into the same time of measurement.

Thus, this study will establish a benchmark for integrity the perceptions of liners and shippers into a single set of factors, allowing for a comprehensive explanation of the elements of contributing to the efficient and effective economical performance of container ports. In terms of factors selected for analyzing the level of service provided, they were also included on both the management and operation dimensions. This is very important because of the competence of service sector is incurred by a dual system of management and operation.

However, as the price factor is less influential on the level of performance and it differs in terms of categorization and is considered confidential information, it cannot be taken under consideration for this study. However, it would be interesting to investigate the comparative competitive performance of container ports in the Southeast Asian region by comparatively measuring the perceptions of container liners and shippers.

¹⁷ J.L. Tongzon, "Port choice in a competitive environment: from the shipping lines' perspective", Conference Proceedings of the International Association of Maritime Economists, (Busan: 2003), pp.631-653.

¹⁸ M. Malchow and A. Kanafani, "A disaggregate analysis of port selection", Transportation Research Part E, Vol. 40, 2004, pp.317-337.

This conceptual framework has led to the objective of this thesis. The main objective of this thesis is to examine and assess the competitive advantages of container terminal services in Thailand. The thesis will concentrate on international shipping companies and shippers who have been utilizing container terminals in Thailand and neighboring countries including Malaysia, Indonesia and the Philippines for both imports and exports. The objective of the research was derived from the situation of container shipping industry in the Southeast Asian Region that has encountered increasingly fierce competition in the recent years.

As becomes increasingly important to international trade (partly due to flexibility, reliability, seamless of mode transferring, reduces transport cost, and speed of transshipment), hence an indispensable focus on container port development by the majority maritime country.

Consequently, the necessity to increase the level of capacity and productivity of container port performance, both in terms of management and operation, to serve the expected desires of customers are becoming significant. Laem Chabang container port of Thailand as a main waterfront gateway of the country has recently employed some strategies and policies for making the favorable attractiveness for its primary customers, i.e. shipping lines and shippers. As the competition for container shipping market share in the region intensifies, Laem Chabang urgently needs to measure its efficiency and effectiveness of performance in relation to regional competition.

This is the approach that could be contributed to initiate an appropriate strategic planning for the prosperity of the country's container international trade. Unfortunately current studies on container port competitiveness have not addressed the Southeast Asian Region. Hence, as the underlying reasons given above, the author needs to assess and determine the competitiveness of Laem Chabang by comparing to the neighboring container ports (Klang, Manila, and Tanjung Priok).

In accordance to the main purpose of the thesis the specific objectives are classified into three categories: the first is needed to identify the general present situation of container shipping industry in the domestic arena of Thailand. This is quite important because of the study of current business environment will bring the fundamental

perspectives of economical, social, political phenomena for insight. The second is the need to examine the external and internal factors that the sampled container ports are challenges, both in terms of advantages and disadvantages. The third is the need to analyze the comparative competitiveness of the four sampled container ports.

1.4 METHODOLOGY AND STRUCTURE OF THESIS

The methodology framework manipulated in this thesis will be divided into four steps. The first step concentrates on the present situation of the principals of competitive advantages in the contemporary term of business environment of container performance in Thailand. The second step identifies and groups related variables for gaining competitive advantages at container terminal operation. The third step determines the weight of each criterion relative to the accomplishment of container port in fulfilling the expected requirements of a port's users. The final step determines alternative container ports for the highest competitiveness.

The research techniques used in this thesis utilizes both of quantitative and qualitative methods for empirical study, utilizing unstructured interviews as well as a field survey in a paper form. The unstructured interviews were conducted in the first stage for investigating the present situation of competitive advantages in Thailand's container industry and neighbouring rivals. In the second stage, the first field survey was used to determine the related independent variables for container port competitiveness in the Southeast Asian Region. Subsequently, the second field survey had been distributed to assemble the perceptions of container port's users. In the final stage, after the second field survey's data are calculated and summarized, the measurement of container port competitiveness was analyzed and the highest competitive container port in the study was determined, then the conclusion and suggestions on Thailand's container port competitive advantages and strategies are presented.

The structure of this thesis is divided into three major parts. Part one consists of two chapters. Chapter one provides an introduction and background for this research. Chapter two describes the physical and economic structure of Thailand and its international trade and demonstrates the organizational structure of maritime transport

in Thailand, the port industry, and some government organizations and private sectors involved in maritime transportation.

Part two is comprised of two chapters. Chapter three concerns with the literature survey and revise the theoretical and alternative approaches to the measurement of container port competitive performance. Chapter four focuses on the comparative investigation of the performance of container terminal operation and management in Thailand and its regional competitors.

Part three is concentrates on the results. Chapter five presents the findings related to the impact of competitive advantage factors on the given business strategies adopted by container terminal operators and the Port Authority of Thailand. It also summarizes the overall empirical results and makes conclusion and recommendations for the relative competitiveness of Thailand's container ports.

CHAPTER TWO

THE ECONOMIC STRUCTURE AND PHYSICAL PERSPECTIVE OF THAILAND

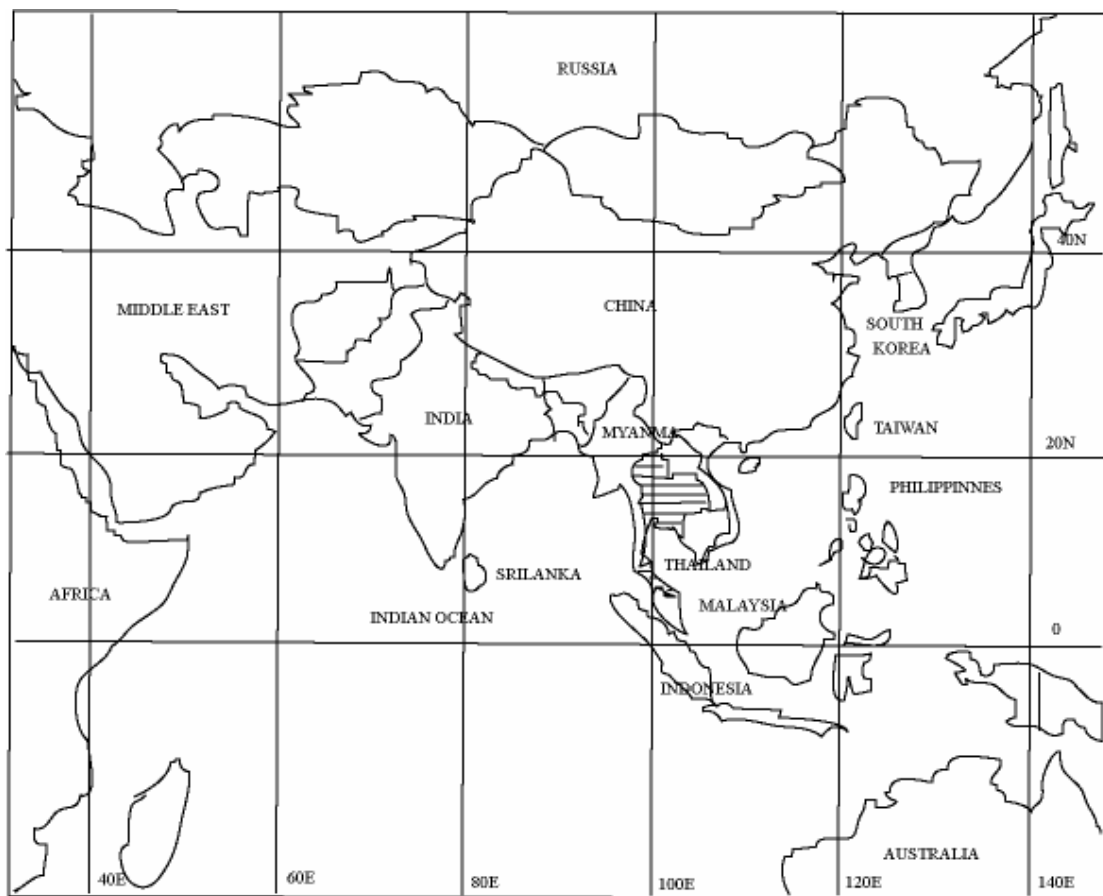
Since the underlying purpose of this study concerns service efficiency and effectiveness in Thai container ports, it is very important to give a brief description of the container industry. This chapter is divided into two sections: (1) it focuses on the geographical location of Thailand; (2) the economic structure of Thailand's as well as the geography of the country's sea transportation system are provided.

2.1 GEOGRAPHICAL FEATURES OF THAILAND

In the present day, Thailand is still an agricultural country. The principal agricultural products are rice, rubber, sugar, and tapioca products. However, the industrial sector of manufactured products has been increasing for the past thirty years. The main manufactured products are plastic products, wooden furniture, iron and steel products, textile yarn and threads. Despite the financial crisis in 1997, which was a hard blow to the Thai economy, the growth rate of its international trade has maintained impressive evidence of sustainability.

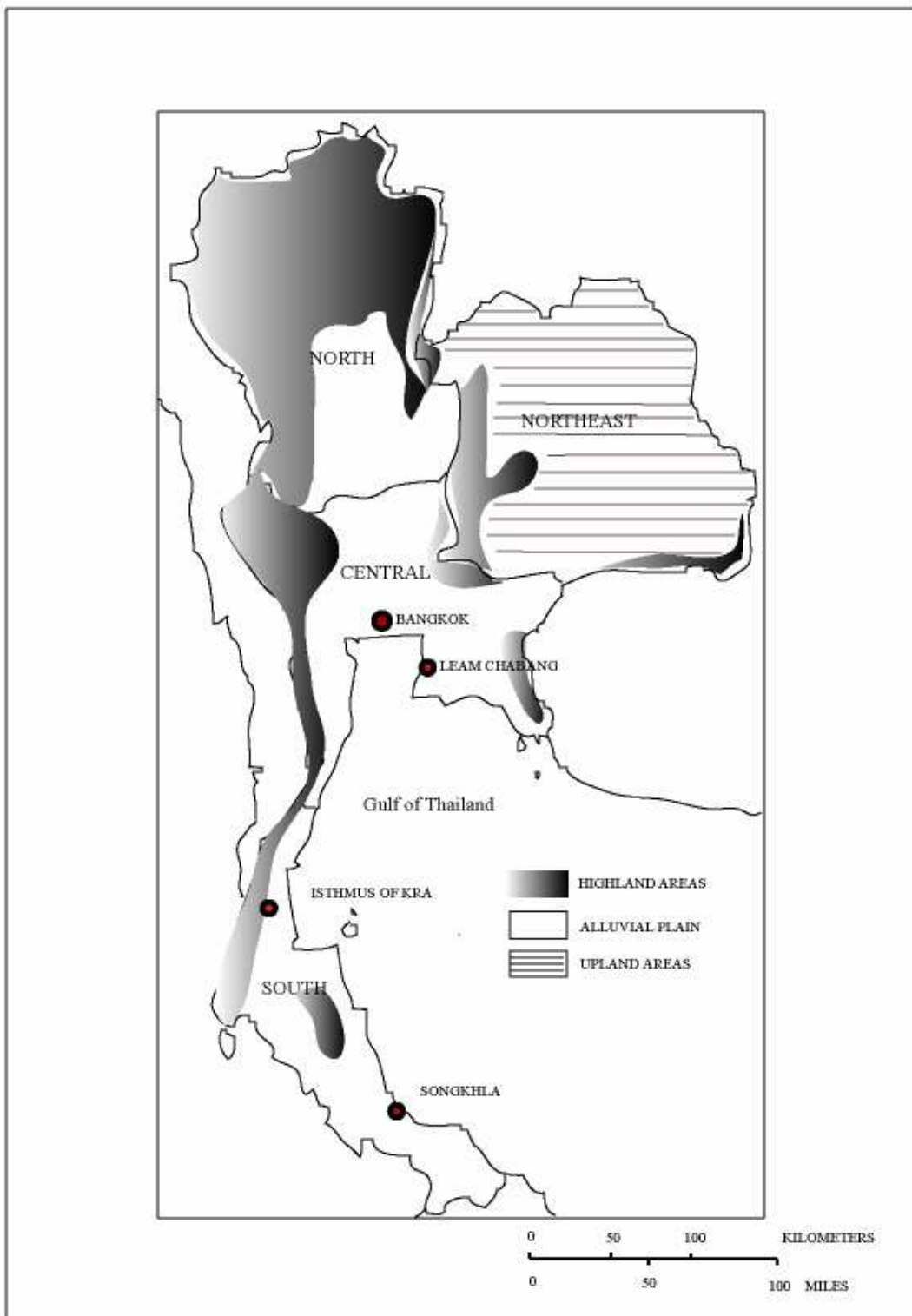
Geographically, Thailand is located in the tropical zone between latitude 5°37' N and 20°27' N, longitude 97°22' E and 105°37' E. Figure 2.1 shows the location of Thailand on a map of Asia. It is bordered by Laos PDR in the north and northeast, Burma in the north and west, Cambodia in the east and Malaysia in the south. Thailand's length measures about 1,620 kilometres from north to south, and its width is about 775 kilometres from west to east. The narrowest part, the Kra Isthmus, is about 64 kilometres wide. The total area of the country is 513,115 square kilometers (Bank of Thailand). The country has been divided into four regions. These are the Northern, Northeastern, Central and Southern Regions. The portrait is shown in figure 2.2. The Northeastern Region is the largest part of the country and borders on Laos and Cambodia.

In terms of personal earnings the Northeastern Region is the poorest part of the country because of a lack of fertilized soil and minimal rainfall. The Northern Region is made up of highlands and mountains, and is very famous for tourism and teak furniture products. The stretching plains of the Central region contain the capital city, Bangkok, which is the heart of the country's industry and international trade. The Southern Region is also very important for coastal tourism and is plentiful in natural resources like sea animals, minerals and rubber products. The government's Kra Canal project, which is still a source of conflict with respect to maritime policy, is also located in this region.



Source: Reproduced from <http://www.lib.utexas.edu/maps/asia.html>.

FIGURE 2.1 THAILAND'S GEOGRAPHICAL MAP



Source: Reproduced from <http://www.lib.utexas.edu/maps/asia.html>.

FIGURE 2.2 MAP OF THAILAND IN REGIONAL PERSPECTIVE

2.2 STRUCTURE OF THAILAND'S ECONOMY

From 1990 up to 1995, Thailand's economic growth rate in terms of gross domestic products (GDP) ranged from 8 % to 12 % per annum causing the country to be regarded internationally as a successfully developing nation. Unfortunately, while Thailand enjoyed high economic growth in the first half of the 1990s, partly as a result of the large capital inflow, the current account deficit began to widen considerably from about 5 % of GDP in 1993 to over 8 % of GDP in 1995 and 1996.

Apart from over-investment in sectors that did not generate much foreign exchange, such as infrastructure, real estate and heavy industry, other factors also contributed to Thailand's gradual loss of competitiveness.¹⁹ Consequently, this led international investors to lose confidence in Thai economy; that speculative attacked against the value of the baht and caused the financial crisis to reach its peak in May 1997.

Recently, the structure of the Thai economy has changed from trading mainly agricultural products to trading more in manufactured goods. According to the executive report of Thailand Development and Research Institute (TDRI) that "the importance of traditional agricultural goods has been reduced to the extent that they made up only 28 percent of the total exports in 1989. Manufactured goods constituted the major bulk of Thai exports, representing 65 percent in 1989."²⁰

Thailand's economic growth jumped to 5.2 percent, the highest since the o crisis in 1997, because of exports and especially private domestic consumption. According to the World Bank manufactured products continued to help increase Thailand's GDP from 1999 – 2002, with held up to the double-digit growth rates over that period.²¹

¹⁹ Report of TDRI (Thailand Development and Research Institute), 1998, p.15.

²⁰ S. Chirathivat and T. Wahawisan, Executive Summary; the trade development strategy for Thailand during the Seventh Plan 1992-1996, 1998 pp.3-4.

²¹ World Bank, Global Economic Prospects 1998/1999.

The products included semi-conductors, radio and television receivers and parts, video recorders, automobiles and parts, as well as iron and steel, plastics, rubber, and chemical products (see Table 2.1).

TABLE 2.1 TWELVE FASTEST GROWING MANUFACTURED EXPORTS 2002

No.	Items	Growth 2002 (%)	Annual average growth (%)
1	Semi-conductor devices, transistors and diodes	64	30
2	Rubber	31	17
3	Radio-broadcast receivers, television receivers and parts thereof	24	19
4	Precious stones and jewelry	18	8
5	Video recording and parts thereof	34	16
6	Motor cars, parts and accessories	10	18
7	Iron and steel and their products	17	11
8	Polymers of ethylene, propylene, etc in primary forms	11	16
9	Chemical products	18	10
10	Rubber products	16	15
11	Plastic products	18	11
12	Electric motors and generators	20	6

Source: Ministry of Commerce of Thailand (<http://www.moc.go.th>).

According to the Bank of Thailand's 2003 figures, the agricultural sector contributed 10 percent to the overall GDP, manufacturing contributed 38 percent, wholesale and retail trade 14 percent, and the services sector 38 percent. Even though the pattern of Thai economy has been changed from a reliance on agricultural products to the manufacturing and services sectors, the majority of the labour force is still involved in agriculture.

However, as indicated in Table 2.2, Thailand's economic growth rate has increased from 2002 to 2003. Although the current account in 2003 registered a large surplus, a much wider deficit in net capital movements resulted in a balance of payments surplus of only US\$ 143 million, significantly smaller than that of US\$ 4.2 billion in 2002. Nonetheless, as a result of the surplus in the balance of payments, international reserves at the end of 2003 rose to US\$ 42.1 billion.

TABLE 2.2 BALANCE OF PAYMENTS OF THAI ECONOMY

(Unit: Million US\$)

Description	Year	
	2002	2003 ^{1/}
Exports, f.o.b.	66092	78416
($\Delta\%$)	4.8	18.6
Imports	63353	74214
($\Delta\%$)	4.6	17.1
Trade balance	2739	4202
Services income and transfer	4269	3773
Current account balance	7008	7975
Capital movement (Net)	-4181	-8604
Private sector	-5703	-8855
- Banks	1776	-2446
Commercial banks	3401	-1298
BIBFs	-1625	-1148
- Non-banks	-7479	-6409
Public sector	-2510	-2418
Bank of Thailand	4032	2669
Error and omissions	1407	772
Overall balance ^{2/}	4234	143

Source: Annual Report 2003 of the Bank of Thailand.

Note: ^{1/} Preliminary data^{2/} Actual data $\Delta\%$ represents percentage change from the same period last year.

When looking at Thailand's key economic indicators after the 1997 economic crisis, growth figures in terms of GDP have been increased constantly (see Table 2.3), particularly in the manufacturing and service sectors.

TABLE 2.3 THAILAND'S KEY ECONOMIC INDICATORS

Item/Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1. GDP at constant 1988 price (billion baht)	2,693.0	2941.7	3115.3	3072.6	2749.7	2872	3008	3074	3238	3460
Percent change	9.0	9.2	5.9	-1.4	-10.5	4.4	4.8	2.2	5.3	6.9
1.1 Agriculture (billion baht)	303.4	276.6	288.8	286.8	282.6	289.2	309.9	320.0	323.4	351.5
Percent change	5.0	4.0	4.4	-0.7	-1.5	2.3	7.2	3.2	1.0	8.7
1.2 Non-agriculture (billion baht)	2389.6	2665.1	2826.5	2785.8	2467.1	2583	2699	2754	2914	3109
Percent change	9.5	9.8	6.1	-1.4	-11.4	4.7	4.5	2.0	5.8	6.7
2. GDP at current price (billion baht)	3629.3	4186.2	4611.0	4732.6	4626.4	4637	4923	5134	5446	5930
Percent change	14.7	15.3	10.1	2.6	-2.2	0.2	6.2	4.3	6.1	8.9
3. GNP per capita (baht)	60865	69326	75146	75146	72979	72981	77863	80558	84846	91420
3. External Account										
3.1 Export	44.7	55.7	54.7	56.7	52.9	56.8	67.9	63.1	66.1	78.1
Percent change	22.1	24.8	-1.9	3.8	-6.8	7.4	19.5	-7.1	4.8	18.2
3.2 Import	53.4	70.4	70.8	61.3	40.7	47.5	62.4	60.6	63.4	74.3
Percent change	18.4	31.9	0.6	-13.4	-33.8	16.9	31.3	-3.0	4.6	17.4
3.3 Trade balance	-8.7	-14.7	-16.1	-4.6	12.2	9.3	5.5	2.5	2.7	3.8
3.4 Current account balance	-7.8	-13.2	-14.3	-3.1	14.3	12.5	9.3	6.2	7.0	8.0
Percent of GDP	-5.4	-7.9	-7.9	-2.0	12.7	10.2	7.6	5.4	5.5	5.6
Exchange rate Baht: US\$	25.2	24.9	25.3	31.4	41.4	37.8	40.2	44.5	43.0	41.5

Source: Annual Report 2003 of the Bank of Thailand.

2.3 THAILAND'S INTERNATIONAL TRADE

International trade is very important to Thai economic stability, as indicated by GDP records shown in Table 2.4. When considering exports, their significance to the GDP after 1997 has for the most part, remained above 40 %. In terms of imports, values in proportion to the GDP are similar.

TABLE 2.4 THE PROPORTIONATE IMPORTANCE OF EXPORTS AND IMPORTS TO GDP

(Billion of US\$)

Year	GDP	%	Exports of Goods & Services		Imports of Goods & Services	
			Services	%	Services	%
1994	142.3	100	44.7	31.4	53.4	37.5
1995	168.1	100	55.7	33.1	70.4	41.9
1996	182.3	100	54.7	30	70.8	38.8
1997	150.7	100	56.7	37.6	61.3	40.7
1998	111.8	100	52.9	47.3	40.7	36.4
1999	122.7	100	56.8	46.3	47.5	38.7
2000	122.5	100	54.6	46.6	43.2	35.3
2001	115.4	100	55.4	49.3	44.1	38.2
2002	126.7	100	53.3	42.1	51.5	40.7
2003	142.9	100	54.4	38.1	52.3	36.6

Note: GDP at current market prices

Source: Annual report 2003 of the Bank of Thailand.

2.3.1 EXPORTS

Thailand's economy grows with the amount of goods its exports. The most important being agricultural and manufactured products. The significant agricultural goods are rice, sugar, rubber, and tobacco, and manufactured goods include garments, electronic integrated circuits, motor vehicles with parts and accessories, plastics, and canned and processed seafoods. The important markets for Thai exports are the USA, ASEAN countries, China, the EU, and Japan. In recent years the values of goods exported to those countries has been increased (see Table 2.5).

TABLE 2.5 THAILAND TOP 10 EXPORT MARKETS, 2001-2003

Market/Year	FOB Value: Millions of US\$			Growth Rate: %		
	2001	2002	2003	2001	2002	2003
U.S.A.	13199.6	13509.6	13618.0	-11.2	2.4	0.8
Japan	9945.5	9949.7	11395.7	-2.8	0.1	14.5
Singapore	5261.4	5553.1	5853.6	-13.3	5.5	5.4
China	2873.4	3555.0	5691.5	1.3	23.7	60.1
Hong Kong	3306.8	3687.8	4316.2	-6.0	11.5	17.1
Malaysia	2733.4	2835.3	3872.6	-3.5	3.7	36.6
Taiwan	1925.3	1969.4	2603.6	-20.7	2.3	32.2
UK	2336.7	2393.0	2580.6	-2.0	2.4	7.8
Netherlands	2037.1	1891.7	2367.6	-10.3	-7.1	25.2
Indonesia	1369.8	1680.2	2310.9	1.1	22.6	37.5
Total 10	44989.0	47024.8	54610.2	-7.8	4.5	16.1
Others	20194.2	21792.8	25628.2	-3.1	4.6	21.3
Grand total	65183.2	68817.7	80238.4	-6.4	4.6	17.7

Source: Department of Trade Negotiation, Ministry of Commerce of Thailand.

2.3.2 IMPORTS

The policy of the Thai government has concentrated on improving the manufacturing and service industries to boost the export-oriented economy. Consequently imports, both in terms of volume and value, have been increased considerably. Most imports are capital goods and intermediate products, and their value are accounted for an average of almost fifty percent of GDP in the past three years. A statistical summary of Thai imports is shown in Table 2.6, 2.7 and 2.8 respectively.

TABLE 2.6 THAILAND'S SIGNIFICANT EXPORT PRODUCTS BY VALUE
2001 – 2003

Goods Items	Year	Value: Millions of US\$			Growth: %		
		2001	2002	2003	2001	2002	2003
Computer, parts and accessories		7280.9	7540.7	7988.4	6.1	3.6	5.9
Electronic integrated circuits		3512.2	3452.8	7834.4	-21.1	-1.7	23.0
Motor cars, motor vehicles, parts and accessories		2655.0	2920.3	7113.8	9.7	10.0	23.7
Garments		2914.4	2722.0	6196.4	-7.0	-6.6	18.9
Rubber		1326.0	1740.2	5864.6	-13.0	31.2	7.6
Precious stones and jewelry		1837.2	2169.3	4213.4	5.5	18.1	15.1
Radio-broadcast receivers, television and parts		1692.8	2101.8	3757.0	-13.8	24.2	24.5
Canned and processed seafoods		2014.6	2016.9	2398.1	-2.5	0.1	33.8
Polymers of ethylene, propylene, in primary forms		1615.0	1798.1	2277.7	-13.4	11.3	18.3
Iron and steel products		1091.4	1280.9	2180.6	-22.0	17.4	4.8
Chemical products		1015.1	1195.2	2052.1	-18.7	17.7	26.1
Air-conditioning machine and parts thereof		1160.5	1114.0	1965.6	7.5	-4.0	29.5
Rubber products		1095.1	1262.2	1242.0	3.3	15.3	22.2
Rice		1582.7	1631.7	1073.2	-3.6	3.1	-10.8
Semiconductors device, transistors and diodes		886.9	1453.9	957.3	-13.4	63.9	-1.6
Plastic products		860.3	995.4	904.5	-3.8	15.7	8.4
Aircrafts, ships and Aircraft equipment		1363.9	639.7	850.8	76.51	-53.1	33.0
Textile yarn and threads		606.4	585.2	655.2	0.53	-3.5	12.0
Medicine and pharmaceutical products		530.5	552.0	651.3	6.6	4.05	18.0
Paper, cardboard and paper products		536.6	588.8	645.3	-4.09	9.73	9.6
Total 20 items		50337.9	52072.4	60821.7	-1.69	3.45	16.8
Others		11457.3	12189.8	14179.0	4.38	6.31	16.6
Grand total		61795.2	64252.1	75018.6	-0.62	3.98	16.8

Source: The Bangkok Shipowners and Agents Association, BSAA Handbook 2004, p.164.

TABLE 2.7 THAILAND'S SIGNIFICANT IMPORT PRODUCTS BY VALUE
2001 – 2003

Goods Items	Year	Value: Millions of US\$			Growth: %		
		2001	2002	2003	2001	2002	2003
Electrical machinery and parts		7280.9	7542.7	8192.8	6.1	3.6	9.8
Industrial Machinery		6051.4	6371.6	4626.2	9.1	5.3	34.0
Crude oil		5756.0	5749.3	3975.2	-5.7	-0.1	36.1
Rubber		1326.0	1740.2	2788.4	-13.0	31.2	60.2
Garments		2914.4	2722.0	2764.3	-7.0	-6.6	1.6
Computer, parts and accessories		3759.7	3662.0	2514.9	2.5	-2.6	15.9
Iron and steel		2368.4	3016.8	2502.2	-9.4	27.4	19.1
Plastic pallet		1615.0	1798.1	2148.8	-13.4	11.3	19.6
Canned and processed sea-foods		2014.6	2016.9	2137.5	-2.5	0.1	6.0
Rice		1582.7	1631.7	1855.4	-3.6	3.1	13.7
Iron and steel products		1091.4	1280.9	1690.0	-22.0	17.4	31.9
Chemical products		1015.1	1195.2	1581.4	-18.7	17.7	32.3
Electrical appliances		821.2	1016.0	1557.6	3.3	15.3	23.4
Air-conditioning machine and parts thereof		1160.5	1114.0	1430.9	7.5	-4.0	28.5
Fabrics		919.6	942.4	1349.8	-7.9	2.5	-7.2
Machinery and parts		861.0	939.5	1257.9	7.4	9.1	33.9
Plastic products		860.3	995.4	1238.0	-3.8	15.7	24.4
Electrical appliances and parts thereof		873.6	971.3	1080.4	-3.1	11.2	11.2
Paper, cardboard and paper products		536.6	588.8	1041.1	-4.1	9.7	8.2
Processed oil		1145.1	1044.7	1020.2	-11.6	-8.8	-2.4
Total 20 items		36954.8	39236.6	46754.0	-8.1	6.2	19.2
Others		28228.4	29581.0	33484.4	-4.0	4.8	13.2
Grand total		65183.2	68817.7	80238.4	-6.4	5.6	16.6

Source: The Bangkok Shipowners and Agents Association, BSAA Handbook 2004, p.161.

TABLE 2.8 THAILAND'S TOP 10 IMPORTS MARKETS, 2001-2003

Markets/Year	FOB Value: Millions of US\$			Growth Rate %		
	2001	2002	2003	2001	2002	2003
Japan	13830.7	14803.5	18074.0	-10.1	7.1	22.1
U.S.A.	7159.4	6147.0	7097.3	-2.2	-14.1	15.5
China	3696.0	4897.5	6002.3	9.1	32.5	22.6
Malaysia	3067.3	3618.5	4489.2	-8.7	17.9	24.1
Singapore	2844.2	2886.1	3234.7	-17.0	1.5	12.1
Taiwan	2589.4	2885.6	3195.2	-10.9	11.4	10.7
South Korea	2112.6	2509.1	2888.3	-2.8	18.8	15.1
Germany	2553.7	2443.5	2506.7	30.7	-4.3	2.6
U.A.E.	1525.8	1418.8	2006.4	-14.1	-7.0	41.4
Saudi Arabia	1342.1	1216.6	1680.8	15.2	-9.4	38.2
Total 10	40655.1	42826.2	51175.2	-5.2	5.34	19.5
Others	21074.0	21143.1	23843.5	9.0	1.6	11.4
Grand total	61729.2	64239.2	75018.6	-0.7	4.1	16.8

Source: Department of Trade Negotiation, Ministry of Commerce of Thailand.

2.4 STRUCTURE OF CONTAINER INDUSTRY IN THAILAND

A wider perspective of Thailand's container industry structure is outlined in this section. It includes three main parts: government bodies involved, shipping industry and ports. Thailand's administrative structure is highly centralized. The prime minister is the center of the country's administration and all government agencies report directly to him. Under this system each ministry is comprised of three main parts: the office of the secretary to the minister, office of the permanent secretary, and a number of departments. The economic and social planning of the country follows the recommendations prepared by the National Economic and Social Development Board (NESDB). All ministry and department policies are directed under this national plan, as well as policies for maritime transport and the shipping industry.

2.4.1 THE GOVERNMENT AGENCIES AND MARITIME TRANSPORT

In Thailand, the government bodies involved directly in transportation activities are in the Transportation, Defense and Interior Ministries, with the Ministry of Transportation being responsible for maritime transport. This section will be devoted to exploring the functions and responsibilities of government bodies involved in promoting maritime transport, including department and state enterprises, both in terms of facilities provided and services rendered which effect the performance of the Thai container port industry.

2.4.1.1 DEPARTMENT OF MARITIME TRANSPORT AND COMMERCE

This department supervises both international and domestic waterways in Thailand. It registers and implements technical inspections of ships and barges, provides piloting and navigational assistance within the port's limited area, and dredges channels when necessary. It services both public and private ports but does not operate any port itself. This policy sometimes creates conflict between terminal operators and officers who in charge of servicing vessels, but this is only a technical barrier that can usually be solved quickly.

The Department of Maritime Transport and Commerce is concerned chiefly with maximum port utilization, maintaining approach channels and dredging them when necessary. It is a public department under the supervision of the Ministry of Transportation and pilots all vessels for the loading and unloading of cargo.

Undoubtedly, the activities of this department have been effective in bringing about the port's competitive advantages. Recently, under the government's policy that need to reforms and reorganizes the public organizations for the development of international trade, in part, led to the improvement of services rendered by the Department of Maritime Transport and Commerce.

2.4.1.2 OFFICE OF THE MERCANTILE MARINE PROMOTION COMMISSION (MMPC)

This department was established under the recommendation of the NESDB, to promote the Thai maritime transport industry, the department is responsible for the study, analysis and research being under taken for the development of new policy. It is also acting as the research's center of maritime transport for the government agents, state enterprises, private sectors and international agencies involved in maritime business. The academic activities of this department are necessary for improving the quality of shipping and ports services. The MMPC is involved in information's distribution and promotion in the mercantile maritime business. But it has no authority in regulating any government bodies.

2.4.1.3 THE PORT AUTHORITY OF THAILAND (PAT)

The Port Authority of Thailand Act was acted in B.E. 2494 (A.D. 1951) and received its status as a state enterprise under the supervision of the Ministry of Transportation. The main purpose, in the early days, was to administer and operates the Klongtoey wharf. In the present day, this administration extends ports in Laem Chabang, Ranong, the river port in Chiang Saen.

As an autonomous body, PAT provides facilities for public ports, but in the case of Bangkok Port however it also provides operations personnel. In Laem Chabang, private owned terminals, and this landlord policy has made Laem Chabang more favorable for shipping lines.

PAT is controlled by many of government bodies involving the policy and budget (Ministry of Transport, Ministry of Finance, the Budget Bureau and NESDB), and there are many rules and regulations, which inevitably lead to the long process of the manipulation of cargo traffic. This is, in part, discouraged the competitive advantages of port operations in Thailand.

2.4.1.4 THE EXPRESS TRANSPORT ORGANIZATION (ETO)

This is another state enterprise that has an influence on the mode of road of cargo transit in Thailand. The organization is also under the supervision of the Ministry of Transportation. It services both domestic and international cargo delivery of parcels, carloads, bulk and other forms of packing. In consideration of its market shares for the road mode of transportation, ETO has shared major proportions of freight traffic compare to private haulage companies due to the policy of the government. Shipping companies must deal with ETO in transporting cargo between a port and the sites of production.

2.4.2 THAILAND'S INTERNATIONAL SHIPPING INDUSTRY

This section focuses on international container shipping because it has the greatest effect on Thai international trade and the overall GDP. Thailand's international shipping has been influenced by foreign shipping companies, due to the inadequate support from the government in promoting and encouraging the development of the Thai flag fleet. Private companies have considered being risk in investment of shipping industry. The Thai international container shipping sectors can be classified into two groups as follows:

- (i) Tramp shipping mainly uses private berths along the Chao Praya River. This sector is used mainly for transporting agricultural dry bulk products for exporting. While private container terminals are serviced for import container freights.
- (ii) Liner shipping mainly uses the Bangkok port, and Laem Chabang port. This sector is for importing and exporting containerized and general cargoes.

In Thailand, seaborne transporters usually use tramp services to carry dry bulk cargo such as ore and grain, while liner services are used to transport other commodities. Non-conference liner services are used more often than conference services because

conference vessels transport their cargoes to Thai ports and then transfer them to feeder services in Singapore, Hong Kong, and Taiwan.²²

Outstandingly, containerized cargoes and vessels have become more importance to Thai international shipping. However, the import of crude oil, which is the major products due to the unlimited demand of the country, has to be excluded because of the extreme difference in products shipping. Table 2.9 and 2.10 show the distribution of imports and exports by vessel types and national flag. It is illustrated the more importance of container ships in relation to other types of vessels in terms of volume carrying, with exception of crude carrier. This indicator has evidently confirmed the higher impact of container market to Thai international trade.

TABLE 2.9 DISTRIBUTION OF IMPORTS AND EXPORTS OF CARGOES BY VESSEL NATIONALITIES AND TYPE OF SERVICES

(Unit : Ton)

Vessel Nationality and Type	Import Volume			Export Volume		
	1995	1996	1997	1995	1996	1997
Thai Fleet	4,937,606	5,601,196	5,898,951	4,971,990	6,716,122	6,213,659
Liner-Conference	732,674	804,356	571,244	843,887	552,304	645,504
Liner-Non-conference	2,010,876	2,051,838	1,735,290	1,986,728	2,557,197	2,184,746
Tramp	1,891,479	1,990,747	1,600,180	2,095,631	2,902,074	2,292,682
Others	302,577	754,255	1,922,237	45,744	704,547	1,090,727
	53,552,427	62,477,646	61,075,881	2,888,987	31,557,323	35,272,072
Foreign Fleet						
Liner-Conference	2,494,000	2,273,957	2,428,275	1,546,607	1,548,799	2,273,969
Liner-Non-conference	12,636,467	15,919,310	1,165,805	11,829,812	12,451,717	14,180,811
Tramp	38,124,160	43,462,052	46,849,633	15,162,106	17,324,548	18,549,731
Others	297,800	822,327	139,968	350,462	232,259	267,561
Total	58,490,033	68,078,842	66,974,832	33,860,977	38,309,445	41,485,731

Source: Department of Maritime Transport and Commerce of Thailand.

²² Office of the Mercantile Marine Promotion Commission, Study Report 2000, 2000, pp.5-7.

According to the Transportation Master Plan 1999 – 2006, prepared by the Thailand Development Research Institute Foundation (TDRI) and submitted to the Ministry of Transport in January 1999, an adjustment by MMPC, has forecasted that Thai seaborne trade will have an average increase volume of 1.65 percent per annum during the 8th NESDP and more than 3 percent per year increases are expected during the 9th, 10th, and 11th NESDPS.²³

TABLE 2.10 THAI IMPORT AND EXPORT VOLUMES OF DISTRIBUTION
BY VESSEL TYPE AND FLAG

(Unit : Ton)

Type of Vessel	Import Volume			Export Volume		
	1995	1996	1997	1995	1996	1997
Thai Fleet	4,937,606	5,601,198	5,898,951	4,971,990	6,716,122	6,213,659
Crude carrier	1,187,700	1,399,155	1,885,998	180,205	1,150,855	1,125,847
Container ship	1,346,758	1,580,970	1,360,783	1,832,697	2,084,526	2,030,472
Bulk carrier	1,180,925	1,343,047	1,358,710	1,359,467	1,999,395	1,878,550
Semi-container ship	252,768	235,457	162,500	290,902	189,117	111,209
Ro-Ro	-	-	-	-	-	-
Conventional ship	955,753	1,034,351	1,120,241	1,308,719	1,292,169	2,264,472
Others	13,702	8,216	10,719	-	60	13,202
Foreign Fleet	53,552,427	62,477,646	61,075,881	28,888,987	31,593,323	35,272,072
Crude carrier	27,164,253	32,874,739	31,630,117	1,786,235	3,879,399	5,363,251
Container ship	6,003,224	7,860,254	7,399,535	5,714,407	5,677,608	6,770,037
Bulk carrier	7,789,804	7,053,297	7,343,145	9,336,862	9,049,463	10,033,235
Semi-container ship	751,668	836,529	2,606,494	878,518	1,338,897	1,719,954
Ro-Ro	212,218	252,959	213,226	67,769	81,718	123,195
Conventional ship	11,050,147	13,088,451	11,421,920	10,576,694	10,576,694	10,923,373
Others	581,113	511,417	461,444	528,502	624,865	642,865

²³ Office of the Mercantile Marine Promotion Commission, op. cit., p.3.

Total Thai +						
Foreign	58,490,033	68,078,842	66,974,832	33,860,977	38,309,445	41,485,731

Source: Recompiled from Office of the Maritime Promotion Commission of Thailand.

Table 2.11 demonstrates the relative significance of containerized cargo increasing in a specified national plan in terms of volume.

TABLE 2.11 FORECAST OF THAI SEABORNE TRADE IN CARGO TYPE AND VOLUME

(Unit : Million Ton)

Type of Cargo	National Economic and Social Development Plan				
	1997	2001	2006	2011	2016
Import Cargo					
Containerized Cargo	11.47	8.06	10.30	13.53	17.38
Crude Oil	34.27	40.73	43.21	54.26	68.45
Bulk Cargo	8.76	9.92	17.16	20.55	27.47
Break Bulk Cargo	13.22	16.09	20.86	22.89	23.25
Total Import Volume	66.97	74.80	91.53	111.23	136.55
Growth Rate (%)	0	2.80	4.0	4.0	4.0
Export Cargo					
Containerized Cargo	13.74	10.59	13.52	17.75	22.79
Crude Oil	6.49	2.63	2.39	2.33	2.18
Bulk Cargo	8.80	13.72	15.83	17.93	18.35
Break Bulk Cargo	12.45	14.08	15.60	11.88	10.86
Total Import Volume	41.48	41.02	44.64	49.89	54.18
Growth Rate (%)	0	-0.29	1.57	2.25	1.66
Total Import + Export					
	108.46	115.82	135.87	161.12	190.73
Growth Rate (%)	0	1.65	3.25	3.46	3.43

Source: Reproduced from the study report of TDRI, 2003.

2.4.2.1 THAI MERCHANT FLEET

This part is focused on Thai merchant fleet market. Thailand merchant fleet in 1996 was relatively lower than other countries in Southeast Asia. In term of capacity, the national merchant fleet is ranked the fifth in the region (see Table 2.12).

TABLE 2.12 PROPORTION OF MERCHANT FLEET IN ASEAN REGION, 1996

Country	Total Capacity (Million DWT.)					
	Total	Tankers	Dry Bulk Ships	Container Ships	General Cargo Vessels	Others
Singapore	25.722	11.839	7.863	2.642	2.196	1.180
Philippines	13.902	0.258	11.077	0.221	2.075	0.271
Malaysia	6.132	1.025	2.268	0.491	0.981	1.368
Indonesia	3.851	1.374	0.344	0.080	1.718	0.337
Thailand	2.303	0.263	0.871	0.296	0.850	0.023
Vietnam	1.201	0.034	0.106	-	0.682	0.378
Brunei	0.352	-	-	-	0.004	0.348

Source: Reproduced from the Review of Maritime Transport 1997, reports by UNCTAD Secretariat.

Thailand's economic growth during 1989 to 1997, were depend on international trade, for around 80 percent of GDP, with less extent foreign owned vessels carried out these figures. Even though it is normal to depend on foreign owned vessels for trading internationally, in case of Thailand it seem to be too high.

This dependency has a considerable impact on national security and economic stability. The Thai merchant fleet had increased its share of Thailand's international trade by 8 percent in 1989 to 11 percent in 1997, and its share of freight charges from 7 percent in 1989 to 9 percent in 1997 (see Table 2.13).

TABLE 2.13 SHARE OF SEABORNE TRADE OF THAI VESSELS, 1989 – 1997

Year	Thai Seaborne Trade (Thousand Tones)	Total Freight Charge (Million Baht)	Shares of Thai Vessels		Shares of Freight on Seaborne Trade	
			(1,000 Tones)	Percentage	(Million Baht)	Percentage
1989	64,586	73,667	5,261	8.1	5,156	7.0
1990	69,427	89,319	6,665	9.6	6,877	7.7
1991	75,351	102,940	7,224	9.6	7,926	7.7
1992	84,011	112,930	7,981	9.5	8,695	7.7
1993	84,773	126,994	8,051	9.5	9,651	7.6
1994	77,582	144,927	8,622	11.1	11,304	7.8
1995	92,351	161,640	9,909	10.7	13,524	8.4
1996	106,388	193,865	12,317	11.6	17,517	9.0
1997	108,460	209,751	12,113	11.2	18,288	8.8

Source: Office of the Mercantile Marine Promotion Commission, Maritime Information News 1989 – 1997.

2.5 PORT INDUSTRY OF THAILAND

Port industry in Thailand plays important roles as other maritime countries. Presently, both river ports and deep-sea ports in Thailand have changed significantly in relation to be a channel to facilitate strong and firm economic system. They have provided diversity of services e.g. the node of cargo transfer as origin and destination, consolidation and distribution center of cargo to and from oversea and hinterland etc.

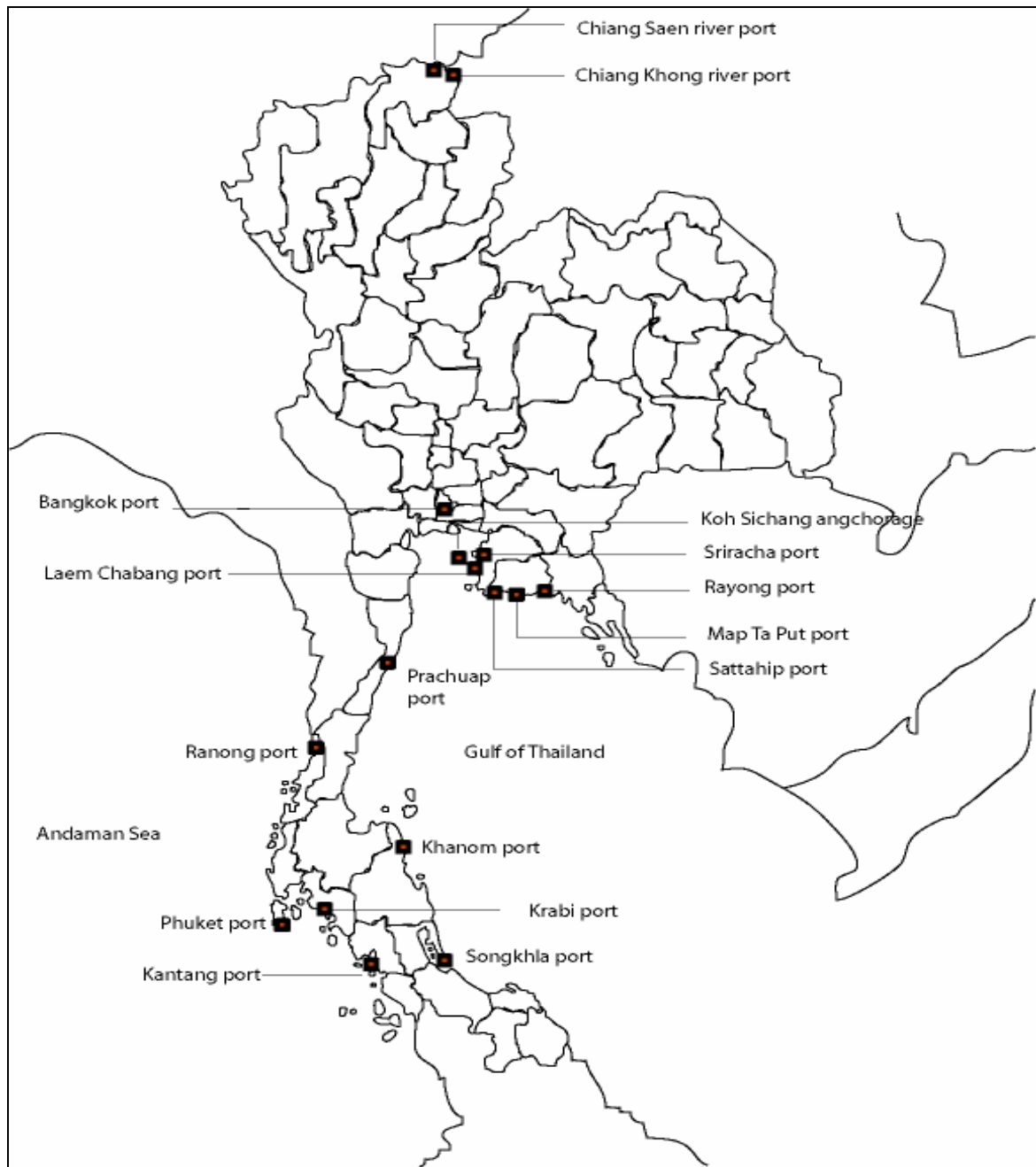
According to the Mercantile Marine Promotion Commission (MMPC), that approximately 90 percent of total international trade of Thailand has been handled by

the country's ports.²⁴ Ports also influence the competitiveness of Thai exports and the costs of imports as well. As ports in Thailand have contributed to the economic growth of the nation in majority of proportion of GDP. Hence, next section is devoted to explore the present situation of Thailand port industry.

2.5.1 PRESENT SITUATION OF THAILAND'S PORTS

Thailand's ports are composed of both public ports and private ports. However, private ports are mainly serving their own cargoes. Following section will present detail of both public and private ports. Figure 2.4 illustrates the map of locations and names of country's ports.

²⁴ Office of the Mercantile Marine Promotion Commission, op. cit., p.8.



Source: Produced by the Author

FIGURE 2.4 MAP OF THAILAND'S PORTS OF LOCATIONS

2.5.1.1 PUBLIC PORTS

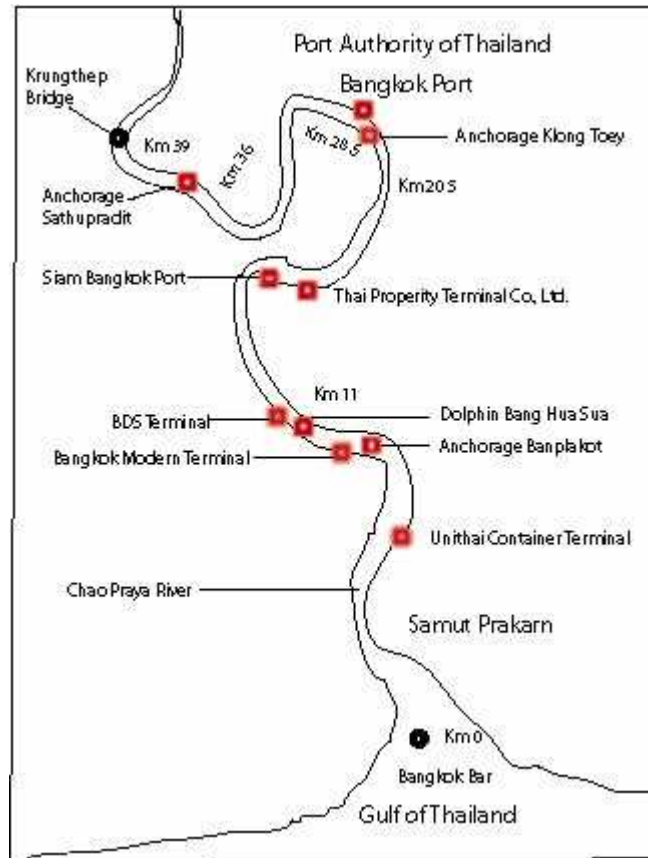
Public ports in Thailand are under administrations of the Port Authority of Thailand (PAT) and the Department of Maritime Transport and Commerce (DMTC). These two organizations are government agencies under supervision of Ministry of Transportation. The management of the majority of Thai public ports falls under the DMTC responsibility, except the two main ports of Bangkok and Laem Chabang

ports. The Board of Port Commissioners is responsible in determining administrative and operative policies. PAT takes responsibility in managing both Bangkok Port and Laem Chabang port, but Laem Chabang's terminal operations are awarded to private operators, like a land lord system. Other small public ports are Songkhla, Phuket, Ranong, and Maptiput. Three of them, except Maptaput, fall under direction of DMTC and have been awarded to the private sector in operations.

The Industrial Estates Authority of Thailand (IEAT) is the landlord of Maptaput port, but it has been awarded to private sector as well. Since Bangkok and Laem Chabang ports are two of the most importance ports that have much influence to Thai economic, next section will focus on these two ports, followed by the other three ports.

2.5.1.1.1 BANGKOK PORT

It is the first port established for the purpose of international trade in Thailand and wad constructed under government budgets (see Figure 2.5). It provides very limited services for bulk cargo and general cargo for only inbound leg. The whole outbound leg is containerized cargo.



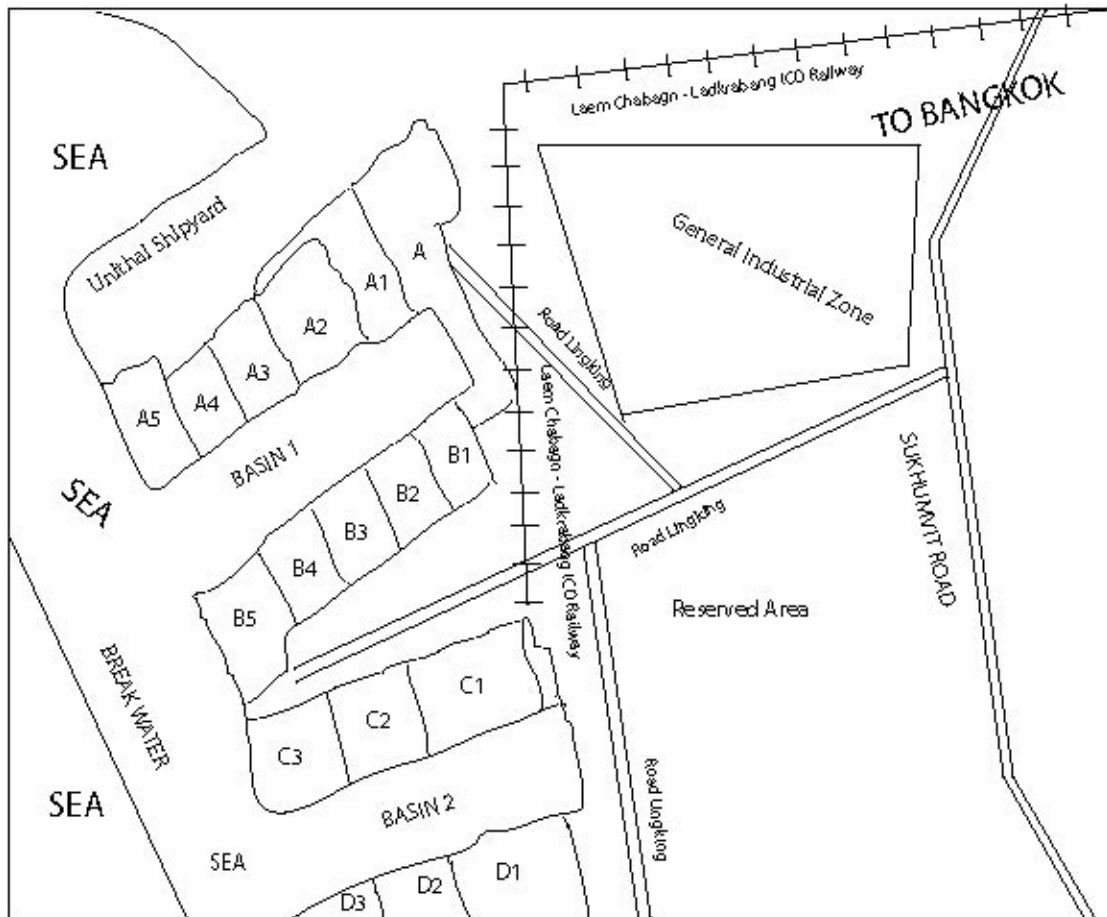
Source: Modified from The Bangkok Shipowners and Agents Association, BSAA Handbook 2004, p.41.

FIGURE 2.5 MAP OF CHAO PRAYA RIVER PORTS

The estuary approach to the port is through the 18 kilometers long the Chao Praya River, with bar channel of 150 meters wide in the reaches and 250 meters in the bends. So, piloting is compulsory. Dredging maintenance is required continuously to maintain channel depth. It is the government policy to develop another principal port of the country outside Bangkok to avoid traffic problem, therefore, the containerized cargo passed through Bangkok port has been limited to the maximum of 600,000 TEUs per year.

2.5.1.1.2 LAEM CHABANG PORT

Laem Chabang port started its operation in 1991. Presently, terminal services are comprised of six container terminals, two dry-bulk, one multipurpose, and one coastal vessel terminal. The approach channel of navigation to the port and berthing area provide 14 meters of a draft (see Figure 2.6).



Source: Modified from <http://www.lcb.pat.or.th/main/map.html>

Note: A refers to coastal vessels & ancillary services

A1 refers to coastal vessel terminal

A2 refers to Multi-purpose terminal

A3 refers to general cargo terminal

A4, A5 refers to Dry bulk cargo terminal

B1-B5 refers to containerized cargo terminals

C3 refers to containerized cargo terminal

C1, C2, and D1-D3 are for future extension.

FIGURE 2.6 MAP OF LAEM CHABANG PORT

Nowadays, Laem Chabang port has become the principal container port of the country. It is the most modernized and the highest technology of infrastructures and superstructures in container handling equipment by the support of Thai government. It is very competitive for this port in terms of containerized cargo volume, which has been increased continuously over the past several years.

2.5.1.1.3 MAPTAPUT PORT

This port provides an approach channel depth of 12.5 meters. Currently, there are four berths for liquid cargo, one multipurpose berth, and one dry bulk berth. The main purpose of the port is to serve the industrial plants and petrochemical industry in Maptaput area.

2.5.1.1.4 SONGKHLA PORT

It was established in 1988 by the Thai government budget. The operation has been awarded to the private sector. But it is under supervision of DMTC. It provides a channel depth of 9 meters. Currently, this port has three berths in service and allow for vessels with less than 8.5 meters draft. However, this port is experienced in a small proportion of cargo traffic.

2.5.1.1.5 PHUKET AND RANONG PORT

Phuket port is located in Phuket province on the Andaman Sea coast in the Southern Thailand. It provides berthing for vessels of draft less than 8.5 metres. It services a multipurpose berth, but is mainly utilized by the cruise ship. Ranong port is the latest seaport on the Andaman Sea Coastline. It is located in Ranong province and still less effective in cargo transportation.

2.5.1.2 PRIVATE PORTS

All of the private ports are operated under the supervision and monitoring of the Ministry of Transportation through DMTC. The important private ports are as follows.

2.5.1.2.1 PRIVATE WHARVES ALONG THE CHAO PRAYA RIVER

This group of wharves is comprised of 55 dry cargo berths, 17 liquid cargo berths, and 5 containerized cargo berths with the total length of approximately 7.7 kilometres. They are located upstream of Bangkok Port and have 6.8 metres draft (7,000 DWT) and those are located downstream have 9 metres draft (15,000 DWT).

2.5.1.2.2 PRIVATE PORTS AT SRIRACHA

This group is mainly located at Sriracha and Rayong. Sriracha is located on the main coastline immediately to the north of Laem Chabang and is the main oil wharves of the country.

The Sriracha wharves are comprised of 22 berths, of which 13 are jetties and 4 are buoys for liquid cargo capable of receiving VLCC. The dry cargo wharves are comprised of four berths for 60,000 DWT vessels.

The Rayong wharves are comprised of one single point mooring capable of receiving VLCC and one dry bulk berth for 100,000 DWT vessels.

Koh Sichang Anchorages area is located east and adjacent to the island of Koh Sichang, and comprised of some 50 anchorages and a number of floating pontoons. They functions as a transshipment facility handling mainly dry bulk and general cargo.

2.6 THE PROJECTION OF CONTAINER PORT SERVICE DEMAND IN THAILAND

According to MMPC the future main general cargo and containerized cargo throughput volumes of ports are forecasted as follows Bangkok port and private wharves providing feeder services to the transshipment at Singapore and Hong Kong ports, as well as for the short routes in the Asian region.²⁵ Laem Chabang port capacity will be higher than demand of the country from 14.4 million tones and will be increased to 24.3, 34.8, and 25.9 million tones in 2006, 2011, and 2016 respectively. This anticipated figure raises the problem of how container terminals in Thailand can attract the volume of containerized cargo to closely match the capacity of facilities that will be provided. Two key containers users, shipping lines and shippers, are the customers which PAT has to pay attention in convincing them satisfied with their expectation. Then, they would make sound return economic. This thesis is aimed to explore and examine the key factors which would contribute to the competitive advantage of container ports in Thailand.

As Laem Chabang has been evidently promoted by the Thai government, hence, it become the principal container port for handling containerized cargo of the exporting and importing of the country. Laem Chabng port is very modern up to the international standards as well as efficiency in the linkage of the transport system in connection with the Lad Krabang ICD, which acts as an inland container depot of Laem Chabang port. Laem Chabang port's has been developed to increase containerized cargo volume to reach the demand of main liners to call directly.

As a consequence, the main liner alliances have been calling at Laem Chabang port e.g. the Global Alliance of Tran-Pacific route calling twice a week, the Grand Alliance one a week and the Cosco Container Lines once a week, and on the Trans-Atlantic, the Grand Alliance calling once a week.

²⁵ Office of the Mercantile Marine Promotion Commission, op. cit., p.21.

2.7 SUMMARY

International trade is extremely important for Thailand's economic growth and stability. Statistical records of Thailand trade in goods and services have shown the major role of sea transportation in the movement of cargo, and therefore the role of the port as a gateway for the nation's trade is very significant.

To promote an export-oriented system, the Thai government has created policies and regulations to give the industrial sector a boost. This has led to increase in the volume of manufactured products, affecting the capacity and efficiency of container terminals and increasing demands on the Port Authority of Thailand. Hence, a sound organizational structure leading to efficient services and economic returns is needed in the Port Authority of Thailand and throughout the network of container terminals. The next chapter focuses on the organizational structure of sea transport in Thailand.

In summary, the maritime transport activities in Thailand have been directed and controlled by government bodies. However, in recent years this pattern of management has been changed considerably. For the main ports of the country, especially Laem Chabang port, the government through PAT has launched and implemented policies to increase performance and efficiency. Specifically, the service operations of Laem Chabang terminals have been awarded to private sectors in a long period of concession. This has evidently led to the higher performance efficiency of handling services for port users. Additionally, Laem Chabang port as the principal container port of the country, it needs to measure key criteria of competitive advantages from the attitudes of port users, shipping lines and shippers, to ascertain the perceptions that have directly involvement. Therefore, next chapter studies the competitive advantages in business both theoretical and alternative approached. The measurement of these advantages is also explored.

CHAPTER THREE

THEORETICAL AND ALTERNATIVE APPROACHES TO COMPETITIVE MEASUREMENT OF CONTAINER PORTS

3.1 INTRODUCTION

In an era of modern international competition, modern container ports have to compete by adopting a global strategy in which it can be contributed to higher returns of all parties involved, i.e. maximize the sum of producers and consumers' surpluses.

Furthermore, customer satisfaction has to be achieved because it “represents the customer’s overall assessment of all elements of service activities rendered by”.²⁶

This chapter focuses on the theoretical approach to the measurement of a container port’s competitive advantages in exploring the influential factors of competitiveness on the performance of container terminal services.

This chapter, therefore, clarifies the approaches of the competitive advantage measurement of container terminal services for the containerized cargo traffic passing through as origin or destination point. To prove the requirement of competitive advantage measurement of this thesis, the process was divided into two steps. The first is to frame the conceptual approach, followed by adopting relevant.

3.2 COMPETITIVE ADVANTAGE STRATEGY FORMULATION

²⁶ D.M. Lambert, J.R. Stock and L.M. Ellram, Fundamental of Logistics Management, (New York: Irwin/McGraw-Hill, 1998), p.41.

In formulating the strategy of the firm in any industry, competitive advantage is significant. Pearce and Robinson proposes the process of making the best strategy into three ingredients as follows:²⁷

(1) The strategy must be consistent with conditions in the competitive environment. Also, it must take advantage of existing or projected opportunities and minimize the impact of major threats.

(2) The strategy must place realistic requirements on the firm's resources. In other words, the firm's pursuit of market opportunities must be based not only on the existence of external opportunities but also on competitive advantages that arise from the firm's key resources.

(3) The strategy must be carefully executed.

Competitive advantage is the product of at least one of the following: superior efficiency, superior quality, superior innovation, or superior customer responsiveness. They are the generic building blocks of competitive advantage. Achieving superiority requires an organization to develop appropriate competence, which in turn is a product of the kind of resources and capabilities that a company possesses.

Porter's framework, well known as the five forces model, focused on five forces that shape competition within an industry. Porter argues that the stronger each of these forces is, the more limited is the ability of established companies to raise prices and earn greater profits. A strong competitive force can be regarded as an external threat since it depresses profits. A weak competitive force can be seen as an external opportunity, for it allows a company to earn greater profits. But the analysis of industries cannot be undertaken in isolation. Industries are embedded in a wider macro environment, which comprises the technological, social and demographic, ecological, political and legal and broader macro-economic environment.²⁸

²⁷ J.A. Pearce II and R.B. Robinson, Formulation, Implementation, and Control of Competitive Strategy, (New York: McGraw-Hill/Irwin, 2005), p.148.

²⁸ I. Brookes and J. Weatherston, The Business Environment Challenges and Changes, (London: Prentice Hall, 1997).

Changes in the macro-environment can have a direct impact on the five forces in Porter's model. In relating to the external environments the independent variables were subdivided into potential exogenous growth barriers (threats) and potential exogenous growth drivers (opportunities). The selection of variables for both groups was influenced by the Porter's five forces model and the wider macro-environmental view.

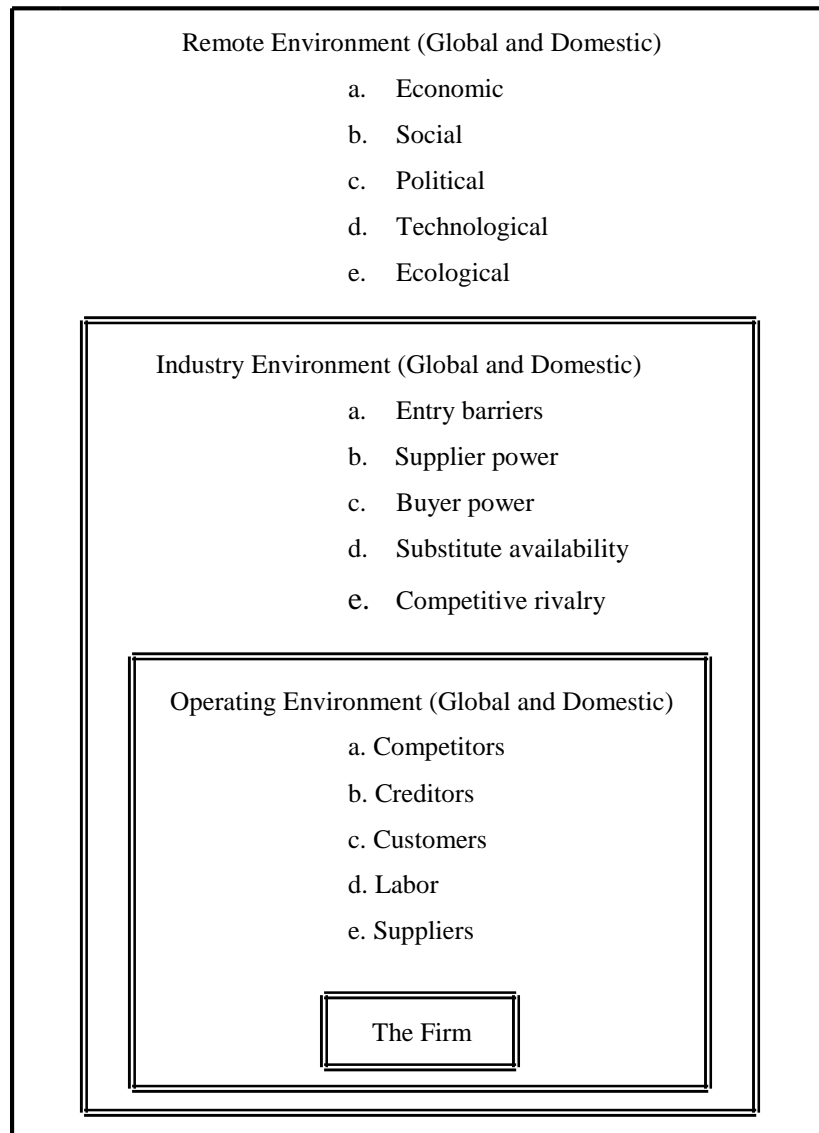
These theories establish the group of variables as important factors influencing business success. According to Pearce and Robinson, they propose the notion of external environment with which influence a firm's choice of direction and action and, ultimately, it's organizational structure and internal process.²⁹

The external environment is classified into three interrelated subcategories: the factors of remote, industry, and operating environment (see Figure 3.1). This notion is useful to the study of this research that needs to determine the situation of port industry external environment in all subcategories. As a consequence, the result of the external environment analysis could become a set of analyzed data to further progress in the section of principal factors analysis.

In terms of internal environments, for formulating effective strategy, the internal analysis is the important second stage to implement deliberately. Presently, the internal analysis has received attention as being a critical underpinning to effective strategic management. In regard to Pearce and Robinson, the recent existing approaches of internal analysis utilized by most industry are those of the resource-based view (RBV), the value chain, and SWOT analysis.³⁰ Briefly, some details are described. The variables that influence the long-term business success were categorized into six areas including: resources, capabilities, quality, efficiency, customer responsiveness, and innovation.

²⁹ J.A. Pearce II and R.B. Robinson, op. cit., p.78.

³⁰ J.A. Pearce II and R.B. Robinson, op. cit., pp.153-168.



Source: Reproduced from J.A. Pearce II and R.B. Robinson, Formulation, Implementation, and Control of Competitive Strategy, (New York: McGraw-Hill/Irwin, 2005), p.78.

FIGURE 3.1 EXTERNAL ENVIRONMENTS OF THE FIRM

There are basically four approaches to competitive strategy formulation in the literature: resource-based strategy, activity-based strategy, and model-based approach, and the concept of SWOT analysis. The following sections describe in detail on the approaches

3.2.1. RESOURCE-BASED VIEW (RBV)

The resource-based concept proposes the notion of three basic types of resources. These resources create distinctive competencies of the firm ultimately. They are tangible assets, intangible assets, and organizational capabilities. By the set of these resources, in order to getting valuable internal analyzing, management has to determine which of those resources represent strengths or weaknesses. Without the appropriate resources, the company may not be able to create a distinctive competency.

The variables contributing to the resource-based view were “acquisition of venture capital, equity capital situation, trademark/label, and image. Mahoney and Pandian convincingly argue that the resource-based approach incorporated concepts from the mainstream strategy view.³¹

They observed that distinctive competencies, as defined by Andrews, Ansoff and Selznick, are a fundamental component of the resource-based view.³² They also claim that the resource-based approach can be considered a fifth branch of the organizational economics tree of knowledge along with positive agency theory (Eisenhardt, 1989), property rights (Alchian, 1984), transaction cost economics (Williamson, 1985) and evolutionary economics (Nelson and Winter, 1982).³³

Collis, on the other hand, critically examines the contribution of the resource-based view of the firm to global competition in particular and to strategic management in

³¹ J.T. Mahoney and J.R. Panadian, “The resource-based view within the conservation of strategic management”, *Strategic Management Journal*, Vol. 13, 1992, pp.363-380.

³² K.R. Andrew, *The concept of Corporate Strategy*, (Dow Hones-Irwin, Homewood, IL, 1971); H.I. Ansoff, *Corporate strategy: An Analytical Approach to Business Policy for Growth and Expansion*, (New York, McGraw-Hill: 1965); P. Selznick, *Leadership in Administration*, (New York: Harper & Row, 1957).

³³ K.M. Eisenhardt, “Agency theory: An assessment and review”, *Academy of Management Review*, Vol. 14, 1989, pp.57-74; A.A. Alchian, “Specificity, Specialization, and Coalitions”, *Journal of Institution and Theoretical Economics*, Vol. 140, 1984, pp.34-49; O.E. Williamson, *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, (New York: Free Press, 1985); R. Nelson and R. Winter, *An Evolutionary Theory of Economic Change*, (Cambridge: MA, Belknap Press, 1982).

general. Through a detailed field-based case study of three firms in the worldwide bearings industry, he concludes that the resource-based view of the firm complements economic analysis and that both are essential to a complete understanding of global strategy.³⁴

The resource-based approach is a recently articulated theory that is still under development. Its origin dated to the seminal paper by Wernerfelt.³⁵ His review is based mainly on Mahoney and Panadian and Peteraf who provide extensive bibliographies.³⁶ The connections between RBV and closely related disciplines, such as organization economics or the theory of industrial organizations, are well developed by Conner and Mahoney and Panadian.³⁷ The remarkability of this approach is that its explicit treatment of the role of resources in strategy formation.

According to the resource-based approach, a firm's sustainable competitive advantage depends heavily on its resources and how they are used. In particular, the theory assumes that superior firms possess heterogeneous resources that differentiate it from other firms and allow it to earn rents; that is, the average and even marginal costs of their products are below, perhaps significantly below the market prices they receive. The rents may be converted to sustainable profits if forces exist which limit competition for critical resources, once the industry has recognized their value. Two factors limiting competition are *imperfect imitability* and *imperfect substitutability* of heterogeneous resources.

Such factors exist when there are barriers due to patents, contracts, learning effects, or market preferences that make imitation and substitution by other firms difficult or

³⁴ D.J. Collis, "A resource-based analysis of global competition: the case of the bearing industry", Strategic Management Journal, Vol. 12 (summer), 1991, pp.49-68.

³⁵ B. Wernerfelt, "A resource-based view of the firm", Strategic Management Journal, Vol. 5, 1984, pp.171-180.

³⁶ J.T. Mahoney and J.R. Panadian, op. cit., 1992; M.A. Peteraf, "The cornerstones of competitive advantage: a resource-based view", Strategic Management Journal, Vol. 14, 1993, pp.179-191.

³⁷ K.R. Conner, "A historical comparison of resource-based theory and five schools of thought within industrial organization economics: do we have a new theory of the firm", Journal of Management, Vol. 17, 1991, pp.121-151; J.T. Mahoney and J.R. Panadian, op. cit., 1992.

impossible. Moreover, critical resources of the superior firm will be perfectly immobile. Which means they are idiosyncratic and have no use in other firms, or imperfectly mobile, they can be traded but have higher value within the firm.

Finally, the theory stated that a firm can establish heterogeneous new resources only if there are limits to competition prior to efforts on the part of the firm to create them. Otherwise, the rents that the superior firm can realize will be dissipated by excessive costs of initial competition.

In reviewing connections between the resource-based method and other research on strategy, Mahoney and Panadian discuss four types of rents accruing to the superior firms.³⁸ Ownership of scarce resources such as valuable land, production facilities near markets, or patents lead to *Ricardian rents*.

As the result of collusion or government protection, the firm may achieve monopoly rents. Firms that undertake risky and entrepreneurial ventures in an environment characterized by significant uncertainty or complexity may realize *Schumpeterian*, or entrepreneurial rents. Firms with idiosyncratic resources that are scarce, but less scarce and less sustainable than Ricardian resources, may receive quasi-rents.

Dierickx and Cool address the issue of sustainability, which they suggest is linked to characteristics of the stock asset (heterogeneous resource) accumulation process. They identify six phenomena affecting the efficacy of such processes.³⁹

Inefficiencies associated with attempting to create and exploit heterogeneous resources too quickly are called *time compression diseconomies*. The phenomena of success breeding success in competitive endeavors leads to *asset mass efficiencies*: they are akin to barriers to entry for late entrants in a market.

³⁸ J.T. Mahoney and J.R. Panadian, op. cit., 1992.

³⁹ I. Dierickx and K. Cool, "Asset stock accumulation and sustainability of competitive advantage", *Management Science*, Vol. 35, 1989, pp.1504-1511.

When creation of a valuable asset does not necessarily lead to competitive advantage because complementary assets are absent, the firm has failed to recognize the *interconnectedness of stock assets*. A loss of competitive advantage through deterioration of heterogeneous resources is called *asset erosion*.

Finally, causal ambiguity refers to the uncertainties and discontinuities associated with a successful effort in creating a heterogeneous resource. If the causes of initial success are difficult to identify, the firm may be hard to pressed to sustain the ensuring advantage, or to repeat the success. The concept of a firm's core competencies is an important idea linked to RBV (Prahalad and Hamel).⁴⁰ Core competencies refer to those heterogeneous resources that provide the superior firm with sustainable competitive advantage.

3.2.2 VALUE CHAIN VIEW (VCA)

The activity-based view of the firm is mostly due to Porter.⁴¹ According to Porter, the sources of competitive advantage mainly center on activities, because a firm is basically a collection of interrelated economic activities of different sorts. In essence, therefore, a firm's strategy defines its configuration of activities and how they interrelate.

The basic unit of competitive advantage is then an activity, and it is activities that determine relative cost, buyer value, and hence differentiation. Porter arrays the activity in a firm in what he terms the value chain and value system, where the term value refers to customer value, from which, the potential profit ultimately derives. In this context, a firm's strategy is manifested in the way in which it configures and links the many activities in its value chain relative to competitors. Porter claims that the resource-based view of the firm cannot be an alternative theory of strategy, because strategy cannot be separated from the cross-sectional determinants of competitive

⁴⁰ C.K. Prahalad and G. Hamel, "The core competence of the corporation", Harvard Business Review, May-June, 1990, pp.79-91.

⁴¹ M. Porter, Comparative strategy: techniques for analyzing industries and competitors, (New York: Free Press, 1980); M. Porter, The Competitive Advantage of Nations, (New York: Free Press, 1991).

advantage and from the conception of a firm as a collection of activities. Furthermore, he states that resources are not valuable by themselves, but because they allow firms to perform activities that create advantages in particular markets. For him, resources and activities are, in a sense, duals of each other. These statements suggest that it should be possible to establish an explicit link between resources and activities. The term of value chain describes a way of looking at a business as a chain of activities that transform inputs into outputs that customer's value.⁴²

Consequently, when this notion is applied to use in internal analysis of business organization, it is an approach that attempts to understand how a business creates customer value by examining the contributions of different activities within the business to that value. It disaggregates the business into sets of activities that occur within the business. The set of activities started with the inputs a firm receives and finishes with the firm's products or services and after-sales service to customers.

In other words, VCA attempts to look at its costs across the series of activities the business performs to determine where low-cost advantages or cost disadvantages exist. Furthermore, involving this approach the concept of value added is applied in studies on various ports.

According to Haezendonck and Winkelmans that "in general terms, the value added concept always aims at assessing the contribution of port activities to a nation's Gross Domestic Product".⁴³

Also, in relating to C. Johnson and F. Wood that "value added is important to all participants in the supply chain. They must convincingly demonstrate that their contribution adds value to the entire process and that this value exceeds whatever their contribution costs".⁴⁴

⁴² M. Porter, op. cit., 1991.

⁴³ E. Haezendonck and W. Winklemans, "The Strategic positioning as an instrument for competition analysis", in Port Competitiveness; an economic and legal analysis of the factors determining the competitiveness of seaports, (Antwerp: De Boeck Ltd., 2000), p.22.

⁴⁴ J.C. Johnson and D.F. Wood, Contemporary Logistics, (New Jersey: Prentice-Hall Inc., 1996), p.48.

Oral and His associates are among the first to systematically conduct competitive analysis using model-based approach. For example, Oral and Dominique examine competitive strategy formulation with respect to manufacturing-market interface and explicitly take into account the context of the firm and the environment in which it operates. They propose an analytical framework, which can be used to study how a firm perceives the opportunities and threats in its environment and attempt to optimize its objectives subject to internal and external constraints.⁴⁵

Oral (1993) extends the developments in Oral and Dominique (1989). In his paper, Oral proposed a model to measure the level of industrial competitiveness, and also describes its phase-by-phase implementation in a large glass making company. The competitiveness level of the firm is expressed as a function of two major factors: industrial mastery and cost superiority.⁴⁶

Industrial mastery is the indicator of a firm's success compared to its competitors in terms of generating and managing capital and operational resources. Cost superiority, on the other hand, is the indicator of a firm's input usage rated and input costs.

Studies on competitive analysis where the unit of analysis is the operating unit- i.e. plant or service center- are relatively rare in the literature. There is a body of practitioner literature on competitive benchmarking which provides normative guidelines for identifying performance gaps between plants, and identifying practices necessary to be at par with, or, outperform one's competitors.⁴⁷

⁴⁵ M. Oral and C-R. Dominique, "An analytical approach to competitive strategy formulation", IIIE transactions, Vol. 29/3, 1989, pp.271-278.

⁴⁶ M. Oral and C-R. Dominique, "A methodology for competitiveness analysis and strategy formulation in glass industry", European Journal of Operation Research, Vol. 68, 1993, pp.9-22.

⁴⁷ F.G. Tucker, S.M. Zivan and R.C. Camp, "How to measure yourself against the best", Harvard Business Review, Vol. 65, No. 1, 1987, pp.8-10; R.H. Hayes, S.C. Wheelwright and K.B. Clark, Dynamic Manufacturing, (New York: Free Press, 1988); R.C. Camp, Benchmarking: The Search for Industry Best Practices that Lead to Superior Performance, (Milwaukee: WI, Quality Press, ASQC, 1989).

In the research literature, references to studies on competitive analysis of manufacturing and service operations of firms are extremely limited. At best, the research literature on competitive analysis of plants can be characterized as being in the developmental stages.

The few studies where model-based approaches have been used to conduct competitive analysis of the operating units of a firm are Parkan and Sinha. Parkan proposes models for computing “operational competitiveness ratings” of a set of production units. He illustrates the application of these models to evaluate the competitiveness of the branches of a major bank and hotel operations. Sinha (1996) proposes “moving frontier analysis” a method for conducting competitive analysis of dynamically-complex operations of a high technology manufacturing plant.⁴⁸

Using a wafer fabrication plant of a semiconductor manufacturing company as a research site, he demonstrates the application of moving frontier analysis over a 28 month period to determine (1) the gap between a plant’s performance and industry best practices, and (2) whether it will be possible to close this performance gap, and if so, the time it will take it do so. Competitive analyses presented in Parkan and Sinha focus primarily on the measurement of competitiveness, and do not provide much insight into the drivers of competitiveness.⁴⁹

3.2.3 SWOT ANALYSIS APPROACH

SWOT concept is another technique that has been accepted widely in analyzing the internal structure of business organization in several industries. SWOT (the acronym standing for Strengths, Weaknesses, Opportunities and Threats) analysis is a commonly used tool for analyzing internal and external environments in order to

⁴⁸ C. Parkan, “Operational competitiveness ratings of production units”, Managerial and Decision Economics, Vol. 15, 1994, pp.201-221; C. Parkan, “Measuring the performance of hotel operations”, Socio-Economic Planning Sciences, Vol. 30, 1996, pp.257-292; K.K. Sinha, “Moving frontier analysis: An application of data envelopment analysis for competitive analysis of a high-technology manufacturing plant”, Annals of Operations Research, Vol. 66, 1996, pp.197-218.

⁴⁹ Ibid.

attain a systematic approach and support for a decision situation.⁵⁰ It usefulness is not complicated in creating a quick overview of a company's strategic situation.

In referencing to Pearce and Robinson they proposed the definitions of SWOT in the following:⁵¹

- (1) Strength is a resource advantage relative to competitors and the needs of the markets a firm serves or expects to serve.
- (2) Weakness is a limitation or deficiency in one or more resources or competencies relative to competitors that impedes a firm's effective performance.
- (3) Opportunity is a major favorable situation in a firm's environment, and key trends are one source of opportunities.
- (4) Threat is a major unfavorable situation in a firm's environment, and threats are key impediments to the firm's current or desired position (see Figure 3.3).

In addition, the main objective of SWOT analysis is making a favorable match between a firm's internal resources and external situation. In other words, it is built on the results of an RBV of a firm to aid strategic analysis. Furthermore, according to R. Jauch and F. Glueck "internal analysis is the process by which the strategists examine the firm's marketing and distribution, research and development, production and operations, corporate resources and personnel, and finance and accounting factors to determine where the firm has significant strengths and weaknesses".⁵²

Internal diagnosis is the process by which strategists determine how to exploit the opportunities and meet the threats the environment is presenting by using strengths and repairing weaknesses in order to build sustainable competitive advantages.

⁵⁰ P. Kotler, Marketing Management: Analysis, Planning, Implementation, and Control, 6th ed., Prentice-Hall International Edition, 1988; T.L. Wheeler and J.D. Hunger, Strategic Management and Business Policy, 5th ed., Addison-Wesley Publishing, Reading, MA, 1995.

⁵¹ J.A. Pearce II and R.B. Robinson, *Op. Cit.*, pp.166-169.

⁵² L.R. Jauch and W.F. Glueck, Business Policy and Strategic Management, (Singapore: McGraw-Hill, 1988), p.156.

In a real situation, every company is confronted with a variety of internal and external forces, which on the one hand can comprise potential stimulants, or on the other hand can compromise potential limitations as regards the performances of the company or the objectives the company wishes to achieve.

As a first step in the development of a strategic planning system, business managers should therefore commence with the identification and evaluation of these strategic factors that assist or hinder the company in reaching its full potential. Because every company is confronted with a dynamic environment, the relative importance of a strategic factor will change constantly, to this analysis is according to be of a permanent nature.

This list of strategic factors can be used as a point of departure for the actual strategic plan within a small or medium sized enterprise. It is a flexible instrument. The greatest advantage is that it helps managers of small and medium sized enterprises survey the different management areas, gain insight into the significance within the framework of the company, and accordingly initiate suitable actions.

Good performances within a company are the results of correct interaction of business management with its environment. This environment can be of either an internal or external nature. To operate successfully in this respect, the company must concentrate its future objectives on its strengths, while averting tendencies related to the companies' weaknesses. Responding to internal strengths and weaknesses is therefore an essential component of the strategic management process.⁵³

But success can only be achieved in this respect to the extent that one is familiar with the opportunities and threats resulting from the external environment. The recognition of the internal strengths and weaknesses, as well as external opportunities and threats, takes place on the basis of a study, also called a SWOT-analysis.

⁵³ R.D. Hisrich and M.P. Peters, Entrepreneurship: Starting, Developing and Managing an Enterprise, (Boston: Homewood, 1989).

No standard list of crucial factors that apply for all companies exists because of the specificity of this set. SWOT-analysis uses to analyses the companies internal and external environment. The investigation of the internal environment will accordingly result in an overview of all weaknesses and strengths of the company, while the investigation of the external environment will result in an overview of all opportunities and threats.

The external environment consists of variables existing outside the company, which in the short-term are not under the control of the company. These variables form the context in which the company exists and functions. The external environment can be further subdivided into a direct environment and an indirect environment.

The direct-environment includes those elements or groups, which are directly influenced by the actions of the company. Examples of these are the shareholders, the government, the suppliers, the local authorities, the competitors, the clients, the creditors and the employee's organizations.

The indirect-environment includes more general forces that primarily have an influence on the long-term decisions of the company, such as economic, socio-cultural, technological, political and juridical influences.

The internal environment of the company consists of variables within the company itself, of which the business management of the company does not have an influence in the short-term.⁵⁴ These variables form the enterprise context in which work takes place. They also include the company structure, the company culture and the resources of the company.

The formulation of a strategy is a process for the development of long-term plans, to effectively respond to environmental opportunities and threats in the light of the strengths and weaknesses of the company. Points of departure here are the objectives of company management, which determine the long-term objectives to be achieved.

⁵⁴ T.L. Wheeler and J.D. Hunger, Strategic Management, 2nd, (Addison-Wesley Publishing, 1987).

The course to be taken by the company to realize this is called the company strategy or the company policy. The internal and external factors most important to the enterprise's future are referred to as strategic factors and they are summarized within the SWOT analysis. The final goal of strategic planning process, of which SWOT is an early stage, is to develop and adopt a strategy resulting in a good fit between internal and external factors. SWOT can also be used when strategy alternative emerges suddenly and the decision context relevant to it has to be analyzed. If used correctly, SWOT can provide a good basis for successful strategy formulation. Nevertheless, it could be used more efficiently.⁵⁵

When using SWOT, the analysis lacks the possibility of comprehensively appraising the strategic decision-making situation; merely pinpointing the number of factors in strength, weaknesses, opportunities or threat groups does not pinpoint the most significant group. In addition, SWOT includes no means of analytically determining the importance of factors or decision alternatives.

The further utilization of SWOT is, thus, mainly based on the qualitative analysis, capabilities and expertise of the persons participating in the planning process. As planning processes are often complicated by numerous criteria and interdependencies, it may be that the utilization of SWOT is insufficient. Hill and Westbrook (1997) found that none of the 20 case companies prioritized individual SWOT factors, on grouped factors further into subcategories, and only three companies used SWOT analysis as an input for a new mission statement.⁵⁶

In addition, the expression of individual factors was of a very general nature and brief. Thus, it can be concluded that the result of SWOT analysis is too often only a superficial and imprecise listing or an incomplete qualitative examination of internal and external factors. Applications for gaining extra value from SWOT analysis in further strategic planning processes have been presented.

⁵⁵ M.H.G. McDonald, The Marketing Planner, (Oxford, Butter-worth-Heinemann: 1993).

⁵⁶ T. Hill and R. Westbrook, "SWOT analysis: it's time for a product recall", Long Range Planning, Vol. 30, No. 1, 1997, pp.46-52.

Weihrich presented the SWOT matrix, which helps to systematically identify relationships between threats, opportunities, weaknesses and strengths, and offer a structure for generating strategies on the basis of these relationships. Procter presented a computer package partly based on Weihrich's SWOT matrix.⁵⁷

In Procter's package, computer-aided creativity procedures words for decision makers to use in identifying strengths, weaknesses, opportunities and threats. In addition, Procter's method includes creative generation and systematic evaluation of strategic alternatives.⁵⁸

Flett introduced a method of initiating and crystallizing conceptual thinking. His method is a mix of Kipling's five Ws (What, When, Who, and Why). The method results in a broad in scope and innovative strategic management planning framework.⁵⁹

Kotler presented that external factors could be classified according to their attractiveness and success probability (opportunities) and seriousness and probability of occurrence (threats). Internal factors could be rates by their performance and importance. In addition, he subdivided SWOT by business unit.⁶⁰

Wheelen and Hunger summarized the external and internal strategic factors into EFAS (Synthesis of External Strategic Factors) and IFAS (Synthesis of Internal Strategic Factors). They showed how internal and external factors can be weighted and rated to illustrate how well management is responding to these specific factors (rating) in light of their perceived importance to the company (weight). Weighting was carried out at scale from 0.0 (not important) to 1.0 (most important) so that the

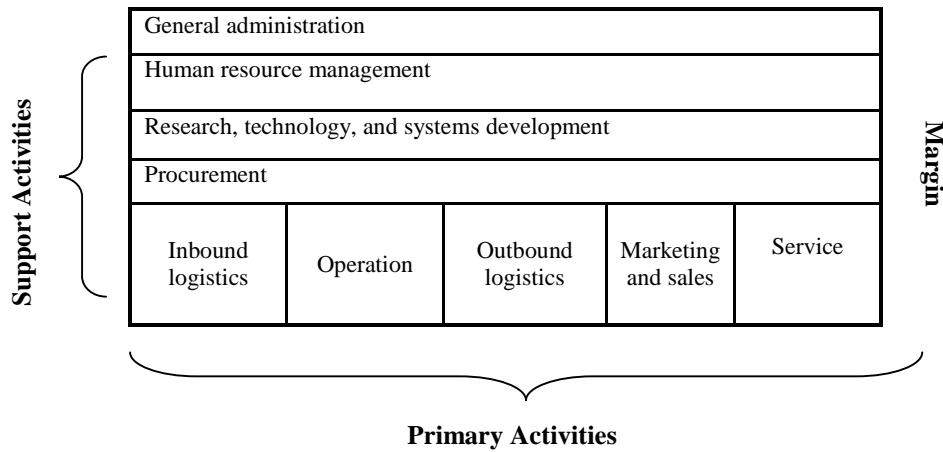
⁵⁷ H. Weihrich, "The SWOT matrix: a tool for situational analysis", Long Range Planning, Vol. 15, No. 2, 1989, pp.54-66.

⁵⁸ R.A. Procter, "Selecting an appropriate strategy; a structured creative decision support model", Marketing and Intelligence Planning, Vol. 10, No. 11, 1992, pp.21-24.

⁵⁹ F. Flett, "Innovation in mature companies-rejuvenation or stagnation?", Management Decision, Vol. 27, No. 6, 1989, pp.51-58;

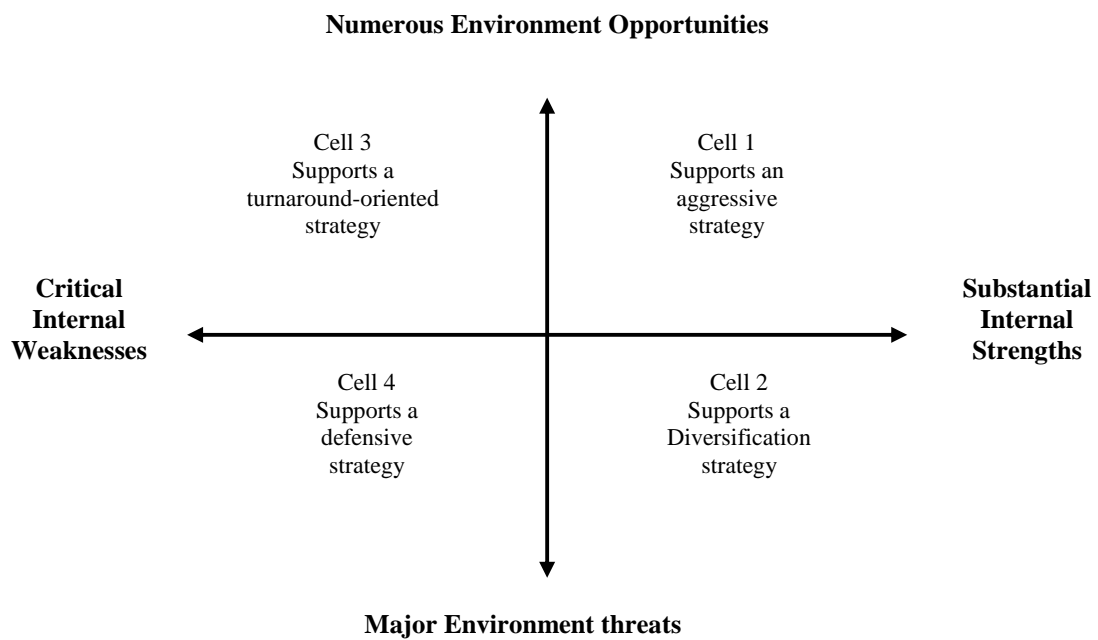
⁶⁰ P. Kotler, op. cit., 1988.

sum of the weights was 1.0 and rating at scale 1 (poor) to 5 (outstanding). The product of their two strategic factors was a weighted score indicating how well the company is responding to current and expected strategic factors in its environment.⁶¹



Source: Reproduced from J.A. Pearce II and R.B. Robinson, Formulation, Implementation, and Control of Competitive Strategy, (New York: McGraw-Hill/Irwin, 2005), p.160.

FIGURE 3.2 THE VALUE CHAIN



Source: Reproduced from J.A. Pearce II and R.B. Robinson, Formulation, Implementation, and Control of Competitive Strategy, (New York: McGraw-Hill/Irwin, 2005), p.167

FIGURE 3.3 SWOT ANALYSIS DIAGRAM

⁶¹ T.L. Wheeler and J.D. Hunger, Strategic Management and Business Policy, 5th ed., Addison-Wesley Publishing, Reading, MA, 1995.

3.3 THE COMPETITIVE ADVANTAGES OF SEAPORTS

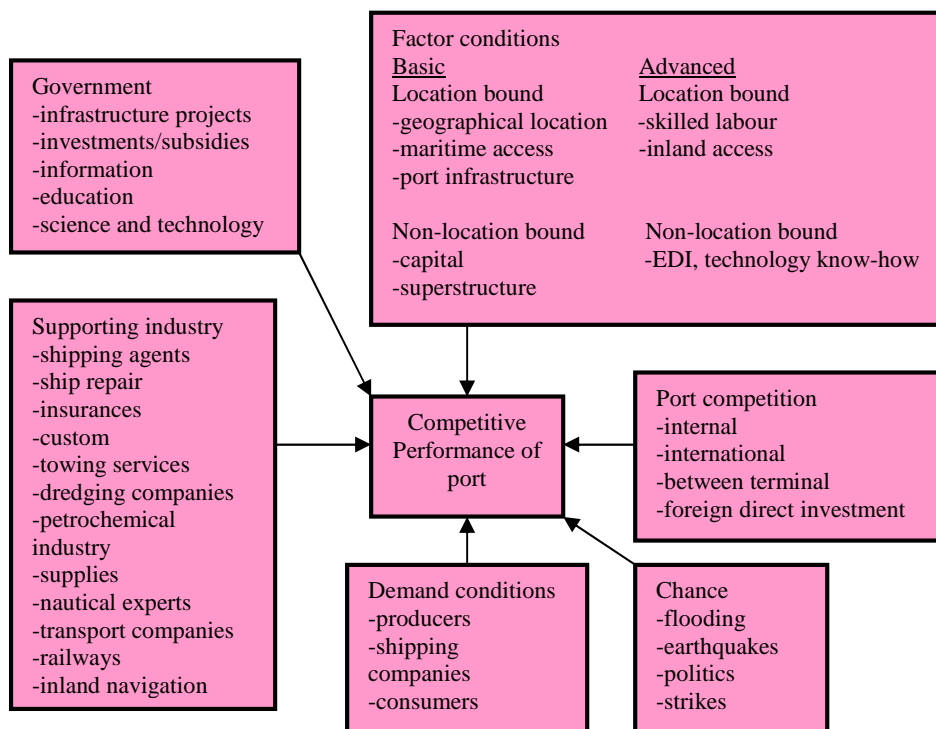
This section concentrates on the specific competitive advantage in seaport industry directly. The influential works of former studies are surveyed to make wider illustration of seaport competitiveness of competitive advantage measurement.

Haezendonck and Notteboom studied the underlying dimensions of determinants that influence seaport competitiveness. They also proposed a theoretical framework based on the Porter's diamond of competitive advantage. They made a field survey, questionnaire and interviews based on a questionnaire, to identify the perceptions of senior business executives and port experts on the key sources of competitive advantage of the port of Antwerp.

Subsequently, they designed the "double diamond models" are produced to serve the study purpose with which incorporates government and chance into the former model of Porter. To a less extent, they also take into consideration of the domestic and foreign diamond perspective relevant to the actors operating in the port (see Figure 3.4).⁶²

It seems that the model of double diamond, as described above, is very useful; hence, it has been developed to use for this thesis.

⁶² E. Haezendonck and T. Notteboom, "The competitive advantage of seaports", In Port Competitiveness: An Economic and Legal Analysis of the Factors Determining the Competitiveness of Seaports, edited by M. Huybrechts, H. Meersman, E. Van de Voorde, E. Van Hooydonk, A. Verbeke and W. Winkelmanns (Antwerp: De Boeck Ltd, 2002), p.82.



Source: Reproduced from E. Haezendonck and T. Notteboom, “The competitive advantage of seaports”,
 In Port Competitiveness: An Economic and Legal Analysis of the Factors Determining the
 Competitiveness of Seaports, edited by M. Huybrechts, H. Meersman, E. Van de Voorde, E.
 Van Hooydonk, A. Verbeke and W. Winkelmans (Antwerp: De Boeck Ltd, 2002), p.84.

FIGURE 3.4 THE EXTENDED PORTER DIAMOND APPLIED TO SEAPORT

Tongzon in the work of “systematizing international benchmarking for ports” introduced a systematic approach to identifying similar ports based on the technique of principal component analysis. By the technique of systematic approach, he used it to identify the most important factors underlying the port classification. The first stage he made a selection of criteria used for grouping ports under similar contexts. There are six quantitative measures of performance relating to:⁶³

- 1) total throughput;
- 2) number of commercial ship visits;
- 3) vessel size and cargo exchange;
- 4) nature and role of the port;
- 5) port function;
- 6) infrastructure provided.

⁶³ J.L. Tongzon, “Systematizing international benchmarking for ports”, Maritime Policy and Management, Vol. 22, No. 2, 1995, pp.171-177.

Notably, this study examined only the performance of containerized cargo handling. In the stage of data analysis he employed the principal component analysis technique to develop comprehensive performance indexed reflecting the individual measures of context developed and to identify those significant indicators underlying the classification of ports.

Ircha's study of "port strategic planning: Canadian port reform" proposed to determine the resources available to exploit external opportunities and defend against threats. It is also devoted to consider the internal strengths and weaknesses of Canadian ports. The ultimate purpose of the work after getting the result of data analysis is to provide some recommendations to the strategic plan committee of Canadian ports. Ircha's work used the technique of SWOT analysis to make thoroughly understandable the port's role and its response to internal and external challenges. The analysis was conducted by the involved inputs from stakeholders and customers.⁶⁴

As SWOT technique is accepted in its capability in analyzing the environment of business organization, so this thesis will also employs it for internal and external environment's analysis of container port.

Doom and Colleagues purposed the conceptual framework on the strategic inland port planning by adopting a multi-stakeholder approach. They proposed the nine steps of process in developing an inland port strategy master plan. On the step of analysis of the current situation of each perspective (social, economic, security, etc.) they allowed a descriptive method, then part of the results are used to make a questionnaire for making in-depth interview of port users and local community.⁶⁵

⁶⁴ M.C. Ircha, "Port strategic planning: Canadian port reform", Maritime Policy and Management, Vol. 28, No. 2, 2001, pp.125-140.

⁶⁵ M. Doom, C. Macharis and A. Verbeke, A framework for sustainable port planning in inland ports; a multistakeholder approach", The international association of maritime economists annual conference proceedings, Korea Maritime University, Busan, 2003, pp.296-313.

Subsequently, the previous conducted analysis' output will be taken to derive the SWOT analysis of each port zone. Hence, the proposed idea of their work on the steps of analysis, current situation, and internal analysis of organization are suitable in adopting to utilize in this thesis.

Heaver presented the idea of improving competitiveness, but did not carry it further to include evaluation. He focused on the changes in technologies have affected the structure and competitiveness of the port industry. First, the industry has moved from one in which dominantly public capital was used to provide common user facilities, to one in which more private capital has been used to provide terminals which are designed to serve the logistics requirements of more narrowly defines groups of shippers. Secondly, the efficiency of port cargo handling and of ocean and inland transportation services has increased so greatly that the geographical monopoly power once enjoyed by ports has been eroded greatly.

He also pointed that the market power of ports has been affected greatly by technological developments in port and in the transportation industries that serve them. These including: specialization of ships and terminals; increased efficiency of inland transport systems; terminals have been effective in the development of more efficient throughput capacity; terminals are more likely to serve one of a few logistics systems; terminals are becoming more capital intensive; and private investment in terminals is increasing.

He concluded that the individual terminals have become more important than previously to the selection of port routings and terminals are the major focus of competitive strategy, not ports. However, in case of container terminals, he gave a suggestion that the critical contractual relationships between terminals and shipping lines are normally and the focus to performance on the terminal raise new questions about the strategies of port authorities in terms of their ability to provide added-value services based on the economies of scale or scope.⁶⁶

⁶⁶ T.D. Heaver, "The Implications of Increased Competition among Ports for Policy and Management", Maritime Policy and Management, Vol. 22, No. 2, 1995, pp.125-133.

Dowd and Leschine provided a perspective on US container terminal productivity-how it is measured, the validity of the measurements used, and the factors that affect productivity elements. They described that the limits on the productivity of a container terminal may be imposed by either physical or institutional factors or a combination of both: physical limiting factors include the area, shape and layout of the terminal, the amount and type of equipment available, and the type and characteristics of the vessels using the terminal; institutional factors may be imposed on a terminal operator by any of the enterprises in the containerization system including such things as union work rules, import/export mix, container size mix, container available, stow of arriving vessels, customs regulations, intermodal links, and various requirements imposes on the terminal operator by the carrier.

They concluded that there is no universal method of validation to compare productivity on an international, national or port-wide basis and comparison between ports must be made carefully, selectively, on a case-by-case basis. Thus, they suggested that the measurement of container productivity has more in common with a commercial art form than with science and container terminal productivity must be considered in a system perspective for it to be of maximum value to industry. However, they provided a guideline of useful considerations when considering container terminal productivity, as shown in Table 3.1.⁶⁷

Carbone and Martino analyzed the competitiveness of ports on the challenge within the trend of high-integrated supply chain, in which ports act as a member of a given chain. They adopted a supply-chain management (SCM) approach as a method of analysis to analyze how port operators are involved in a given supply chain. The requirements for seaport services are growing according to: physical accessibility from land and systematic organization of the information flow are decisive factors for the industry with regard to the choice of a seaport. Hence, the perception perceived that the competitive position of a port is not only determined by its internal strengths (efficient cargo handling and hinterland connections) but it is also affected by its links in a given supply chain.

⁶⁷ T.J. Dowd and T.M. Leschine, "Container terminal productivity: a perspective", Maritime Policy and Management, Vol. 17, No. 2, 1990, pp.107-112.

TABLE 3.1 PRODUCTIVITY MEASUREMENTS AND FACTORS AFFECTING
CONTAINER TERMINAL PRODUCTIVITY

Terminal operational elements	Systemic factors influencing productivity	Other limiting influences on operations	Productivity measure	Productivity factor measured
Container yard	<ul style="list-style-type: none"> - Area, shape, layout - Yard handling methodology - Box size mix - Dwell time 	<ul style="list-style-type: none"> - How many containers must be grounded, stacked (inc. chassis) 	<ul style="list-style-type: none"> - TEU/yr/gross acre - TEU capacity/net storage area 	<ul style="list-style-type: none"> - Yard throughput - Yard storage
Crane	<ul style="list-style-type: none"> - Crane characteristics - Level of skill, training - Availability of cargo - Breakdowns - Breaks in yard support - Vessel characteristics 	<ul style="list-style-type: none"> - Operational delays 	<ul style="list-style-type: none"> - Moves/gross gang or crane hours minus down time - Moves/gross gang or crane hours 	<ul style="list-style-type: none"> - Net productivity - Gross productivity
Gate	<ul style="list-style-type: none"> - Hours of operation - Number of lanes - Degree of automation - Availability of data 	<ul style="list-style-type: none"> - How much weighing, inspection, documentation - Documentation checks are expedited 	<ul style="list-style-type: none"> - Container/h/lane - Equipment moves/h/lane - Truck turn-around time 	<ul style="list-style-type: none"> - Net throughput - Gross throughput
Berth	<ul style="list-style-type: none"> - Vessel scheduling - Berth length - Number of cranes 	<ul style="list-style-type: none"> - Extent of berth utilization 	<ul style="list-style-type: none"> - Container vessel shifts worked/yr /container berth 	<ul style="list-style-type: none"> - Net utilization
Labour	<ul style="list-style-type: none"> - Gang size - Work and safety rules - Work force skill, training, motivation - Vessel characteristics 	<ul style="list-style-type: none"> - General tempo of operations 	<ul style="list-style-type: none"> - Number of moves/man-hour 	<ul style="list-style-type: none"> - Gross labour productivity

Source: Reproduced from T.J. Dowd and T.M. Leschine, "Container terminal productivity: a perspective", Maritime Policy and Management, Vol. 17, No. 2, 1990, p.109.

As a consequence, the risk for ports losing important customers can be derive not only from deficiencies in port infrastructures, terminal operations and inland connections, but also from the customers' service network reorganization and its entry into new partnerships with logistics services providers, which may be using a different hub. Carbone and Martino considered a seaport as a cluster of organizations in which

different logistics and transport operators are involved in bringing value to the final customers.⁶⁷

Goss discussed the strategies, which might be adopted by port authorities and analyzed the several forms of competition relevant to seaports. However, he did not make any analytical measurement on the competition. He presented the competitive forces in port industry into five forms: competition between whole ranges of ports or coastline; competition between ports in different countries; competition between individual ports in the same countries; competition between the operators or providers of facilities within the same port; and competition between different modes of transport. In terms of strategies, he proposed a number of distinct strategies that a port authority may adopt including: minimalist; pragmatic; public service; and competitive strategy.⁶⁸

Turner examined the possible consequences of seaport policy alternatives within the framework the current of competitive environment. By comparing a base model of an existing mixed dedicated and common-user seaport to an alternative policy that effectively pools all carriers' demand for terminal services. He employed the stochastic simulation modules as a tool for comparing the impact of policy alternatives by comparing a base model of an existing mixed dedicated and common-user seaport to an alternative policy that effectively pools all carriers' demand for terminal services. Additionally, he also applied the general inventory/customer service concept to the study in response to the competitive conditions seaports may be forces to carry the burden of high customer service requirements.⁶⁹

⁶⁷ V. Carbone and M. Matino, "The changing role of ports in supply-chain management: an empirical analysis", Maritime Policy and Management, Vol. 30, No. 4, 2003, pp.305-320.

⁶⁸ R.O. Goss, "Economic policies and seaports: 2. The diversity of port policies", Maritime Policy and Management, Vol. 17, No. 3, 1990, pp.221-234.

⁶⁹ H. Turner, "Evaluating seaport policy alternatives: a simulation study of terminal leasing policy and system performance", Maritime Policy and Management, Vol. 27, No. 3, 2000, pp.283-30.

Heaver focused on the effects on ports of the closer integration that is developing in the maritime and port industries, in the different forms of co-operation among liner shipping firms on a global basis: joint ventures; mergers; strategic alliances; and cartel agreements, on the emphasis of development in Europe. Nevertheless, he only presented an analysis in the way of descriptive approach in reviewing the currently competitive environment of port industry in Europe. He proposed the idea that it is necessary to examine the strategic interests of major market players in the port activities including: shipping companies; port authorities; stevedores; inland transport modes. He summarized the heterogeneity of port activities reflected in a diversity of market player, each with their own objectives, tools and impact (see Table 3.2).⁷⁰

⁷⁰ T.D. Heaver, "Do mergers and alliance influence European shipping and port competition", Maritime Policy and Management, Vol. 27, No. 4, 2000, pp.363-373.

TABLE 3.2 OBJECTIVES, TOOLS AND IMPACT

Market players	Objectives (possible)	Tools	Impact
Shipping companies	<ul style="list-style-type: none"> - Profit maximization - Market share - Control over logistics chain 	<ul style="list-style-type: none"> - Tariff - Cost control (capacity, volume, time, co-operation,...) - Marketing - Range and level of service 	<ul style="list-style-type: none"> - Larger vessel - Rationalization of sailing schedules - Alliances and consortia - Dedicated terminals
Port authorities	<ul style="list-style-type: none"> - Contribution to cost minimization for logistics chain (both through port dues and time costs) - Maximization of cargo handling (public company) - Maximization of profit (private company) 	<ul style="list-style-type: none"> - Maritime access - Land and concession policy - Socio-economic negotiations - Pricing setting 	<ul style="list-style-type: none"> - Further information maritime access - Guaranteeing of social and economic stability - Concession policy affects industrial structure
Stevedores	<ul style="list-style-type: none"> - Profit maximization - Long term customer loyalty, including through logistics services and value-added activities (e.g. stuffing and stripping, storage pre-delivery inspection) 	<ul style="list-style-type: none"> - Pricing setting - Technology of goods handling aimed at speed, quality - Range and level of service 	<ul style="list-style-type: none"> - Returns to scale for terminals - Industrial logistics
Hinterland transport modes	<ul style="list-style-type: none"> - Profit maximization - Market share 	<ul style="list-style-type: none"> - Tariffs - Speed - Flexibility - Capacity 	<ul style="list-style-type: none"> - Fierce modal competition
Freight forwarders and shipping agents	<ul style="list-style-type: none"> - Profit maximization - Customer loyalty - Diversification (e.g. added logistics services) 	<ul style="list-style-type: none"> - Tariffs - Range and level of service 	<ul style="list-style-type: none"> - All-in-one price for door-to-door transport - Strong dependency (in both direction)
Owner of goods	<ul style="list-style-type: none"> - Minimization of total generalized logistics costs (including time cost) 	<ul style="list-style-type: none"> - Negotiating power (dependent on availability of alternatives) 	<ul style="list-style-type: none"> - Scale increase (positive impact on negotiating position) - Greater volatility

Source: Reproduced from T.D. Heaver, "Do mergers and alliance influence European shipping and port competition", *Maritime Policy and Management*, Vol. 27, No. 4, 2000, p.367.

There are, in briefly, a number of existing publications have attempted to analyze the fierce competition for market share among ports located within the same region and serving approximately the same hinterland. Researchers who have adopted a wide range of approaches and key determinants in measuring port performance and efficiency have addressed the subject of port performance.

According to Fleming and Hayuth, geographical location is vital to explaining a port's competitive success.⁷¹ Baird has stated that faster turn around time within the port is an important factor in port advancement.⁷² Tabernacle has illustrated the importance of crane productivity in enhancing port performance with the help of the learning curve concept.⁷³

Tongzon has come close to determining the overall port performance by looking at factors such as location, frequency of ship calls, economic activity within the sector, labour and capital productivity and work practices within the port.⁷⁴ There is extensive literature on freight transport choice of shippers centering on modal choice and carrier selection.⁷⁵ These articles have listed the "route factors" such as frequency, capacity, convenience, transit time; "cost factor" such as freight rate and "service factor" such as delays, reliability, avoidance of damage, loss and theft as some of the important factors influencing the decision of the shippers in their choice of a carrier.

⁷¹ D. Fleming and Y. Hayuth, "Special characteristic of transportation hub: centrality and intermediacy", Journal of Transport Geography, Vol. 2, No. 1, 1994, pp.3-18.

⁷² A. Baird, "Containerization and the decline of the upstream urban port in Europe", Maritime Policy and Management, Vol. 23, No. 2, 1996, pp.145-156.

⁷³ J. Tabernacle, "A study of the changes in performance and efficiency", Maritime Policy and Management, Vol. 22, No. 1, 1995, pp.115-124.

⁷⁴ J.L. Tongzon, "Determinants of port performance and efficiency", Transportation Research-A, Vol. 22A, No. 3, 1994, pp.234-281.

⁷⁵ D. Merick, "More than the bottom line-how users select a shipping service", Proceedings of the 14th Australian Transport Research Forum, (Perth: 1989), pp.65-81; N. Marr, "Do managers really know what service their customers require?", International Journal of Physical Distribution, Vol. 10, No. 7, 1980, pp.433-444; M. McGinnis, "Shipper attitude towards freight transportation choice: A factor analytic study", International Journal of Physical Distribution, Vol. 10, No. 1, 1980, pp.25-34; R. Jerman, R. Anderson and J. Constantin, "Shipper Vs Carrier perceptions of carrier selection variables", International Journal of Physical Distribution, Vol. 9, No. 1, 1978, pp.29-38.

Furthermore, the trend of recent context of container port competition points towards shipping lines as the key players in determining port choice with increasing attention given by them to provide logistical services on a global basis in an integrated approach.

However, Robison suggested that shippers play the key role in determining port choice. He suggested that ports are “element embedded in value-driven chain systems” and it is important for the port and its service providers to offer sustainable value to its users vis-à-vis other competing value-driven chain systems.⁷⁶

In terms of competitiveness, Haezendonck and Notteboom provided a comprehensive appraisal by showing that hinterland accessibility, productivity, quality, cargo generating effect, reputation and reliability are factors, which proved critical in strengthening a port’s competitiveness.⁷⁷ Oceanic and hinterland distances were also found to play a significant role by Malchow and Kanafani.⁷⁸

As a whole, the factors that influence a port’s competitiveness can be summarized in the extensive framework proposed by Rugman and Verbeke.⁷⁹ These factors were grouped into six categories that include factor conditions (production, labor, infrastructure etc.); demand condition; related and supporting industries; firm structure and rivalry; chance; and government intervention. Klink and Berg defined a seaport’s hinterland as the “continental area of origin and destination of traffic flows through a port i.e. the interior region served by the port”.⁸⁰

⁷⁶ R. Robinson, “Ports as elements in value-driven chain systems: the new paradigm”, Maritime Policy and Management, Vol. 29, 2002, pp.241-255.

⁷⁷ E. Haezendonck and T. Notteboom, op. cit., pp.67-87.

⁷⁸ M. Malchow and A. Kanafani, “A disaggregate analysis of factors influencing port selection”, Maritime Policy and Management, Vol. 28, 2001, pp.265-277.

⁷⁹ A. Rugman and A. Verbeke, “How to operationalize Porter’s diamond of international competitiveness”, The International Exclusive, Vol. 35, 1993, pp.283-300.

⁸⁰ H.A. Van Klink and G.C. Van den Berg, “Gateways and intermodalism”, Journal of Transport Geography, Vol. 6, 1998, pp.1-9.

3.4 CONCEPTUAL FRAMEWORK OF CONTAINER PORTS' COMPETITIVE ADVANTAGE MEASUREMENT

It is commonly accepted that the measurements of competitive advantage of any business organization have two main alternatives, objective and subjective methods. As the purpose of this thesis that needs to explore the perceptions of container port's customers relative to the competitiveness of the container port, thus, the subjective approach of measurement is adopted.

As a consequence, the measurement of container port competitive advantages needs to focus on the key criteria of container port performance that will make and contribute to the users' highest satisfaction.

3.4.1 THE PROCESS OF ANALYSIS METHODOLOGY

The methods of measuring were comprised of five steps:

- 1) The environments of external and internal of container port must be assessed by the SWOT analysis technique;
- 2) The general variables of container port's competitiveness must be found;
- 3) The analysis of general variables has to be attained in pursuing the principal component analysis technique;
- 4) The pairwise comparisons of each level of the hierarchy model of container ports' highest competitiveness are made in weighting to fulfill the objective of this thesis.

For the first two steps are derived from the previous studies and official documents, thus in turn they become the sources of secondary data to make analysis in the first step. Then, the latter three steps the questionnaires survey are used to collect the data of consumers' attitudes to derive the ratio of subjective value of potential factors of container port's competitiveness.

3.4.2. PRINCIPAL COMPONENT ANALYSIS (PCA)

According to one of the objectives of this thesis to define the influential factors contributing to the competitive advantage of container ports, thus the well-known PCA is employed. This is because the nature of subjective measurement of personal attitudes and fixed weights are distributed to each individual, hence, this techniques is compatible to solve the problem to obtain the port competitive index. The rationale for using principle component analysis is that it helps one to reach an aggregative representation form various individual port performance indicators.⁸¹

However, there are some claimes about the rotation method of factor analysis regarding reliability. Basilevsky stated an equivalent situation also exists in factor analysis, where coefficients may be estimated under several different assumptions, for example, by an oblique rather an orthogonal model, since an initial solution can always be rotated subsequently to an alternative basis should this be required.

Although transformation of the axes is possible with any statistical model (the choice of a particular coordinate system is mathematically arbitrary), in factor analysis such transformations assume particular importance in some (but not all) empirical investigations.

The transformations, however, are not an inherent feature of factor analysis or other latent variable(s) models, and need only be employed in fairly specific situations, for example, when attempting to identify clusters in the variables (sample) space. Here, the coordinate axes of an initial factor solution usually represent mathematically arbitrary frames of references which are chosen on grounds of convenience and east of computation, and which may have to be altered because of interpretational or substantive requirements. Therefore, contrary to some claims, the matter is that the

⁸¹ P. De and B. Ghosh, op. cit., pp.5-27.

rotation of factors is not intrinsically subjective in nature and, on the contrary, can result in a useful and meaningful analysis.⁸²

The single most distinctive characteristic of factor analysis is its data-reduction capability. Given an array of correlation coefficients for a set of variables, factor-analytic techniques enable us to see whether some underlying pattern of relationships exists such that the data may be rearranged or reduced to a smaller set of factors or components that may be taken as source variables accounting for the observed interrelations in the data.

The most common applications of the method may be classified into one for the following categories: (1) exploratory uses- the exploration and detection of patterning of variables with a view to the discovery of new concepts and a possible reduction of data; (2) confirmatory used- the testing of hypotheses about the structuring of variables in terms of the expected number of significant factors and factor loadings; and (3) uses as a measuring device- the construction of indices to be used as new variables in later analysis. The three ordinary steps of factor analysis are (1) the preparation of the correlation matrix, (2) the extraction of the initial factors- the exploration of possible data reduction, and (3) the rotation to a terminal solution- the search for simple and interpretable factors.⁸³ Each step will be examined in greater detail.

3.4.2.1 PREPARATION OF CORRELATION

The first step in factor analysis involves the calculation of appropriate measures of association for a set of relevant variables. The nature and scope of the variables included in the analysis have crucial implications for the factor results and their possible interpretation. Granted that some type of correlation matrix is used as the basic input to the factor analysis, the user has some alternatives; correlation between

⁸² A. Basilevsky, Statistical Factor Analysis and Related Methods: Theory and Applications, (New York: John Wiley & Sons, Inc., 1994).

⁸³ J. Kim, "Factor Analysis", In: SPSS: Statistical Package for the Social Science, (New York: McGraw-Hill, 1975), pp.468-473.

variables (or attributes) or association between individuals or objects may be calculated. Suppose we have data on 10 individuals in terms of 8 social characteristics. We could calculate the correlation between each pair of social characteristics (*R*-type) or between each pair of individuals (*Q*-type). If factor analysis is applied to a correlation matrix of units (objects, individuals, communities, or the like), it is called *Q*-factor analysis, while the more common variety based on correlations between variables is known as *R*-factor analysis.

3.4.2.2 EXTRACTION OF INITIAL FACTORS

The second step in factor analysis is to explore the data-reduction possibilities by constructing a set of new variables on the basis of the interrelations exhibited in the data. In doing so, the new variables may be defined as exact mathematical transformations of the original data, or inferential assumptions may be made about the structuring of variables and their source of variation. The former approach, which uses defined factors, is called “principal component analysis”.

Whether factors are exactly defined or are inferred, initial factors are usually extracted in such a way that one factor is independent from the other; that is, factors are orthogonal.

3.4.2.3 DEFINED FACTORS

Principal component analysis is a relatively straightforward method of transforming a given set of variables into a new set of composite variables or principal components that are orthogonal (uncorrelated) to each other. What would be the best linear combination of variables- best in the sense that the particular combination of variables would account for more of the variance in the data as a whole than any other linear combination of variables.

The first principal component, therefore, may be viewed as the single best summary of linear relationships exhibited in the data. The second component is defined as the second best linear combination of variables, under the condition that the second component is orthogonal to the first.

To be orthogonal to the first component, the second one must account for the proportion of the linear combination of variables that accounts for the most residual variance after the effect of the first component is removed from the data. Subsequent components are defined similarly until all the variance in the data is exhausted.

The principal component model may be compactly expressed as follows:

$$z_j = a_{j1}F_1 + a_{j2}F_2 + \cdots + a_{jn}F_n$$

where each of the n observed variables is described linearly in terms of n new uncorrelated components F_1, F_2, \dots, F_n , each of which is in turn defined as a linear combination of the n original variables.

Since each component is defined as the best linear summary of variance left in the data after the previous components are taken care of, the first m components- usually much smaller than the number of variables in the set- may explain most of the variance in the data. For factor analytic purpose, the analyst normally retains only the first few components for further rotation.

3.4.2.4 INFERRED FACTORS

Classical-factor analysis, on the other hand, is based fundamentally on the faith that the observed correlations are mainly the results of some underlying regularity in the data. More specifically, it is assumed that the observed variable is influenced by various determinants, some of which are shared by other variables in the set while others are not shared by any other variable.

The part of a variable that is influenced by the shared determinants is usually called *common*, and the part that is influenced by idiosyncratic determinants is usually called *unique*. Under this assumption, the unique part of a variable does not contribute to relationships among variables. It also follows from the preceding assumption that the observed correlations must be the result of the correlated variables sharing some of the common determinants.

The basic model may be expressed as follows:

$$z_j = a_{j1}F_1 + a_{j2}F_2 + \cdots + a_{jm}F_m + d_jU_j, j = 1, 2, \dots, n$$

where z_j = variable j in standardized form;

F_i = hypothetical factors;

U_j = unique factor for variable j ;

a_{ji} = standardized multiple-regression coefficient of variable j on factor i (factor loading);

d_j = standardized regression coefficient of variable j on unique factor j .

The following correlations are assumed to hold among the hypothesized variables:

$$r_{(F_i, U_j)} = 0, i = 1, 2, \dots, n; j = 1, 2, \dots, n; \text{ and } i \neq j$$

$$r_{(U_j, U_k)} = 0, j \neq k$$

That is, the unique factor U_j is assumed to be orthogonal to all the common factors and to the unique factors associated with other variables. This means that the unique portion of a variable is not related to any other variable or to that part of itself which is due to the common factor.

Therefore, if there is any correlation between the two variables j and k , it is assumed to be due to the common factors. Furthermore, if the common factors are assumed to be orthogonal to each other, i.e., unrelated, the following fundamental factor theorem emerges:

$$\begin{aligned} r_{jk} &= r_{jF_1}r_{kF_1} + r_{jF_2}r_{kF_2} + \cdots + r_{jF_m}r_{kF_m} \\ &= a_{j1}a_{k1} + a_{j2}a_{k2} + \cdots + a_{jm}a_{km} \\ &= \sum_{i=1}^m a_{ji}a_{ki} \end{aligned}$$

That is, the correlation between variables j and k is the sum of the cross products of the correlations of j and k with the respective common factors. If there is only a single common factor, the above expression could be reduce to:

$$r_{jk} = r_{jF_1} r_{kF_1}$$

This means that the correlation between j and k is due solely to the factor F_1 , or if one were to control the hypothetical factor F_1 , the partial correlation between j and k would be zero.

3.4.2.5 ROTATION OF FACTOS INTO TERMINAL FACTORS

This is the final step in factor analysis. Regardless of whether factors are defined or inferred, the exact configuration of the factor structure is not unique; one factor solution can be transformed into another without violating the basic assumptions or the mathematical properties of a given solution.

In other words, there are many statistically equivalent ways to define the underlying dimensions of the same set of data. This indeterminacy in a factor solution is in a way unfortunate because there is no unique and generally accepted best solution. Therefore, one is left to choose the best rotational method to arrive at the terminal solution that satisfies the theoretical and practical needs of the research problem. The classification of the types of factor analysis is presented in Table 3.3:

TABLE 3.3 STEPS OF FACTOR ANALYSIS

Steps in factor analysis	Major options	Key referenced to literature
1 Preparation of correlation matrix	(a) Correlation between variables (b) Correlation between units	(a) R factoring (b) Q factoring
2 Extraction of initial factors	(a) Defined factors (b) Inferred factors	(a) Principal component solution (b) Classical or common factor solution
3 Rotation to terminal factors	(a) Uncorrelated factors (b) Correlated factors	(a) Orthogonal factors or rotation (b) Oblique factors or rotation

However, according to Chisnall in “the measurement of behavioral factors such as attitudes and motivation has been attempted by researchers using a variety of techniques. None is fully satisfactory – there are two important factors relating to the measurement of attitudes: reliability and validity. Subsequently, this thesis adopts the validity concept to employ to the evaluation of scaling techniques. To a lesser validity is concerned with the extent to which the scale measures what it is supposed to measure or what it is believed to be capable of measuring”.⁸⁴

Thus, this thesis adopts the ordinal ratio scales, and the arbitrary weightings used are set out in relating to the need to measure the perceptions of container ports’ users in assigning weights to each general variable, hence the ratio scales for utilizing the technique of principal component analysis are designed as below:

THE RATIO SCALES OF GENERAL VARIABLES

Not at all important	=	1
Not very important	=	2
Fair	=	3
Important	=	4
Very important	=	5

3.4.3 THE ANALYTIC HIERARCHY PROCESS

The AHP has a successful track record regarding applications in the wider transport area following its introduction as a multi-criteria decision-making (MCDM)

⁸⁴ P.M. Chisnall, Marketing Research, (London: McGraw-Hill, 1981).

methodology in the late 1970s.⁸⁵ The AHP methodology is a flexible tool that can be applied to any hierarchy of performance measures.⁸⁶

According to Zimmermann, most of the MCDM approaches consist of two steps: (1) Aggregation of the judgments with respect to all goals and decision-making alternatives; and (2) Ranking of the decision alternatives according to the aggregates judgments (scores).⁸⁷

Vreeker et al suggest that the basic rules for solving multi-level hierarchical problems involve essentially four steps: (1) specification of choice problem; (2) information analysis; (3) choosing the appropriate method; and (4) evaluation of alternatives.⁸⁸

The success of the AHP in research in a number of areas supports its use to solve transport problems, as for example in Vreeker, Lirn, Chang and Yeh, Poh and Ang, Tzeng and Wang and Frankel.⁸⁹ Lirn used the AHP to study job attractiveness in the

⁸⁵ T.L. Satty, "A Scaling Method for Priorities in Hierarchy Structures", Journal of Mathematical Psychology, Vol. 15, 1977, pp.234-281.

⁸⁶ A. Rangone, "An analytical hierarchy process framework for comparing the overall performance of manufacturing department", International Journal of Operation & Production Management, Vol. 16, 1996, pp.104-119.

⁸⁷ H.J. Zimmermann, Fussy set theory and its application, (Boston: Kluwer Academic Publishers, 1991).

⁸⁸ R. Vreeker, P. Nijkamp and C.T. Welle, "A multicriteria decision support methodology for evaluating airport expansion plans", Transportation Research Part D, Vol. 7, 2002, pp.27-47.

⁸⁹ Ibid.; T.C. Lirn, "The job attractiveness of airlines to students in Taiwan: An AHP approach", Journal of the Eastern Asia Society for Transportation Studies, Vol. 5, 2003, pp.556-571; Y.H. Chang and C.H. Yeh, "Evaluating airline competitiveness using multiattribute decision-making", Omega, Vol. 29, 2001, pp.405-415; K.L. Poh and B.W. Ang, "Transportation fuels and policy for Singapore: An AHP planning approach", Computers & Industrial Engineering, Vol. 37, 1999, pp.507-525; G.H. Tzeng and R.T. Wang, Application of AHP and Fuzzy MADM to the evaluation of a bus system's performance in Taipei City, Third International Symposium on the Analytic Hierarchy Process, (Washington D.C., George Washington University, 11-13 July, 1994); E.G. Frankel, "Hierarchy logic in shipping policy and decision-making", Maritime Policy and Management, Vol. 19, 1992, pp.211-221.

airline industry in Taiwan.⁹⁰ Yedla and Shrestha utilized the AHP to select environmentally friendly transport systems in India.⁹¹

Chou and Liang used the AHP to create a model capable of evaluating the performance of shipping companies. The advantages of the AHP as a decision tool have been extensively reviewed.⁹² Saaty and Vargas lists 10 advantages of the AHP as a decision-making tool: unity; complexity; interdependence; hierarchy structure; measurement; consistency; synthesis; tradeoffs; judgment and consensus; and process repetition.⁹³

As argued by Forgionne, the AHP methodology as a decision support system mechanism can easily accommodate model modifications and simulations through sensitivity analysis.⁹⁴ The property of “the AHP provides the objective mathematics to process the inescapably subjective and personal preferences of an individual or a group in making a decision. With the AHP and its generalization, the Analytic Network Process (ANP), one constructs hierarchies or feedback networks, then makes judgments or performs measurements on pairs of elements with respect to a controlling element to derive ratio scale that are then synthesized throughout the structure to select the best alternative”.⁹⁵ The important steps of this technique are as follows:

3.4.3.1 PAIRWISE COMPARISON MAKING

⁹⁰ T.C. Lirn, op. cit., pp.556-571.

⁹¹ S. Yedla and RM, Shrestha, “Multicriteria approach for the selection of alternative options for environmentally sustainable transport system in Delphi”, Transportation Research Part A: Policy and Practice, Vol. 37, 2003, pp.717-729.

⁹² T.Y. Chou and G.S. Liang, “Application of a fuzzy multicriteria decision-making model for shipping company performance evaluation”, Maritime Policy and Management, Vol. 28, 2001, pp.375-392.

⁹³ T.L. Saaty and L.G. Vargas, Models, Methods & Applications of the Analytic Hierarchy Process, 2001.

⁹⁴ E.G. Forgionne, R. Kohlib and D. Jennings, “An AHP analysis of quality in AI and DSS Journals”, Omega, Vol. 30, 2002, pp.171-183.

⁹⁵ T.L. Saaty and L.G. Vargas, *ibid*, p. 27.

This is the first step to be practiced. This method, according to Harker, involves the estimation of the weights of a set of criteria from a matrix of pairwise comparison $A = (a_{ij})$ which is positive and reciprocal.⁹⁶ Thus, given the matrix:

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} & \cdots & a_{1n} \\ a_{21} & a_{22} & a_{23} & \cdots & a_{2n} \\ a_{31} & a_{32} & a_{33} & \cdots & a_{3n} \\ \vdots & \vdots & \vdots & & \vdots \\ a_{n1} & a_{n2} & a_{n3} & \cdots & a_{nn} \end{bmatrix}$$

This matrix has reciprocal properties; that is:

$$a_{ij} = \frac{1}{a_{ji}} \text{ for all } i, j = 1, 2, \dots, n.$$

where the subscripts i and j refer to the row and column, respectively, where any entry is located. Now let $A_1, A_2, A_3, \dots, A_n$ be any set of n elements and $w_1, w_2, w_3, \dots, w_n$ their corresponding weights or intensities.

The comparison of weights can be represented as follows:

$$\begin{array}{c|ccccc} & A_1 & A_2 & A_3 & \cdots & A_n \\ A_1 & \frac{w_1}{w_1} & \frac{w_1}{w_2} & \frac{w_1}{w_3} & \cdots & \frac{w_1}{w_n} \\ A_2 & \frac{w_2}{w_1} & \frac{w_2}{w_2} & \frac{w_2}{w_3} & \cdots & \frac{w_2}{w_n} \\ A_3 & \frac{w_3}{w_1} & \frac{w_3}{w_2} & \frac{w_3}{w_3} & \cdots & \frac{w_3}{w_n} \\ \vdots & \vdots & \vdots & \vdots & & \vdots \\ A_n & \frac{w_n}{w_1} & \frac{w_n}{w_2} & \frac{w_n}{w_3} & \cdots & \frac{w_n}{w_n} \end{array}$$

⁹⁶ P.T. Harker, "The art and science of decision making: the analytic hierarchy process", in Eds. The Analytic Hierarchy Process: applications and studies, (Darmstadt; Weihert-Druck Gmbh, 1989), p.30.

TABLE 3.4 THE FUNDAMENTAL SCALES OF PAIRWISE COMPARISON

Intensities of Importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
2	Weak	
3	Moderate importance	Experience and judgment slightly favor one activity over another
4	Moderate plus	
5	Strong importance	Experience and judgment strongly favor one activity over another
6	Strong plus	
7	Very strong or demonstrated importance	An activity is favored very strongly over another; its dominance demonstrated in practice
8	Very, very strong	
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation
Reciprocals of above	If activity I has one of the above nonzero numbers assigned to it when compared with activity j, then j has the reciprocal value when compared with I	A reasonable assumption
Rational	Ratios arising from the scale	If consistency were to be forced by obtaining n numerical values to span the matrix

Source: Reproduced from T.L. Saaty, L.G. Vargas, Models, Methods & Applications of the Analytic Hierarchy Process, 2001, p.9.

3.4.3.2 SYNTHESIS: LOCAL PRIORITIES⁹⁷

From the set of pairwise comparison matrix we generates a set of local priorities, which express the relative impact of the set of elements on an element in the matrix above. To do this it need to compute a set of eigenvectors for each matrix and then normalize to unity the result to obtain the vectors of priorities. Computing eigenvector,

⁹⁷ T.L. Saaty and K.P. Kearns, Analytical Planning: the organization of systems, (London: A. Wheaton & Co. Ltd., 1985a), p.38; Y. Haimes, Risk Modeling, Assessment, and Management, (New York: John Wiley & Sons, Inc., 1998), pp.170-179.

this is done by multiplying the elements in each row and taking their n th root where n is the number of elements.

Then normalize to unity the column of numbers thus obtained by dividing each entry by the sum of all entries. The example of computing process is as follows:

$\frac{w_1}{w_1}$	$\frac{w_1}{w_2}$	$\frac{w_1}{w_3}$	$\frac{w_1}{w_4}$	←	If $\frac{w_1}{w_1} \times \frac{w_1}{w_2} \times \frac{w_1}{w_3} \times \frac{w_1}{w_4}$ are multiplied out and then the 4 th root taken, an estimate of the first component of the principal eigenvector has been developed from this row, and so on.
$\frac{w_1}{w_2}$	$\frac{w_2}{w_2}$	$\frac{w_2}{w_3}$	$\frac{w_2}{w_4}$		
$\frac{w_1}{w_3}$	$\frac{w_2}{w_2}$	$\frac{w_3}{w_3}$	$\frac{w_3}{w_4}$		
$\frac{w_1}{w_4}$	$\frac{w_2}{w_2}$	$\frac{w_3}{w_3}$	$\frac{w_4}{w_4}$		
$\frac{w_2}{w_1}$	$\frac{w_2}{w_2}$	$\frac{w_3}{w_3}$	$\frac{w_4}{w_4}$		
$\frac{w_3}{w_1}$	$\frac{w_2}{w_2}$	$\frac{w_3}{w_3}$	$\frac{w_4}{w_4}$		
$\frac{w_4}{w_1}$	$\frac{w_2}{w_2}$	$\frac{w_3}{w_3}$	$\frac{w_4}{w_4}$		
$\frac{w_4}{w_2}$	$\frac{w_2}{w_2}$	$\frac{w_3}{w_3}$	$\frac{w_4}{w_4}$		

So the eigenvector component row 1 = $\sqrt[4]{\frac{w_1}{w_1} \times \frac{w_1}{w_2} \times \frac{w_1}{w_3} \times \frac{w_1}{w_4}}$

Once the n eigenvector components have been developed for all the rows, it becomes necessary to normalize them to do further computation as follows:

$\frac{w_1}{w_1}$	$\frac{w_1}{w_2}$	$\frac{w_1}{w_3}$	$\frac{w_1}{w_4}$	→	$\sqrt[4]{\frac{w_1}{w_1} \times \frac{w_1}{w_2} \times \frac{w_1}{w_3} \times \frac{w_1}{w_4}} = a$
$\frac{w_2}{w_1}$	$\frac{w_2}{w_2}$	$\frac{w_2}{w_3}$	$\frac{w_2}{w_4}$	→	$\sqrt[4]{\frac{w_2}{w_1} \times \frac{w_2}{w_2} \times \frac{w_2}{w_3} \times \frac{w_2}{w_4}} = b$
$\frac{w_3}{w_1}$	$\frac{w_3}{w_2}$	$\frac{w_3}{w_3}$	$\frac{w_3}{w_4}$	→	$\sqrt[4]{\frac{w_3}{w_1} \times \frac{w_3}{w_2} \times \frac{w_3}{w_3} \times \frac{w_3}{w_4}} = c$
$\frac{w_4}{w_1}$	$\frac{w_4}{w_2}$	$\frac{w_4}{w_3}$	$\frac{w_4}{w_4}$	→	$\sqrt[4]{\frac{w_4}{w_1} \times \frac{w_4}{w_2} \times \frac{w_4}{w_3} \times \frac{w_4}{w_4}} = d$

Now add the column and normalize:

$$\begin{array}{|l} a \\ b \\ c \\ d \end{array} = \text{Total, then } \frac{a}{\text{total}} = x_1, \frac{b}{\text{total}} = x_2, \frac{c}{\text{total}} = x_3, \frac{d}{\text{total}} = x_4$$

After we get the estimate of vector of priorities, however it is important to note that in the judgment matrix we don't have ratios like w_i/w_j but only numbers or reciprocals of numbers from the scale. That matrix is generally inconsistent.

Algebraically the consistent problem involves solving $Aw = nw$, $A = (w_i/w_j)$ and the general one with reciprocal judgments involves solving $A'w' = \lambda_{\max}w'$, $A' = (a_{ij})$ where λ_{\max} is the largest eigenvalue of the judgment matrix A . This is the second step to get the estimates of vector of priorities.

By using ratio scales, the weights are only unique up to multiplication by a positive constant i.e. w is equivalent to cw where $c > 0$. Hence, in case of perfectly consistency of judgment, then the entries of the matrix A would contain no errors and could be expressed as:

$$a_{ij} = \frac{w_i}{w_j} \quad \text{for } i, j = 1, 2, \dots, n$$

However, all measurements, including those, which make use of instruments, are subject to experimental error and to error in the measurement instrument itself. Hence, Saaty has solved this problem by using the largest eigenvalue, λ_{\max} derives from the solution of matrix A to replace n , so the equation is as follows:

$$AW = \lambda_{\max} w$$

The λ_{\max} finding by first add each column of the judgment matrix and then multiply the sum of the first column by the value of the first component of the normalized

priority vector, the sum of the second column by that of the second component and so on. Then add the resulting numbers.⁹⁸

This yields a value denoted by λ_{\max} . Exemplifying, multiplication of the matrix by the vector of priorities is achieved as follows:

$$\begin{bmatrix} \frac{w_1}{w_1} & \frac{w_1}{w_2} & \frac{w_1}{w_3} & \frac{w_1}{w_4} \\ \frac{w_2}{w_1} & \frac{w_2}{w_2} & \frac{w_2}{w_3} & \frac{w_2}{w_4} \\ \frac{w_3}{w_1} & \frac{w_3}{w_2} & \frac{w_3}{w_3} & \frac{w_3}{w_4} \\ \frac{w_4}{w_1} & \frac{w_4}{w_2} & \frac{w_4}{w_3} & \frac{w_4}{w_4} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{cases} \frac{w_1}{w_1}x_1 + \frac{w_1}{w_2}x_2 + \frac{w_1}{w_3}x_3 + \frac{w_1}{w_4}x_4 = Y_1 \\ \frac{w_2}{w_1}x_1 + \frac{w_2}{w_2}x_2 + \frac{w_2}{w_3}x_3 + \frac{w_2}{w_4}x_4 = Y_2 \\ \frac{w_3}{w_1}x_1 + \frac{w_3}{w_2}x_2 + \frac{w_3}{w_3}x_3 + \frac{w_3}{w_4}x_4 = Y_3 \\ \frac{w_4}{w_1}x_1 + \frac{w_4}{w_2}x_2 + \frac{w_4}{w_3}x_3 + \frac{w_4}{w_4}x_4 = Y_4 \end{cases}$$

3.4.3.3 CONSISTENCY OF LOCAL PRIORITIES

This technique is used to make a successively improve the consistency of judgment that is the ultimate target needed. Thus, firstly we can found the consistency index of a matrix of comparisons by the equation as follows:

$$C.I. = \frac{\lambda_{\max} - n}{n - 1}$$

Secondly, the consistency ratio (C.R.) is obtained by dividing the C.I. with the appropriate one of the average random consistency index (R.I.), as the following equation shows:

$$C.R. = C.I. / R.I.$$

⁹⁸ T.L. Saaty and L.G. Vargas, op. cit., pp.57-62.

Average Random Consistency Index (R.I.)

N	1	2	3	4	5	6	7	8	9	10
R.I.	0	0	.52	.89	1.11	1.25	1.35	1.40	1.45	1.49

Note: the average random consistency index is computed from 500 $N \times N$ positive reciprocal pairwise comparison matrices whose entries were randomly generated using the 1 to 9 scales.⁹⁹

3.4.3.4 A SUMMARY OF STEPS IN THE AHP

The steps followed in the AHP is as follows:

- 1) Define the problem and determine what you want to know.
- 2) Structure the hierarchy from the top (the objectives from a managerial viewpoint) through the intermediate levels (criteria on which subsequent levels depend) to the lowest level (which usually is a list of the alternatives).
- 3) Construct a set of pairwise comparison matrices for each of the lower levels-one matrix for each element in the level immediately above. An element in the higher level is said to be a governing element for those in the lower level since it contributes to it or affects it. In the complete simple hierarchy, every element in the lower level affects every element in the upper level. The elements in the lower level are then compared to each other based on their effect on the governing element above. This yields a square matrix of judgments. The pairwise comparisons are done in terms of which element dominates the other.
- 4) There are $n(n-1)/2$ judgments required to develop each matrix in step 3 (reciprocals are automatically assigned in each pairwise comparison).
- 5) Having made all the pairwise comparisons and entered the data, the consistency is determined using the eigenvalue. The consistency index is tested then using the departure of λ_{\max} from n compared with

⁹⁹ ibid.

corresponding average values for random entries yielding the consistency ratio C.R.

- 6) Steps 3, 4 and 5 are performed for all levels and clusters in the hierarchy.
- 7) Hierarchical synthesis is now used to weight the eigenvectors by the weights of the criteria and the sum is taken over all weighted eigenvector entries corresponding to those in the next lower level of the hierarchy.
- 8) Multiplying each consistency index by the priority of the corresponding criterion and adding them together find the consistency of the entire hierarchy. The result is then divided by the same type of expression using the random consistency index corresponding to the dimensions of each matrix weighted by the priorities as before. Note first the consistency ratio (C.R.) should be about 10 % or less to be acceptable. If not, the quality of the judgments should be improved, perhaps by revising the manner in which questions are asked in making the pairwise comparisons.

3.5 THE FIELD SURVEY STATEMENT

Questionnaires were distributed to those concerned both directly and indirectly with the container industry in Thailand, the results showed primary data related to the attitudes of container port customers on the factors that they acknowledge contribute to container port competitiveness.

The sample targets were both Thai and foreign shipping lines and shipping agents with which branch offices in Thailand. Other targets included shippers who export and import containerized cargo, freight forwarders who deal with container traffic, insurance companies who are involved with containerized cargo transfer, container terminal operators, and some experts and academics related to the container industry.

The questionnaires were distributed during June of 2005. The survey was to discover the general factors that container port users are looking for that would contribute to the competitive advantage of Thailand's container ports over their rivals in Southeast Asia (i.e. Klang port, Manila port, Tanjung Priok port, and Laem Chabang port).

3.6 SUMMARY

The matter of this chapter illustrates the principal perspective of theoretical framework of competitive advantage both in conventional term and in specific field of container port industry. The main point of the chapter is the survey for insight of practical analysis of container port competitive advantage of the former studies contributed by some researchers. Subsequently, the practices of competitive advantage in reality have been summarized.

As a consequence, the concepts and methods of previous studies on container port competitive advantages are very useful to develop for applying in this thesis. The statistical analysis of this thesis on the competitive performances of container ports is based on the want-satisfying utility concept. The techniques being adopted are the Principal Component Analysis and the Analytic Hierarchy Process. The next chapter is devoted to the analysis of container port competitiveness in Thailand compared to their specific rivals in the region of Southeast Asia.

CHAPTER FOUR

COMPARATIVE ANALYSIS OF PORT COMPETITIVENESS IN SOUTHEAST ASIA

This chapter analyzes the business environment and competitiveness of the container port industry in Thailand and neighbouring countries.

4.1 THE ENVIRONMENTS OF CONTAINER PORTS IN THAILAND

The environment analysis of the competitive advantages of container ports in Thailand is adopted the SWOT approach to analyze the present situation of container port's external and internal environments. The analysis is based on the secondary data, which was published as a result of previous studies, and on un-structured interviews with container port experts both in the government and private sectors.

4.1.1 EXTERNAL OPPORTUNITIES

4.1.1.1 ECONOMY

The National Economic and Social Development Board (NESDB) predicted that there will be an upward trend in the long- term economic growth rate and the Thai economy will expand by average of at least 0.6 percent per year. Furthermore, during the 9th National Economic and Social Development Plan (2002 – 2007) and the 10th NESDP (2008 – 2012), the economy will grow on an average of 4.7 percent. The data of this economic is shown in Table 4.1 below.

TABLE 4.1 FORECAST OF THAI ECONOMIC GROWTH

Economic Growth (%)	1996 – 2001 8 th NESDP	2002 – 2007 9 th NESDP	2008 – 2012 10 th NESDP
Base Case	0.6	4.7	4.7
High Case	2.6	6.5	5.7

Source: Reproduced from Office of the Mercantile Marine Promotion Commission, Study Report 2000, 2001, p.17.

Hence, with a more sustainable growth rate in the Thai economy, there will be an increase in international trade as well (see Table 4.2).

TABLE 4.2 FORECAST OF CONTAINERIZED CARGO OF THAILAND

Issues	2001	2006	2011	2016
Import	8.06	10.30	13.53	17.38
Export	10.59	13.52	17.75	22.79
Total Volume	18.65	23.82	31.28	40.17
Total Growth Rate (%)		27.72	31.31	28.42

Source: Reproduced from Office of the Mercantile Marine Promotion Commission, Study Report 2000, 2001, p.20.

Furthermore, the world's containerized cargo demand will increase steadily in the years ahead (see Table 4.3 and 4.4). These indications show a positive forecast for Thai container ports.

TABLE 4.3 FORECAST OF DEMAND IN THE WORLD'S CONTAINER PORTS
(Million TEUs)

World Regions	2004-I	2004-II	2008-I	2008-II	2012-I	2012-II
North & West Europe	41.15	39.70	49.01	46.39	57.07	53.21
Mediterranean	28.46	25.92	36.19	32.58	43.61	37.30
Middle East	12.91	11.65	16.74	14.90	20.90	19.10
Indian Sub-Continent	7.50	6.95	10.50	9.75	12.20	11.10
Northeast Asia	30.50	26.62	39.61	32.86	48.50	38.68
China Port Region	51.40	45.00	66.55	54.50	83.85	67.97
Southeast Asia	55.70	47.59	76.50	61.25	105.11	85.00
North America	37.87	35.50	48.32	45.15	57.73	52.75
Central America & Caribbean	15.08	13.55	20.13	17.59	24.54	21.30
South America	9.31	8.00	12.91	11.40	16.40	14.90
Australia	5.43	5.18	6.77	6.24	8.44	7.47
Africa	6.04	5.82	8.87	7.23	12.75	9.00
Total	301.37	271.48	392.05	339.84	491.10	417.78

Source: C. Lin Sien, M. Goh and J.L. Tongzon, Southeast Asian Development; a comparative analysis, (Singapore: Primepak Services, 2003), p.77.

TABLE 4.4 WORLD CONTAINER PORT DEMAND FORECAST

(Growth Rate in Percent)

World Regions	2004-I	2004-II	2008-I	2008-II	2012-I	2012-II
North & West Europe	13.65	14.62	12.50	13.65	11.62	12.74
Mediterranean	9.44	9.55	9.23	9.59	8.88	8.93
Middle East	4.28	4.29	4.27	4.38	4.26	4.57
Indian Sub-Continent	2.49	2.56	2.68	2.87	2.48	2.66
Northeast Asia	10.13	9.81	10.10	9.67	9.88	9.26
China Port Region	17.06	16.58	16.96	16.04	17.07	16.27
Southeast Asia	18.48	17.53	19.51	18.02	21.40	20.35
North America	12.57	13.08	12.32	13.29	11.76	12.63
Central America & Caribbean	5.00	4.99	5.13	5.18	5.00	5.10
South America	3.09	2.95	3.29	3.35	3.34	3.57
Australia	1.80	1.91	1.73	1.84	1.72	1.79
Africa	2.00	2.14	2.26	2.13	2.60	2.15
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: C. Lin Sien, M. Goh and J.L. Tongzon, Southeast Asian Development: a comparative analysis, (Singapore: Primepak Services, 2003), p.78.

Note: "I" in case of the optimistic scenario; "II" in case of the pessimistic scenario.

4.1.1.2 POLITICAL FACTORS

Since 1996, The Thai government has taken measures to promote the maritime industry by encouraging private companies to participate directly in every sector thereof. This includes financial support, tax incentives, marketing support, and other areas. The main strategy of the Thai government with respect to the transportation of goods is to initiate multimodal transport development and Electronic Data Interchange. In The report of OMPC indicated " the government realized the importance of developing Multimodal Transport to increase trade efficiency and the country's transport. The Cabinet's resolution on December 14, 1993, appointed Transport Committee as proposed by the Ministry of Transport and Communications to oversee their goals. There are four subcommittees to support the operation committee as follows:

- 1) Subcommittee on laws, rules, regulations and documents on Multimodal transport.

- 2) Subcommittee for Promotional of Mutimodal transport Operators.
- 3) Subcommittee for Multimodal Transport and Infrastructure Development.
- 4) Subcommittee for Electronic Data Interchange Development.”¹⁰⁰

The cabinet approved these processes on October 31, 1993, and, the policy of the Thai government is to create opportunities for the Thai container industry to gain more customers.

4.1.1.3 TECHNOLOGY

Since there is an urgent need to improve information technology in the area of the business of international trade, the Thai government is supporting the development of an effective EDI system for transportation efficiency. In the present day, the procedure of information transfer between customs agents, importers and exporters is based on an EDI system in which about 50 percent of products are recognized, but this will increase to cover all products in a few years. This development of information technology is a great opportunity for Thai container ports to increase their efficiency.

4.1.1.4 MARKETING

The Thai government is employing the trade policy by signing bilateral trade agreements with many countries around the world, The recent success of an agreement on a free trade area (FTA) between Thailand and Bahrain, China, India, and Australia, will help increase the volume of containerized cargo passing through Laem Chabang port and will bring niche marketing opportunities into view.¹⁰¹

4.1.1.5 CUSTOMS' FREE ZONE

Another policy under the responsibility of the Thai Customs Department is the Customs' Free Zone, The purpose of which is to attract foreign and domestic

¹⁰⁰ Office of the Mercantile Marine Promotion Commission, op. cit., p.10

¹⁰¹ The Bangkok Shipowners and Agents Association, op. cit., p.70.

manufacturers to Thailand. The advantages offered by a Free Zone Program are as follows, according to BSAA,

- 1) The imported merchandise moved into or manufactured in a Free Zone for industrial, commercial or any other operations involving economic growth and development is not subject to import taxes and duties.
- 2) The import of a component or raw material into a Free Zone is free of taxes and duties and no customs duty is charged if it is re-exported to other countries.¹⁰²

4.1.2 EXTERNAL THREATS

4.1.2.1 ECONOMY

Since Thailand is a major importer of crude, especially for industrial manufacturing, there is a desire to find a ways to avoid the impact of fluctuating of crude prices. This is one barrier to the competitive advantages of container ports in Thailand that will be continued into the future.

4.1.2.2 MARKETING

Ports in neighboring countries are developing and increasing in size, and though this is not a serious threat at this time, in the near future they can become major competitors for container market shares. One significant example is the development of Da Nang port in Central Vietnam, which is part of the 500 kilometres long Route No. 1 that links Mukdahan of Thailand and Suwanaket of Laos. Route No. 2, which runs from Nakhon Phanom in Thailand through the Kammuan district of Laos to Ha Tint in Vietnam is 200 kilometres long. These projects are almost finished, and soon some containerized cargoes from both the Northeast of Thailand and Laos will shift to Danang port. Additionally, Malaysia's increasingly significant Klang port has taken some container business from the port at Laem Chabang because they offer lower transport cost and some lead-time to Europe and the United States of America. At present, some rubber products along with canned and processed seafoods are transported to Klang port.

¹⁰² The Bangkok Shipowners and Agents Association, op. cit., pp.64-65.

4.1.3 INTERNAL STRENGTHS

4.1.3.1 SERVICES

Laem Chabang port is composed of modern facilities that meet international standards for containerized cargo handling services. Lad Krabang Inland Container Depot (ICD) acts as the inland container port of Laem Chabang as well as the node of linkage between Laem Chabang and various sites of industrial production. To a lesser extent, Most of the Container Freight Stations Operators in Lad Krabang ICD are affiliated with the container terminal operators at Laem Chabang port.

4.1.3.2 LOCAL RESOURCES

Labour skill is acceptable by main liners in significant. (Based on data received through interviews with executives from foreign main liners). Free of natural disasters and can accept the calls of larger container ocean vessel.

4.1.4 INTERNAL WEAKNESSES

4.1.4.1 ECONOMY

Since there are plans to extend the port at Laem Chabang, there are some issues with local communities related to occupations and pollution.

4.1.4.2 MANAGEMENT AND ORGANIZATION

National legislation and ministerial directives can distort the market responsibilities of Thai container ports. The government policy of port privatization is in conflict with labour unions in the Port Authority of Thailand.

4.1.4.3 TERMINAL OPERATIONS

The majority of shareholders in container terminal operators are foreign companies, which gives the Thai government a less bargaining power when need to adjust some unanticipated barrier concerning the fair interests of all participants who using container port.

4.2 CONTAINER PORTS' ENVIRONMENT QUANTITATIVE ANALYSIS

This section is applied AHP method to make SWOT analysis for Thailand's current container port environments. The following definitions need to be made at this point; SWOT groups refer to four entities (i.e. strengths, weaknesses, opportunities and threats) and SWOT factors refer to the individual underlying these group. The method introduces proceeds as follows:

- (1) SWOT analysis is carried out. The relevant factors of the external and internal environment are identified and included in SWOT analysis. When standard AHP is applied, it is recommended that the number of factors within a SWOT group should not exceed 10 because the number of pairwise comparisons needed in the analysis increases rapidly.
- (2) Pairwise comparisons between SWOT factors are carried out within every SWOT group. When making the comparisons, the questions at stake are: (1) which of the two factors compared is a greater strength (opportunities, weakness or threat); and (2) how much greater. With these comparisons as the input, the relative local priorities of the factors are computed using the eigenvalue method. These priorities relative importance of the factors.
- (3) Pairwise comparisons are made between the four SWOT groups. The factor with the highest local priority is chosen from each group to represent the group. These four factors are then compared and their relative priorities are calculated as in step 2. These are the scaling factors of the four SWOT groups and they are used to calculate the overall (global) priorities of the independent factors within them. This is done by multiplying the factors' local priorities (defined in step 2) by the value of the corresponding scaling factor of the SWOT group. The global priorities of all the factors sum up to one.

(4) The results are utilized in the strategy formulation and evaluation process. The contribution to the strategic planning process comes in the form of numerical values for the factors. New goals may be set, strategies defined and such implementations planned as take into close consideration the foremost factors.

The analytical findings of SWOT analysis of alternative container port's environments are shown in Table 4.5 to 4.8 as follows:

TABLE 4.5 THE SWOT ANALYSIS OF LAEM CHABANG CONTAINER PORT

SWOT groups	Priorities of the groups	SWOT Factors	Consistency ratio	Priorities of the factors within the group
Strengths	0.323	(1) Information transaction (2) Skilled labour (3) Technology know-how (4) User's demand	0.01 %	0.151 0.090 0.052 0.031
Weaknesses	0.111	(1) Geographical location (2) Management policy (3) Connectivity (4) Supporting industries	0.03 %	0.051 0.009 0.019 0.032
Opportunities	0.108	(1) Economic growth (2) Government policy (3) Government marketing (4) Customs policy	0.03 %	0.040 0.008 0.036 0.023
Threats	0.458	(1) Neighboring rivals (2) Crude oil dependence (3) Environment issues (4) Privatization project	0.02 %	0.218 0.080 0.036 0.123

The results of SWOT quantitative analysis of Laem Chabang container port's current environments in which shown in Table 4.5 above are considerably important. In terms of internal environments that include strengths and weaknesses, it found that strengths could overcome weaknesses with higher priority of 0.323 percent against 0.111 percent of the latter. While the external environments, including opportunities and threats, show in different way that threats are higher than opportunities (0.458 percent against 0.108 percent). Furthermore, considering in the impact of factors in SWOT factors on the competitiveness of Laem Chabang can be found that: in terms of

strengths, information transactions and skilled labour are significant factors contributing to the strong position of it; however, in case of weaknesses the major burdens are geographical location and management policy; whilst the high benefits of opportunities derive from economic growth and government policy; finally in terms of threats that it needs to combat deliberately are neighbouring rivals and privatization project of the government.

TABLE 4.6 THE SWOT ANALYSIS OF KLANG CONTAINER PORT

SWOT groups	Priorities of the groups	SWOT Factors	Consistency ratio	Priorities of the factors within the group
Strengths	0.455	(1) Information transaction (2) Skilled labour (3) Technology know-how (4) User's demand	0.01 %	0.212 0.126 0.073 0.043
Weaknesses	0.139	(1) Geographical location (2) Management policy (3) Connectivity (4) Supporting industries	0.06 %	0.019 0.065 0.039 0.016
Opportunities	0.320	(1) Economic growth (2) Government policy (3) Government marketing (4) Customs policy	0.04 %	0.177 0.049 0.078 0.017
Threats	0.086	(1) Neighbouring rivals (2) Crude oil dependence (3) Environment issues (4) Privatization project	0.05 %	0.046 0.009 0.024 0.006

In case of Klang container port's business environments (Table 4.6, the two most importance factors of strengths are the same as Laem Chabang, which are information transaction and skilled labour, noticeable the Klang's information transaction and skilled labour are greater than Laem Chabang. The Klang's opportunities are mainly based on economic growth (0.476) and government marketing (0.431). The problems of weaknesses and threats that challenge the competence of Klang container port are management policy, connectivity, neighbouring rivals, and environment issues. The environmental situation of Manila and Tanjung Priox (Table 4.7, 4.8) are shown the results, which seem felled into the same pattern of Laem Chabang and Klang cases

but only difference in terms of factor weights that are lesser than both former container ports.

TABLE 4.7 THE SWOT ANALYSIS OF MANILA CONTAINER PORT

SWOT groups	Priorities of the groups	SWOT Factors	Consistency ratio	Priorities of the factors within the group
Strengths	0.359	(1) Information transaction (2) Skilled labour (3) Technology know-how (4) User's demand	0.04 %	0.126 0.116 0.077 0.040
Weaknesses	0.120	(1) Geographical location (2) Management policy (3) Connectivity (4) Supporting industries	0.03 %	0.054 0.038 0.010 0.017
Opportunities	0.081	(1) Economic growth (2) Government policy (3) Government marketing (4) Customs policy	0.03 %	0.013 0.005 0.020 0.043
Threats	0.440	(1) Neighbouring rivals (2) Crude oil dependence (3) Environment issues (4) Privatization project	0.04 %	0.206 0.081 0.124 0.030

TABLE 4.8 THE SWOT ANALYSIS OF TANJUNG PRIOX CONTAINER PORT

SWOT groups	Priorities of the groups	SWOT Factors	Consistency ratio	Priorities of the factors within the group
Strengths	0.239	(1) Information transaction (2) Skilled labour (3) Technology know-how (4) User's demand	0.06 %	0.113 0.080 0.030 0.015
Weaknesses	0.128	(1) Geographical location (2) Management policy (3) Connectivity (4) Supporting industries	0.02 %	0.010 0.015 0.038 0.065
Opportunities	0.093	(1) Economic growth (2) Government policy (3) Government marketing (4) Customs policy	0.06 %	0.029 0.007 0.044 0.013
Threats	0.540	(1) Neighbouring rivals (2) Crude oil dependence (3) Environment issues (4) Privatization project	0.07 %	0.311 0.039 0.143 0.047

TABLE 4.9 THE ULTIMATE RESULTS OF SWOT ANALYSIS

Criteria Alternatives	Strengths	Weaknesses	Opportunities	Threats	Global Priorities	Order
LP	+0.323	-0.111	+0.108	-0.458	-0.138	3
KP	+0.455	-0.139	+0.320	-0.086	+0.550	1
MP	+0.359	-0.120	+0.081	-0.440	+0.120	2
TP	+0.239	-0.128	+0.093	-0.541	-0.337	4

Note: LP refers to Laem Chabang container port, KP refers to Klang container port, MP refers to Manila container port, and TP refers to Tanjung Prio container port.

The findings of SWOT analysis, by applied AHP method, for the competitive environment situations of container ports in this study show that Klang is most powerful in the current market position with the 0.550 points over the other three competitors. The comparing results, in Table 4.9, ranked Laem Chabang in the third position. These results are reasonable because of: (1) In terms of supporting industries and connectivity of Laem Chabang are rather so much weakness compare to Klang

and Manila container ports. This is may be caused by the policy of former Thai government that seemed less concentrate on the port industry. The related industries, that are become most importance for port competitiveness in present days (distribution center, packaging suppliers, freight agents, inland haulage company, bank, insurance company, hospital, and etc.) are not sufficient in providing the serve the expected needs of customers; (2) Geographical location is also caused to the deficiency of Laem Chabang, this is because its location is not in the prime position of main liner route. While in case of other three rivals, they located in closer to main route of Malacca Strait, both west-bound and east-bound, than Laem Chabang; (3) Privatization program and crude oil dependence are also made significant impact to the potentiality of Laem Chabang. The burden of privatization is becoming fiercely because the Thai Union Labour of State Enterprises are disagree with this policy of the government and they are perceived that it is not reasonable to change the status of state enterprises to become the private company because the objective of them is to serve the nation's growth and social welfare. In terms of energy for productions, Thailand is highly consumed the crude from abroad to serve to industrial sections, including port industry.

As a consequence, the swing frequently and high price of crude are unavoidable impact to the effectiveness of Thailand's container port operation. The main reason that the crude price is more impact to the Thai container port than other three regional competitors is based on the fact that those three countries are possessed some sources of the crude fossils. However, as the structural position of container traffic industry has been changing frequently, hence the environments circumscribe in this industry should to be closely monitored by each rivals in expecting to sustain and extend their competitive edge.

4.3 THE CONTAINER PORTS' COMPETITIVE ADVANTAGES ANALYSIS

The purpose of this section is to analyze the results of the two field surveys. The first survey asked about key independent variables that affect the competitive advantages of container ports while the second survey compared of important criteria contributing to the sound competitive advantages of container ports. The combined data represents

the perceptions of container port users. Table 4.10 illustrates the summarized results of the first survey. The first survey was conducted during the first half of June 2005 by direct interviews, e-mail and telephone methods.

TABEL 4.10 THE SUMMARIZATION OF PCA SURVEYS

Activities	Respondents	Characteristics of Respondents	Quantity of questionnaires
Questionnaire distributions	Academics & Professionals	Academics, government researchers, container terminal managements	20(25%)
	Port Authority of Thailand	Managements and researchers of PAT	20(25%)
	Shipping lines	Ship owners, ship agents (both foreign shipping companies who affiliated in Thailand and domestic shipping providers	20(25%)
	Shippers	Thailand's consignees, consignors, and freight forwarders	20(25%)
		Total	80 (100%)
Questionnaire filled completely returns	Academics & Professionals	Academics, researchers, port authority researchers, container terminal managements	8(40%)
	Port Authority of Thailand	Managements and researchers of PAT	12(60%)
	Shipping lines	Ship owners, ship agents (both foreign shipping companies who affiliated in Thailand and domestic shipping	19(95%)
	Shippers	Thailand's consignees, consignors, and freight forwarders.	15(75%)
		Total	54 (68%)

The survey was made through totally 80 questionnaires and 54 completely filled returns (68%). In terms of each category of respondents shipping lines are made highest proportion in responding of 95 percent following by shippers with 75, the port authority of Thailand's officers with 60, and academics and professionals with 40 percent respectively.

However, this proportional rate of completely filled returns is accorded to the conventional field survey practice, hence it is reasonable in reliability of representative data gathered. Furthermore, in case of academics and professionals all of them have been working in the area related to the maritime transportation. Almost of academics, who responded to the questionnaires, have been lectured and researched for the shipping industry for considerably period of years.

The professionals, who are part of representatives of this research, are working with the Thailand's government agents that have been indirectly and directly responsible to the ocean going business of the country such as the Office of the Mercantile Marine Promotion Commission, the Department of Maritime Transport and Commerce, and the Office of Transport and Traffic Policy and Planning.

This sector illustrates the results of factor component analysis. A total of 15 variables proposed by professionals and academics in the area of port management and shipping industry, and from previous international studies. The main objective of principal component analysis is to reduce the number of variables to the smallest number of factors that have no relation to each other. The results of the analysis will be used to further analyze the importance of factors contributing to the potential competitive advantages of container ports. The results of the analysis are composed of four independent criteria. The variables that are closely related are grouped together as detailed in the next section.

4.3.1 THE STATISTICAL RESULTS OF PCA ANALYSIS

In this section illustrates the statistical results of the analysis. The component matrix shows the factor loading of each criterion in each factor. Using the technique of Principal Component Analysis for the general criteria of container port competitiveness, the results are as follows:

4.3.1.1 DESCRIPTIVE STATISTICS

There are fifteen variables in all, and, from the attitudes of 54 respondents the mean categories can be divided into two groups of variables. Total throughput, inland cargo

advantage, foreland cargo advantage, transnational corporation's industrial products, infrastructures, superstructures, maritime access, intermodal interface, number of visiting vessels, supporting industries, transshipments, and service level are ranked at higher than 4 points, and the lesser group are composed of port location, and hinterland access.

The statistical description of the detailed result is shown in Table 4.11. In considering the impact of standard deviation on each criterion, the questionnaire results reported that the highest reading is for maritime access. The lowest reading is 0.50063 for transnational corporation's industrial products.

TABLE 4.11 THE RESULTS OF DESCRIPTIVE STATISTICAL ANALYSIS

	Mean	Std. Deviation	Analysis N
total throughput	4.5439	.50250	54
inland cargo advantage	4.4912	.53861	54
foreland cargo advantage	4.5088	.57080	54
transnational corporation's industrial products	4.5614	.50063	54
number of visiting vessels	4.5263	.53803	54
infrastructures	4.3684	.52207	54
superstructures	4.4211	.56529	54
port location	3.5789	.56529	54
service level	4.5088	.53861	54
inland access	3.5789	.56529	54
maritime access	4.2807	.61975	54
intermodal interface	4.3684	.55522	54
skilled labour	4.4912	.53861	54
supporting industries	4.4561	.56915	54
transshipments	4.5263	.53803	54

Note: Calculated by the technique of Principal Component Analysis

4.3.1.2 THE RESULTS OF PRINCIPAL COMPONENT ANALYSIS

In this part of the analysis, the factors that compose the fifteen criteria mentioned in previous section are determined, and the results lead to the four principal factors including: “throughput”, “facilities”, “services”, and “location”. From the component matrix, the factors are classified by using a weighting method. In this case, we can

assume the high weights of variables in each component should be grouped into the same criteria. As a consequence, component 1 is comprised of the following variables: total throughput, number of visiting vessels, foreland cargo advantage, transnational corporation's industrial production, inland cargo advantage, and transshipments. Component 2 is comprised of infrastructure, intermodal interface, superstructure, and maritime access. of skilled labour, service level, and supporting industries. Component 3 is comprised of skilled labour, service level, and supporting industries. Component 4 is comprised of port location and hinterland access.

The details of the principal analysis are shown in Table 4.12. However, for the implied meaning of each component for the following analysis, we should to name each component that: component 1 is named as “throughput”; component 2 is named as “facilities”; component 3 is named as “services”; and component 4 is named as “location”.

TABLE 4.12 THE ROTATED COMPONENT MATRIX

	Component			
	1	2	3	4
total throughput	.989			
number of visiting vessels	.974			
foreland cargo advantage	.961			
transnational corporation's industrial products	.938			
transshipments	.928			
inland cargo advantage	.928	.134		
infrastructures		.875		-.117
intermodal interface	-.104	.816	-.154	
superstructures	.149	.776		-.128
maritime access	.248	.750	.210	.136
skilled labour			.950	-.120
service level			.912	-.174
supporting industries			.896	
port location				.986
inland access				.986

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. A rotation converged in 5 iterations.

To serve the purpose of this thesis, the criteria that are close in correlation are grouped into the same factor. In accordance with the rotation method of Varimax with Kaiser Normalization, the results of Table 4.12 are appropriate to the purpose of this thesis. It has none of the same criteria that are posed in the same factor in terms of weight loading. These results are useful for making further questionnaires regarding the competitive advantages of container ports.

Additionally, in Table 4.13, the confirmation of component analysis is illustrated. It shows the comparison of the initial eigenvalues, extraction sums of squared loading, and rotation sums of squared loading. The component analysis is approved by the reasonable variance explained. The cumulative percent of variance of four factors could be explained the probability of all independent variables up to 86.14 percent. Undoubtedly, the results of factor analysis using the PCA techniques are accepted for embracing the factors relating to the competitive advantages for container port performance.

TABLE 4.13 TOTAL VARIANCE EXPLAINED

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.728	38.186	38.186	5.564	37.094	37.094
2	3.025	20.166	58.353	2.661	17.738	54.831
3	2.361	15.738	74.091	2.632	17.547	72.378
4	1.808	12.052	86.143	2.065	13.765	86.143
5	.844	5.630	91.772			
6	.373	2.490	94.262			
7	.236	1.575	95.837			
8	.208	1.390	97.227			
9	.145	.965	98.192			
10	.116	.774	98.966			
11	.078	.523	99.488			
12	.064	.427	99.915			
13	.013	.085	100.000			
14	2.476E-16	1.651E-15	100.000			
15	1.446E-16	9.637E-16	100.000			

Extraction Method: Principal Component Analysis.

4.3.2 THE ANALYSIS OF POTENTIAL COMPETITIVE FACTORS

4.3.2.1 HIERARCHY STRUCTURE OF MODEL

This section discussed the steps necessary for analyzing the potential competitive factors derived from the analysis in section 4.3.1. This time, a method called AHP analysis was used to obtain the needed objective. The purpose of this section is to examine the subjective contributions of container port's consumers on the competitiveness of container ports study in this thesis. The groups of respondents both foreign and domestic are including shipping companies, shippers and related individual executives.

The classification of container port's respondents was defined in Table 4.14 as below. The respondents were asked to indicate, in the questionnaires, which one of each pair of potential factors in the second level of hierarchy model is more important and how much intensity by specified weight of the fundamental scale (see section 3.4.3) with respect to the highest competitive container port that is ultimate objective (first level).

Then, the comparison of each pair of alternatives in third level also needed to specify the weight from fundamental scale, which one is more importance and how much of intensity relating to each criterion in the second level (see the hierarchy structure of model below).

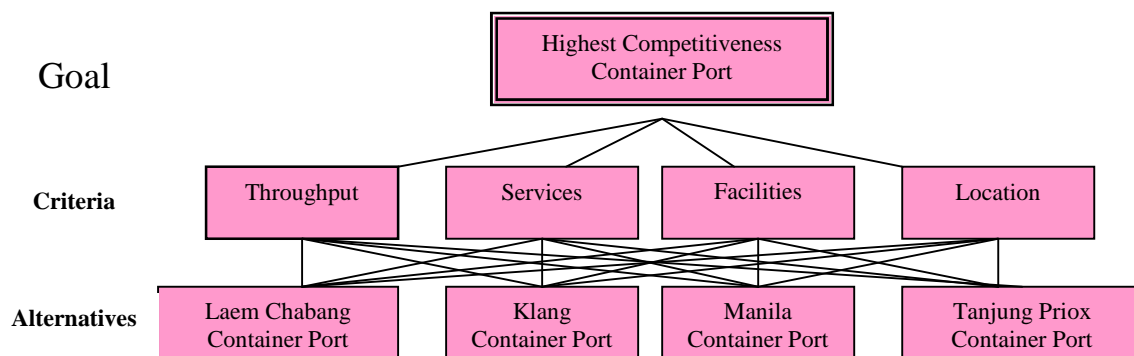


FIGURE 4.1 HIERARCHY STRUCTURE OF MODEL

4.3.2.2. THE SURVEY OF POTENTIAL COMPETITIVE FACTORS

The results were analyzed by using the AHP technique. The primary data from the field survey on the perceptions of respondents regarding the competitive factors were calculated to get average scores. This second survey was distributed during the second half of June 2005. From a total of 60 questionnaires distributed, 37(62%) were completed and returned. In terms of each category of respondents, academics and professionals are made highest proportion in responding of 80 percent following by the port authority of Thailand's officers with 70, shipping lines with 64, and shippers with 60 percent respectively. The summary of surveying data is shown in Table 4.14 and the pairwise comparisons of raw data are shown in Table 4.15 through 4.19.

TABLE 4.14 THE SUMMARIZATION OF AHP'S FIELD SURVEYS

Activities	Respondents	Characteristics of Respondents	Quantity of questionnaires
Questionnaire distributions	Academics & Professionals	Academics, government researchers, container terminal managements	10
	Port Authority of Thailand	Managements and researchers of PAT	10
	Shipping lines	Ship owners, ship agents (both foreign shipping companies who affiliated in Thailand and domestic shipping providers	25
	Shippers	Thailand's consignees, consignors, and freight forwarders	15
		Total	60 (100%)
Questionnaire filled completely returns	Academics & Professionals	Academics, researchers, port authority researchers, container terminal managements	8(80%)
	Port Authority of Thailand	Managements and researchers of PAT	7(70%)
	Shipping lines	Ship owners, ship agents (both foreign shipping companies who affiliated in Thailand and domestic shipping	16(64%)
	Shippers	Thailand's consignees, consignors, and freight forwarders.	9(60%)
		Total	37 (62%)

TABLE 4.15 COMPARES THE RELATIVE IMPORTANCE WITH RESPECT TO CRITERIA

Criteria	Intensities																Criteria	
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8		9
Facilities								⊗										Services
Facilities							⊗											Location
Facilities										⊗								Throughput
Services									⊗									Location
Services												⊗						Throughput
Location												⊗						Throughput
C.I. = 0.01																		

Note: Data derived from questionnaire survey of intensities on averaging.

TABLE 4.16 COMPARES THE RELATIVE IMPORTANCE WITH RESPECT TO THROUGHPUT

Throughput	Intensities																Throughput	
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8		9
LP							⊗											KP
LP				⊗														MP
LP			⊗															TP
KP							⊗											MP
KP						⊗												TP
MP								⊗										TP
C.I. = 0.02																		

Note: 1. Data derived from questionnaire survey of intensities on averaging.

2. LP refers to Laem Chabang container port, KP refers to Klang container port, MP refers to Manila container port, and TP refers to Tanjung Prio container port.

TABLE 4.17 COMPARES THE RELATIVE IMPORTANCE WITH RESPECT TO SERVICES

Services	Intensities																Services	
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8		9
LP											⊗							KP
LP						⊗												MP
LP					⊗													TP
KP					⊗													MP
KP				⊗														TP
MP								⊗										TP
C.I. = 0.05																		

Note: 1. Data derived from questionnaire survey of intensities on averaging.

2. LP refers to Laem Chabang container port, KP refers to Klang container port, MP refers to Manila container port, and TP refers to Tanjung Prio container port.

TABLE 4.18 COMPARES THE RELATIVE IMPORTANCE WITH RESPECT TO FACILITIES

Facilities	Intensities																Facilities	
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8		9
LP											⊗							KP
LP					⊗													MP
LP						⊗												TP
KP		⊗																MP
KP					⊗													TP
MP										⊗								TP
C.I. = 0.03																		

Note: 1. Data derived from questionnaire survey of intensities on averaging.

2. LP refers to Laem Chabang container port, KP refers to Klang container port, MP refers to Manila container port, and TP refers to Tanjung Prio container port.

TABLE 4.19 COMPARES THE RELATIVE IMPORTANCE WITH RESPECT TO LOCATION

Location	Intensities																Location	
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8		9
LP													⊗					KP
LP												⊗						MP
LP										⊗								TP
KP					⊗													MP
KP						⊗												TP
MP								⊗										TP
C.I. = 0.06																		

Note: 1. Data derived from questionnaire survey of intensities on averaging.

2. LP refers to Laem Chabang container port, KP refers to Klang container port, MP refers to Manila container port, and TP refers to Tanjung Prio container port.

4.3.2.3 THE RESULTS OF PAIRWISE COMPARISON AND FINDINGS

This section of analysis needs to build the matrix of pairwise comparison of four criteria and four alternatives derived in previous calculated of section 4.3.3. First, the pairwise comparison of criteria between each pair of them can be raised on the fundamental scale of ratio by comparing the intensity of each pair of criteria to the relative of ratio scale; hence the matrix of criteria pairwise comparison is produced as shown in Table 4.20.

Second step of comparison is compares each pair of alternatives relative to each criterion of the second level. In addition, both steps have, after making comparisons, to compute to find normalized priorities as well. The results of alternatives pairwise comparisons have been shown in Table 4.21 through Table 4.24 respectively.

TABLE 4.20 MATRIX OF PAIRWISE COMPARISON OF CRITERIA

Criteria	Throughput	Services	Facilities	Location	Normalized priorities	Order
Throughput	1	4	2	4	0.492	1
Services	1/4	1	1/3	1	0.123	3
Facilities	1/2	2	1	3	0.274	2
Location	1/4	1	1/3	1	0.112	4
C.I. = 0.01						

TABLE 4.21 MATRIX OF PAIRWISE COMPARISON OF ALTERNATIVES WITH RESPECT TO THROUGHPUT

Throughput	LP	KP	MP	TP	Normalized priorities	Order
LP	1	3	6	7	0.588	1
KP	1/3	1	3	4	0.247	2
MP	1/6	1/3	1	2	0.101	3
TP	1/7	1/4	1/2	1	0.064	4
C.I. = 0.02						

TABLE 4.22 MATRIX OF PAIRWISE COMPARISON OF ALTERNATIVES WITH RESPECT TO SERVICES

Services	LP	KP	MP	TP	Normalized priorities	Order
LP	1	1/3	4	5	0.286	2
KP	3	1	5	6	0.552	1
MP	1/4	1/5	1	2	0.099	3
TP	1/5	1/6	1/2	1	0.063	4
C.I. = 0.05						

TABLE 4.23 MATRIX OF PAIRWISE COMPARISON OF ALTERNATIVES
WITH RESPECT TO FACILITIES

Facilities	LP	KP	MP	TP	Normalized priorities	Order
LP	1	1/3	5	4	0.277	2
KP	3	1	8	5	0.570	1
MP	1/5	1/8	1	1/2	0.057	4
TP	1/4	1/5	2	1	0.096	3
C.I. = 0.03						

TABLE 4.24 MATRIX OF PAIRWISE COMPARISON OF ALTERNATIVES
WITH RESPECT TO LOCATION

Location	LP	KP	MP	TP	Normalized priorities	Order
LP	1	1/5	1/3	1/2	0.079	4
KP	5	1	5	4	0.598	1
MP	3	1/5	1	2	0.195	2
TP	2	1/4	1/2	1	0.129	3
C.I. = 0.06						

4.3.2.4 THE ULTIMATE FINDINGS OF COMPETITIVE ANALYSIS

In this section shows the ultimate result of container port's competitive analysis that is the rank of competitiveness of comparing container port's alternatives. It is obviously the highest competitiveness container port is Klang relative to other three competitors by the composite priority of 0.459 following by Laem Chabang, Tanjung Priox, and Manila respectively. The empirical finding is shown from Table 4.25 through 4.31 as shown below.

TABLE 4.25 RESULTS OF CRITERIA LEVEL

Criteria	Respondents				Normalized priorities	Order
	Academics & Professionals	PA Executives	Shipowners	Shippers		
Throughput	0.488	0.485	0.498	0.495	0.492	1
Services	0.126	0.117	0.124	0.123	0.123	3
Facilities	0.273	0.284	0.263	0.275	0.274	2
Location	0.111	0.113	0.117	0.108	0.112	4
	1.00	1.00	1.00	1.00	1.00	

TABLE 4.26 RESULTS OF ALTERNATIVE LEVEL WITH RESPECT TO THROUGHPUT

Throughput	Respondents				Normalized priorities	Order
	Academics & Professionals	PA Executives	Shipowners	Shippers		
LP	0.585	0.583	0.593	0.591	0.588	1
KP	0.240	0.238	0.255	0.253	0.247	2
MP	0.103	0.109	0.093	0.097	0.101	3
TP	0.067	0.065	0.063	0.061	0.064	4
	1.00	1.00	1.00	1.00	1.00	

TABLE 4.27 RESULTS OF ALTERNATIVE LEVEL WITH RESPECT TO SERVICES

Services	Respondents				Normalized priorities	Order
	Academics & Professionals	PA Executives	Shipowners	Shippers		
LP	0.281	0.278	0.293	0.290	0.286	2
KP	0.550	0.548	0.554	0.557	0.552	1
MP	0.104	0.103	0.095	0.093	0.099	3
TP	0.064	0.066	0.061	0.062	0.063	4
	1.00	1.00	1.00	1.00	1.00	

TABLE 4.28 RESULTS OF ALTERNATIVE LEVEL WITH RESPECT TO FACILITIES

Facilities	Respondents				Normalized priorities	Order
	Academics & Professionals	PA Executives	Shipowners	Shippers		
LP	0.275	0.283	0.272	0.278	0.277	2
KP	0.573	0.571	0.566	0.569	0.570	1
MP	0.052	0.055	0.058	0.061	0.057	4
TP	0.097	0.092	0.099	0.094	0.096	3
	1.00	1.00	1.00	1.00	1.00	

TABLE 4.29 RESULTS OF ALTERNATIVE LEVEL WITH RESPECT TO LOCATION

Location	Respondents				Normalized priorities	Order
	Academics & Professionals	PA Executives	Shipowners	Shippers		
LP	0.071	0.074	0.082	0.087	0.079	4
KP	0.603	0.606	0.593	0.589	0.598	1
MP	0.201	0.198	0.191	0.188	0.195	2
TP	0.124	0.126	0.133	0.131	0.129	3
	1.00	1.00	1.00	1.00	1.00	

TABLE 4.30 SUMMARISATION OF THE HIERARCHY ANALYSIS

Highest Competitive Container Port (1.000)	Throughput (0.492)	LP = 0.588
		KP = 0.247
		MP = 0.101
		TP = 0.064
	Services (0.123)	LP = 0.286
		KP = 0.552
		MP = 0.099
		TP = 0.063
	Facilities (0.274)	LP = 0.277
		KP = 0.570
		MP = 0.057
		TP = 0.096
	Location (0.112)	LP = 0.079
		KP = 0.598
		MP = 0.195
		TP = 0.129

TABLE 4.31 THE RESULTS OF COMPARING CONTAINER PORT'S
COMPETITIVE ADVANTAGES

Criteria	Throughput	Services	Facilities	Location	Composite	Order
Alternatives	(0.492)	(0.123)	(0.274)	(0.112)	Priorities	
LP	0.588	0.286	0.277	0.079	0.409	2
KP	0.247	0.552	0.570	0.598	0.412	1
MP	0.101	0.099	0.057	0.195	0.099	3
TP	0.064	0.063	0.096	0.129	0.080	4
	1.00	1.00	1.00	1.00	1.00	

The comparative competition results in each step of analysis are considerably preciseness. This assumption is based on the quantitative findings in every step of evaluations whether they are concordance between the average weights giving by respondents and normalized priorities of AHP results. The findings show the congruency between them hence the assumption is confirmed. According to the criteria analysis it is approved the highest importance of containerized cargo volume that represented by throughput criteria. Among the perceptions of respondents,

shipowners and shippers are main two groups of container port users that give high concentration on the volume traffics. This is due to the fact that cargo volume is the direct source of profit making and lower costs of sea transportation. When shipping lines make a decision on which port should to make directly calls, the important factor that needs to take into account is the volume. Similarly, shippers, both consignees and consignors, also give high priority on the amount of cargo flows. The huge of cargoes mean high frequency of main liners direct calls at container port that lead to the reduction of logistics costs and quick respond to the market demands on the right time and space. In terms of port facilities, it stands in the second priority.

Generally, the port authorities are quite given most concern about the capacity and utility of port's infrastructures and superstructures in significance. Because they assume the possibility of container terminal operation efficiency and effectiveness is incurred by the potentiality of the handling productivity. Therefore, this is the reason why the port authority respondents are focusing on the criterion of facilities most intensity.

Even though the services entity is positioned the third, it is nowadays becoming more increasing important role in attracting the users. It is found most significance from the academics viewpoint. This is because the influence of the advanced know-how development in the area of service management is looking forward to the service paradigm. As a consequence, the location is least importance regarding to the perceptions of the representative respondents of container port customers.

The rationale underlines the least potential of location can be explained by the assumption made by Hayuth that "shipowners consider profitability from the perspective of the entirety of their operation, from door to door".¹⁰³ This idea implies that the port location solely may be, for many cases, not so much importance to the decision of ship operators because of the fact that they are presently evaluating the route by adopting supply chain approach.

¹⁰³ Y. Hayuth, "Containerization and the load center concept", *Economic Geography*, Vol. 57, No. 2, 1981, pp.160-176.

The discovered findings reveal that Laem Chabang is best competency in terms of throughput. This is the derived consequence of Thailand's economic growth during recent years. Also, some sectors of domestic industrial productions are booming in which lead to an increasing of cargo traffic flows, both inbound and outbound, of raw materials, semi-finished and finished industrial products. The government policy on bilateral agreement of free trade is another determinant that bring to the highest competitiveness of Laem Chabang in accordance with the factor of throughput.

Nevertheless, it is unfortunately for Laem Chabang that for other three variables of criteria including: services; facilities; and location, the results in relating to the capability of Laem Chabang are reversed. It is noteworthy to take more consider in terms of services, supporting industries in the performance arena of Laem Chabang and immediate urban zone are seem insufficient. The government policy in relating to this concern is still be slowing in respond to an ever changing of maritime industry, specific on port sector.

Almost value-added logistics activities that are being very importance for container port services, which are adopted in the prominent container load center around the world, are very weak in the context of Laem Chabang. The rationale to support this idea might be based on the reluctant perceptions and visions of all organizations and sectors that have taken responsibility for maritime development in the country.

So, the implying derived from the criterion of services, for Laem Chabang, is the urgently need to improve the existing supporting logistics activities as well as an establishment of new ones and, at the same time, more participation by private sectors is needed. Laem Chabang ranks second in according to facilities. This is because of, in case of Klang, the Malaysian government envisions it becoming the hub center for national and regional traffic. The Klang Port Authority has pursued a series of privatization programs to achieve higher efficiency and productivity and has taken over all port operations from the Malaysian Railway Administration, hence the financial funds for developing and adopting higher technology handling equipments and important infrastructures/superstructures are wide available, especially foreign

capital. Privatization has enables Klang to have access to foreign capital, management know-how and state-of-the-art technology.¹⁰⁴

Noteworthy, even though it lags effectiveness behind Klang' facilities, Laem Chabang' capacity can also handled for the vessel of post-Panamax size.¹⁰⁵ However, the Port Authority of Thailand has also tried to improve and develop some projects related to intermodal interfaces, but unfortunately they are still be in an initiative stage of planning.¹⁰⁶

The Laem Chabang's location competitive advantage is least influence as showed by the numerical discovery. This is clearly understandable due to it is not located on the prime geographical location. It would take an estimated two and a half day increase in the amount of time for container vessels taking the Straits of Malacca route to call at the Port of Laem Chabang.

Ultimately, the final results of comparative container port competitiveness study, between four representative alternatives, are reached as illustrate in Table 4.31. Klang is the highest competitive performance with scores 0.412, following by Laem Chabang in the second position of scores 0.409, Manila is the third with scores 0.099, and Tanjung Prio with scores 0.080.

Laem Chabang with the less capability than Klang by 3 points, it seems possibly for Laem Chabang's opportunity to fulfill the status of regional hub in the Southeast Asian Region. As a consequence, the sound economic booms of the country that can derive, in part, by the driven-power of port operational efficiency and effectiveness are quite important for Thailand.

¹⁰⁴ C. Lin Sien, M. Goh and J., Tongzon, op. cit., p.42.

¹⁰⁵ Laem Chabang recorded a success when its first post-Panamax vessel of 5,250 TEUs docked at the port on 5 March 1997. (Data from the Port Authority of Thailand)

¹⁰⁶ For example, there are plans for an efficient intermodal transport system, such as using a double track railway and a highway network. (Data from the Port Authority of Thailand)

The container port users; specify liners, consignees, and consignors, have been complained about the inconsistency of government policy on port regulations and cooperating conflicts between the Port Authority and terminal handling providers. These issues are potential forces for the decision on port choice of container shipping lines and shippers. These are also currently challenges facing by Laem Chabang.

For the purpose of sufficient insight of the container port competitive advantages' findings of this study, the methods of sensitivity analysis have been employed in forms of graphical models that have shown in Figure 4.2 to 4.6.

It shows, in Figure 4.2, the whole performance sensitivity analysis framework of competitiveness. Among four container ports it found that Klang is highest in performances and in terms of the potential criteria that impact to the efficiency and effectiveness of services provided the throughput is most forcefulness following by facilities, services, and location respectively.

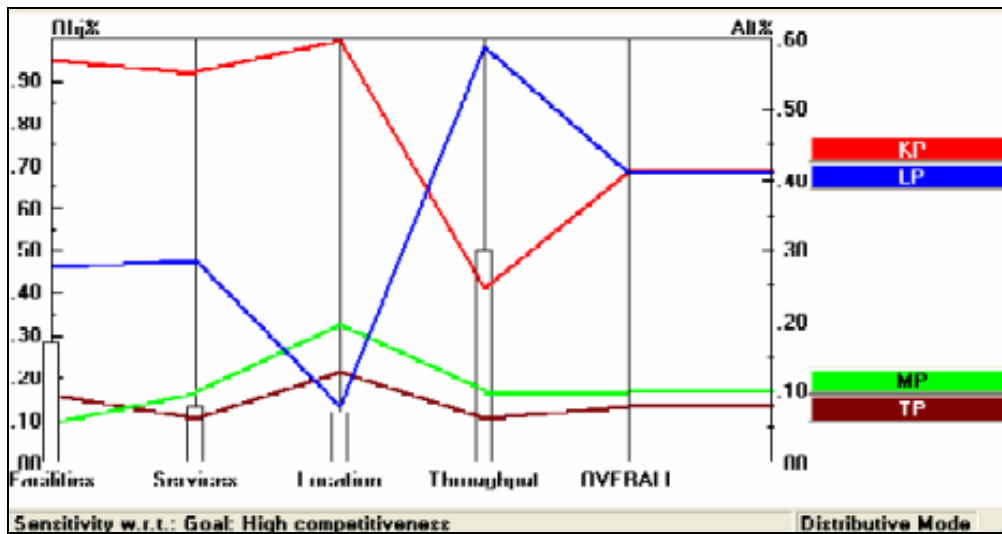


FIGURE 4.2 THE PERFORMANCE SENSITIVITY ANALYSIS

From Figure 4.3 to 4.5 the two-dimensional sensitivity analysis of a pair of criteria are demonstrated.

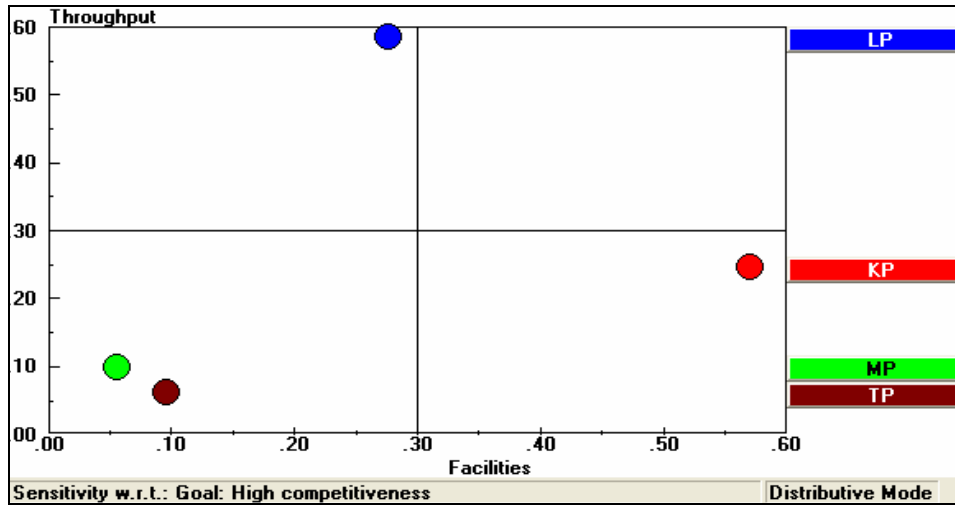


FIGURE 4.3 THE TWO DIMENSIONAL SENSITIVITY ANALYSIS BETWEEN SERVICES AND FACILITIES

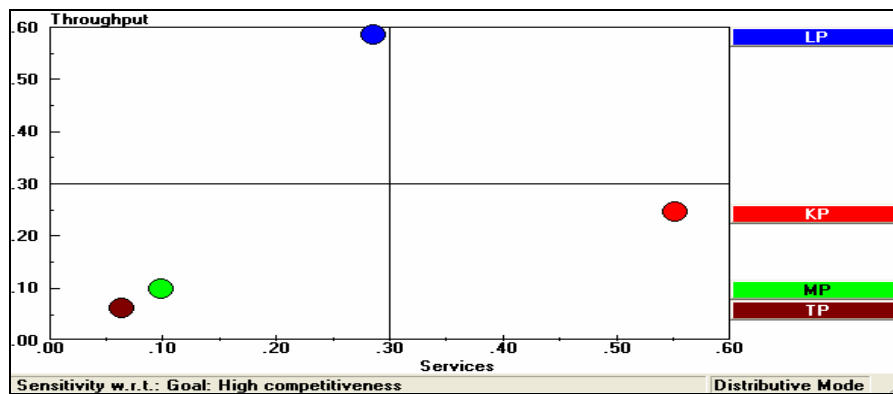


FIGURE 4.4 THE TWO DIMENSIONAL SENSITIVITY ANALYSIS BETWEEN SERVICES AND LOCATION

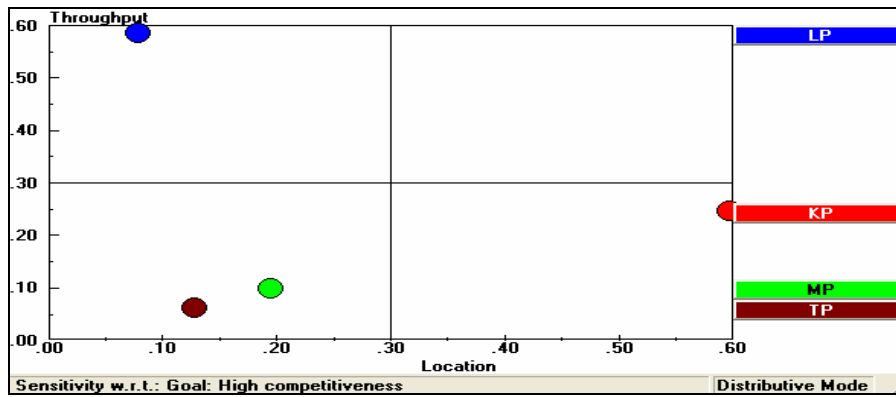


FIGURE 4.5 THE TWO DIMENSIONAL SENSITIVITY ANALYSIS BETWEEN SERVICES AND THROUGHPUT

The location of each container port in relating to the impact of a pair of criteria can be seen the superior of Klang, while Laem Chabang is quite credible just only in the variable of throughput with 59 percent of competitiveness. The competitive comparability between two container ports in response to all criteria in terms of dynamic sensitivity is showed in Figure 4.6.

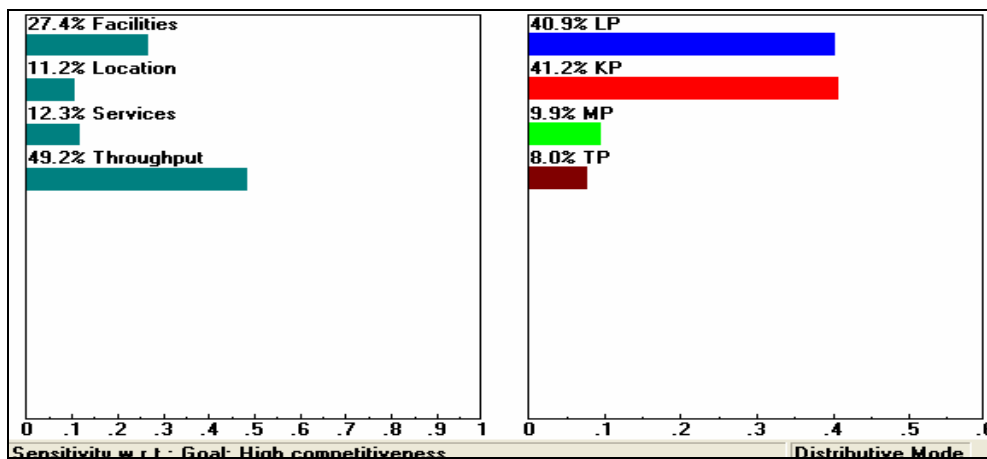


FIGURE 4.6 THE DYNAMIC SENSITIVITY ANALYSIS OF CONTAINER PORTS

The whole performance sensitivity of sample container port competitors as shown in Figure 4.2 indicates that the performance capability of each port is fluctuated with the influential level of each factors concerned. Klang's productivity is illustrated highest in terms of location and then a sharply down slope for the throughput. This feature of

Klang implies that the competitive capability of Klang is most dependent on the location and facility and it needs to improve the position relate to the role of throughput.

In case of Laem Chabang's sensitivity performance shows the highest strength on the throughput, so this factor is responded to the Laem Chabang's market sensitivity. However, it needs to focus on the location and facilities if it needs to increase the level of competitiveness. Briefly, Klang's sensitivity is 43 percent of all criteria in relating to its performance level. Laem Chabang is 41 percent and following by 11 and 9 percent for Manila and Tanjung Priok respectively. These indicators also demonstrate that Klang is highest responsiveness to market demand, following by Laem Chabang, Manila, and Tanjung Priok.

4.4 SUMMARY

This chapter comprises two sections of analyzing container port competitiveness: the first is concerned with the analysis of environment dimensions both external and internal of the container port industry, the second analyzes the highest competitiveness of container ports which are representatives for the purpose of this study. The results of analysis of both sections are derived from the field survey by questionnaire and interview methods. The techniques of analysis are both quantitative and qualitative approaches. A summary of the environmental characteristics of Thai container ports and its regional competitors follows.

4.4.1 EXTERNAL ENVIRONMENTS

In terms of opportunities, Thailand's Laem Chabang container port has several great advantages. They show a trend of sound economic growth, there is a strategy for a customs free zone, and the government has made a priority of developing intermodal transport linkage. When comparing with other three rivals, however, it ranked in the third place of significance. In terms of threats, it is being confronted with rising crude oil prices and privatization policy. To some extent, there are also significant challenges from Klang port in Malaysia, and Da Nang port in Vietnam in competing

for container market shares. In quantitative analysis, it found that the threats to Laem Chabang is most seriously with score -0.458 points, while Klang is challenged by threats slightest with score -0.086 . Then, Laem Chabang Container port is being in situations that need urgently to develop its strategic plan to cope in efficiency with the challenges of external environments of container freight business (see Table 4.9).

4.4.2 INTERNAL ENVIRONMENTS

In terms of internal strengths, Laem Chabang has no domestic rival so the government can fund all related resources for its projects of development. Laem Chabang is both supported by Lad Krabang ICD and excellent labours skills. In numerical perspective, when comparing to the group of its contestants, Laem Chabang is being placed in the third position of strength with score $+0.323$ (see Table 4.9).

Internal weaknesses have arisen as a result of conflict with local communities over the extension project, and with labour unions on the policy of port privatization. The bargaining power of foreign global companies has left little leverage for domestic shareholders and the Thai government.

In addition, Laem Chabang container port needs urgent improvement its strategic planning for getting higher competitive advantages over the neighbouring rivals. The problem of hesitating in any policy-making decision related to the operations and managements of container port will cause it lag far behind in marginal advantages as time goes by.

4.4.3 THE COMPETITIVE ADVANTAGES OF CONTAINER PORTS

The findings of comparable competitiveness among the rivals of container ports' performance are demonstrated the first predominant position of Klang container port with score 0.412 , whilst the Laem Chabang occupied the second affluence with score 0.409 . Manila ranked the third with score 0.099 and the fourth is Tanjung Prio with score 0.080 (see Table 4.31).

These final logical results confirm the competitive advantages of Klang container port. The score 0.412 implies that four competitive criteria (throughput, facilities, services and location) of Klang's performance can outperform over the other three competitors in terms of average competitiveness.

It is noteworthy that Klang container port is just a slight higher competitiveness than Laem Chabang ($0.412 - 0.409 = 0.003$). However, it is quite substantial with the economic terms of efficiency and effectiveness.

To illustrate in percentages of advantage competitiveness among four container ports, the findings showed that Klang container port, acquires 41.2 percent, Laem Chabang's competitive advantages was 40.9 percent, Manila was 9.9 percent, and Tanjung Prio was 8.0 percent.

Furthermore, the comparative competitiveness of four container ports, reflected by the port users in four criteria (throughput, facilities, services, and location) indicated that the users were satisfied with the Klang's performance up to 41.2 percent. This figure implies that if the container port's users have to make a port choice they would certainly select the Klang 41.2 percent, Laem Chabang 40.9, Manila 9.9, and Tanjung Prio 8.0 percent respectively.

The reason underline the above idea is because the users believe that they would get benefits by using Klang' terminal service for a possibility up to 41.2 percent, while, Laem Chabang's service will bring the profitable possibility to them for only 40.9 percent and so on.

Chapter five described the implications derived from the results of discovered findings from this chapter.

CHAPTER FIVE

THE COMPETITIVE ADVANTAGES OF THAILAND'S CONTAINER PORTS

This chapter describes the relative advantages of competitiveness of Thailand's container ports, specifically of Laem Chabang container port. The illustration is derived from the results of analysis in Chapter four. In brief, Laem Chabang's competitive advantages of performance need higher concentration in accordance with the perceptions of container port's users. However, in terms of the present situation of container shipping environments both external and internal, there are some considerable risks for Laem Chabang. Therefore, the results of this study in detail illustrate some implications in following sections.

5.1 GENERAL VIEWS OF COMPETITIVE ADVANTAGES OF THAILAND'S CONTAINER PORTS

In general, the performance and organizational structure of container ports in Thailand is quite outstanding within the ever-changing patterns of container port competitive environments in the era of globalization. This reflection is confirmed by interviewing some experts and as parallel to the expressions of some professionals.

However, some problems of the ineffectiveness of container freight traffics in container port area are, partly, due to the inefficiency of some procedures in steps of the administrations and operations of both directly and indirectly related maritime transportation's organizations in Thailand.

As a consequence, the Port Authority of Thailand, as a direct responsible body in providing management and administrative policies, has been trying to improve in variety of functions and procedures and expects to give customers with a high level of services.

Noteworthy, the Thai government has awarded the Laem Chabang's container-terminals to private operators for the long-term concession, an average of 30 years. This strategy seems quite well in efficiency of handling services, both in terms of costs of handling and laying time. Some executives of shipping lines affirmed this.

However, the analysis of this thesis, on the competitive advantages of Laem Chabang's performance in comparing to its rivals of neighbouring countries i.e. Klang, Manila, and Tanjung Priok container port, has demonstrated some remarkable findings in a rather complicated process. Hence, the following sections describe a detail of implications of container industry's environments and competitive advantages analysis of container ports in Thailand and the Southeast Asian region.

5.2 THAILAND'S CONTAINER PORT ENVIRONMENTS

This sector describes the characteristics of the container port's environments in Thailand, both external and internal circumstances of container shipping industry. They are based on the results of SWOT analysis for the environments of a fierce competition in container business in the Southeast Asian region. However, the description is focused mainly on Thailand's domestic territory.

5.2.1 EXTERNAL OPPORTUNITIES

In terms of domestic environments, it is obvious that Thailand's container port industry is more advantages in many dimensions of business environments. The perspective of economy shows a great opportunity in getting high advantage for cargo volume. This is due to the trend of economic growth of the countries that in turn will make the percentages of containerized cargo increasing consecutively for several coming years (see Table 4.1, 4.2). This beneficial inland cargo advantage is indicated by the attributions of shipping lines' respondents i.e. OOCL, HAPAG-LLOYD. They have directly called at Laem Chabang container port by the post-panamax container vessels twice a week. The main reason is that it has a sufficiency of domestic containerized cargoes.

In terms of politics, it is well for Thailand's container shipping. This is because of the Thai government needs to promote the maritime industry in many approaches in order to improve the whole system of the country's international trade. Specifically, the multimodal transport linkage development policy of the Thai government is also beneficial to container ports as well. As one of the threats to Thai inland container's marketing position is neighbouring rivals i.e. Klang and Da Nang, thus the development policy of multimodal transport will bring some competitive edge for Laem Chabang's market shares of behind-land cargoes.

Thai government's marketing and customs' free zone strategies are potential to attract more main liners calling directly at Laem Chabang container port by larger ocean vessels e.g. panamax and post-panamax sizes with fixing time-window. Some bilateral free trade agreements between Thailand and other countries, such as India, Australia, and China, are the instances of government marketing policy in which the role of Laem Chabang as the main container gateway of the country is increasing at the same time.

The customs' free zone is another strategy that increases the derived demand for transporting raw material, intermediate industrial and finished manufactured products. This is because of the number of foreign direct investments of manufacturing affiliates in Thailand have been increased due to the relief of importing and exporting taxes and duties for products move into or manufactured in a free zone industrial site.

Additionally, the country's growing wealth is fuelling much greater demand for the import of vehicles manufactured oversea, in particular European brands that are currently not manufactured in Thailand.

5.2.2 EXTERNAL THREATS

From the results of both quality and quantitative analysis of Laem Chabang's external threats, it found that the situation is destructing the competitive margin of Laem Chabang container market position. In terms of market share's competition, it is a strong threat to the status quo position of Laem Chabang.

According to the cooperation of development projects, i.e. the two projects of route construction between Thailand, Laos, and Vietnam, These projects will become the new gateways of land transportation between the three countries. However, the best opportunity seems to incline to Da Nang port of Vietnam quite obviously. It is not an over illustration of panic but based on the demand utility of shippers. Hence, it does not so far for increasing the level of competition for containerized cargo volume in the region.

Also, some market shares of the Southern parts of Thailand's products are shaking by transferring pass through the Southern border of Thailand to the Klang port of Malaysia. The present reality is that inland transport providers operating from Malaysia are currently putting their efforts into enticing Thai shippers to ship via Port of Klang by offering a lower freight rate, particularly for those shippers in the South of the country. This flaw cannot be disregarded even though the impact is not so fierce now.

The threat of high price of crude oil in the world market has much impact to Thai transportation system. Approximately 80 percent of crude is imported and this certainly affects the expected economic target of container operators as well, either in terms of volume or operating costs. Thailand is more suffer by the impact of the world's market price of crude than the neighbouring countries.

5.2.3 INTERNAL STRENGTHS

Even though there is a threat of external challenges from neighboring countries to the competitive edge of Laem Chabang, risks of that challenging can be reduced in some scales relative to some internal strengths of Laem Chabang itself.

The followings are strengths supporting the competitive advantage level of the Laem Chabang: (1) "Services Dimension", as mentioned before, Laem Chabang container port has been, by the government policy, promoted to be the principal container port of Thailand. This is undoubtedly has been a decisive factor of the country's seaborne trade internationally. As a consequence, the establishment of Lad Kraband ICD derived by the special support of the government policy has acted as the inland

container freight station of Laem Chabang container port definitely. It is most facilitated to the owners of containerized cargo and the shipping liners. It has also linked the Laem Chabang container port directly by road and rail modes.

By the distance of about 85 kilometres to/from Laem Chabang and vice versa, it leads to a sound economy in transporting cost obviously. Hence, the Laem Chabang has been most advantage by the operation of Lad Krabang ICD both for unloading and loading cargo to containers; (2) “the advantage of local human resources” based on the data obtained from interviewing two operating operators of shipping companies, they confirmed the high quality of skilled of container terminal labourers.

This is, in average, the strong local human resources of the Laem Chabang and has been internationally accepted. In addition, the location of Laem Chabang is obviously, by past experiences and geographic engineering, is freed from natural disasters such as earthquake and heavy storm.

5.2.4 INTERNAL WEAKNESSES

In present day, Laem Chabang has faced an objection from an immediate area. The disagreement on the economic returns incurring by the operations of Laem Chabang port by some groups of communities adjacent to the port site is under going. They see rather that the establishment and future expansion projects of the port will destruct their standard of private living. Also, private individual environmentalists have argued on the issues of water pollution and destruction of coastal sea animals, caused by the operation of the port. This problem is likely to consume some costs and period of time.

In terms of management and direction, some government’s agents who have been in charge of port services have practiced in a manner of malfunctions. This sometimes led to the problem of unfair manipulations complained by some individuals of shippers and shipping lines (data from interviewing).

Furthermore, the disobedience of the Labour Union of State-Enterprises, for the government policy in relating to the program of full privatization of state enterprises

including the Port Authority of Thailand, has caused the inefficiency of some parts of container port performance.

Finally, the container terminal operators in Laem Chabang are all under long-term contraction to private operators. This resulted in a difficulty in terms of the unpredicted regulation adjustment that needs to solve some constraints of the terminal services. This is because of the bargaining power of the government agents is less than the terminal operators.

Next section describes the relative implications of competitive advantages of Laem Chabang container port from the results of empirical analysis in chapter four.

5.3 THE COMPETITIVE ADVANTAGES' IMPLICATIONS OF LAEM CHABANG CONTAINER PORT

This section describes the relative implications of competitive advantages of the Laem Chabang. The empirical analysis results of competitiveness of container ports implied that the environments of the container port industry itself are significant.

The attitudes of the experienced container port's users are expressed in numerical systems to reflect the competitive advantages of Laem Chabang with respect to the potential factors influencing it. Hence, its relative competitiveness of performances is illustrated in the following sections.

5.3.1 THE LAEM CHABANG'S COMPETITIVE ADVANTAGES

The competitive advantages of Laem Chabang are derived from many criterions. The criterion that brings most powerfulness to it is competitive throughput. This is quite understandable because of the first priority need of the shipping lines, consignees, and consignors are the containerized volume. It is fortunately for Laem Chabang that it has been promoted to become the main interface node for container freights of the country by the Thai government.

At the same time, the former main gateway of sea transport, Bangkok port, has been reducing its role to become just a feeder site for Laem Chabang. The Port Authority of Thailand has limited the amount of containerized cargo passing through it just only 600,000 TEUs per annum. This policy has led to the stronger position and high capability of the Laem Chabang container port as a consequence. The currently wealth of Thailand's economic growth rate, specifically on industrial section, is another influential factor to further boost the great of Laem Chabang in the country's territory and as the same in the international scope.

Thailand is in a key position to serve growing intra-Asian trade and a growing economy results in higher domestic consumer demand in which may go some way to slightly redressing the balance between full and empty containers. An important focus for Thailand has been trade between Southeast Asia and Australia/New Zealand (ANZ), which is affected by a draught period causing a reduction in the export of key ANZ commodities such as beef, dairy products and vegetables. This caused a reduction in tonnage on northbound routes, while exports from Asia on southbound route have reached a record levels.

In less extent, Thailand's highest value-based export commodity of computer's part products looks set to experience a continuing growth trend as the government has recently announced plans to make Thailand the regional manufacturing center for hard disk drives, which are so varied in size that experts predict every modern appliance could contain one in the coming years, from mobile phones to digital recording equipments. This is indispensable for Laem Chabang to deserve the more attractive point of container transfer by all concerned by the events described above.

The other significant competitive criteria for Laem Chabang are services and facilities. These two factors seem possible for improving to acquire higher levels of terminal operations. The findings show that Laem Chabang's services and facilities are ranked in the second place over Manila and Tanjung Priox and just a little lesser than Port of Klang.

These discoveries imply that Laem Chabang' opportunity for making a stronger stand for services and facilities determinants is in a short hand. The currently real practices

of container handling efficiency at dockside indicate by the sound economic serving to the post-Panamas vessel size without any constraint.

The determinant of services has become the significant competitive factor in the seaport industry. This is affirmed by the comments of Haezendouck and Notteboom who concluded that the creation of competitive advantages requires a supporting industry in the port concerned. Examples of such industries are feeders, agencies, towing services, warehousing companies, ship repairs, road haulage firms, railways, inland navigation firms, insurers and customs services.¹⁰⁷

Hence, the grater services levels can be made highly beneficial to both shipping operators and shippers by reducing time, transport costs and economy of scale. Services have been believed that they will contribute to the higher value and efficiency of performance in the container shipping. As a consequence, the Laem Chabang container port has to concentrate to these factors as well.

Nevertheless, The Laem Chabang's important constraint is the geographical location. This is the main obstacle to the proliferation of its proportionate advantages. It needs approximately five days for sailing to/from between Laem Chabang and Malacca main ocean-route. This is of cause bearing some ship's operating costs, thus to overcome this issue it need to outperform in some level of ashore operations.

This implies that Laem Chabang' needs of upgrading more higher efficiency and effectiveness of other determinants of facilities and services. The inland transport infrastructures such as road, rail, and inland waterway that link between Laem Chabang and the sites of variety productions need to be accelerated in terms of the capability and frequency. These implications will eventually bring an economy of scale and scope that the lesser multimodal transport cost could be recorded by passing through Laem Chabang as a central node.

¹⁰⁷ E. Haezendonck and T. Notteboom, op. cit., p.73.

5.3.2 THE IMPLICATIONS OF COMPETITIVE ADVANTAGES OF THE SOUTHEAST ASIAN REGION'S CONTAINER PORTS

This section describes relative competitiveness in terms of comparison of the four container ports in Southeast Asian countries (Laem Chabang container port in Thailand, Klang container port in Malaysia, Manila container port in the Philippines, and Tanjung Priox container port in Indonesia). This group of seaports has been selected for this thesis based on the fact that they have been categorized in the same level of relative productivity of efficiency and effectiveness.¹⁰⁸

The results of the analysis of the four criteria of container port competitive advantages show that the throughput ranks the first priority of importance with score 0.492, the facilities ranks the second with score 0.274, the services ranks the third with score 0.123, and the location pose the forth with score of 0.112 (see Table 4.25).

These discoveries are relatively consistent with the conventional perspective concerning the importance of those criteria. We cannot overlook the great influence of services on the competitive ability of a container port, as affirmed by Haezendonck and Notteboom in their reference to the skill of dockworkers in the port of Antwerp.¹⁰⁹

In terms of the importance of intermodal interfaces, a concrete example is the case study of Vancouver Port as a successful terminal. To compete, it has developed a state of art facility, Deltaport offering excellent intermodal connections”.¹¹⁰ Last but not least, the importance of supporting industries for the twenty-first century is confirmed

¹⁰⁸ J.L. Tongzon and W. Heng, op. cit., p.687.

¹⁰⁹ E. Haezendonck and T. Notteboom, op. cit., p.84.

¹¹⁰ P. Avery, op. cit., p.108; F. Suykens and E. Van De Voorde, “A quarter of a century of port management in Europe: objectives and tools”, Maritime Policy and Management, Vol. 25, No. 3, 1998, p.257.

by IAPH's reports that "a growing range of value-added activities in logistics, therefore, will be concentrated in and around port areas."¹¹¹

By doing so, container ports are expected to be not just a transferring point between different modes of transport but also as a logistics hub and center in global transport chains. Container ports are required to be concerned with the business activities of physical distribution systems such as inventory control, warehousing, packaging and sorting (Hoyle and Pinder, 1989). However, even though facilities are highly important, the other three criteria are also indispensable for the container port's competitiveness.

Laem Chabang ranks the second for competitive advantages with score 0.409 points after Port of Klang that ranks the first with score 0.412 points. This finding is very important indicator for the competitive position of Laem Chabang.

This implies that the intermodal linkages and supporting industries in Laem Chabang are less efficient than those at Klang. The work of Sien, Goh, and Tongzon states that "although Laem Chabang has undertaken a series of upgrading programs in its port facilities, simplifying customs procedures and other measures, there is still some room for improvement, especially in the area of inland traffic; port-related services such as banking and insurance, which are core commercial businesses, are mostly located in Bangkok.

Thus, solving this traffic congestion problem should be made one of the port's immediate priorities".¹¹² They also referred to the most successful strategies adopted by Klang port, in which "the port authority and the private terminal operators have established distriparks and warehousing facilities in close proximity to the port, as well as inland clearance depots and dry ports at strategic locations around the country

¹¹¹ IAPH, Port as Indispensable Partner of Maritime Transport, (Paris: 16 July, 2002), p.11.

¹¹² C. Lin Sien, M. Goh and J.L. Tongzon, op. cit., p.41.

– the port has continuously improved its inland intermodal connections through the maintenance of a network of highways and railways”.¹¹³

Hence, the Laem Chabang is in urgently need to improve and develop more efficiency of intermodal linkages and supporting industries in pursuit of a more competitive advantages in relation to the factors in the facilities.

The results related to the services criterion indicate that Klang is the most competitiveness following by Laem Chabang, Manila, and Tanjung Prio respectively. The difference between container ports with respect to service level is very threat and indicates that Laem Chabang’s service level is less than it should be.

The less efficiency of services in Laem Chabang have been revealed, in part, by the work of Pojpring, who noted that there are also some disadvantages such as the process in customs clearance, and the authorities who operate this clearance.¹¹⁴ This indication is obviously related, in part, to the service level in port custom area.

Laem Chabang is utmost advantage with respect to the throughput. This great fortune can be changed by the influence of rapidly developing of the regional competitors. The present container-shipping pattern is a motive force that the dynamic transformation is its nature. Shipping lines and shippers have been focusing on intermodal transport costs, thus wherever can incur the sound economic transaction of container freight traffics they will be going there. The regional competitors could be challenged Laem Chabang’s competitive throughput at any time in the future. Hence, the forever improvement and development of service providing are needed.

Eventually, the competitive advantages of the four container ports in the Southeast Asian region including Laem Chabang, Klang, Manila, and Tanjung Prio have a

¹¹³ C. Lin Sien, M. Goh and J.L. Tongzon, op. cit., pp.44-45.

¹¹⁴ A. Pojpring, “Comparison of Port-user Behavior between the Bangkok Port and the Laem Chabang Commercial Port: Case Studies of Selected Industries”, Master Thesis of Economics, Thammasart University Thailand, 1995, p.155.

great potential to develop for their greater competitive edge. Nowadays, they can sufficiently served their own country's international trade.

The government of each country has been trying to support in many ways relating to the capability of seaport as a gateway of the country. Hence, the market positions of these four container ports in views of customers can be changed in terms of competitive advantages for their interests that derive from the sufficient containerized cargo volume and lower rates of transport costs.

5.4 SUMMARY

The first section of this chapter explores some implications concerning the container industry's environments in Thailand that affect to the market position of Laem Chabang in the Southeast Asian region. The latter section implies the competitive advantages of Laem Chabang and then the big picture of the Southeast Asian container ports' competitive standpoints is described. The next chapter provides the summary and conclusion that stem from the discovered findings.

CHAPTER SIX

SUMMARY AND CONCLUSION

6.2 CONCLUSION

Thailand's container port competitive advantages are in an unstable market position by the challenges from the neighbouring rivals in the Southeast Asian region. This inference is mainly based on the ever changing of container traffics in the Southeast Asian region and global scope.

The Southeast Asian's maritime countries are trying to expand their capability in terms of international seaborne trade. As a consequence, they have been improving and developing their seaport performance both in terms of efficiency and effectiveness, especially container port.

This phenomenon has been pushing a higher competition of container shipping in the region as well. The Laem Chabang's competitive advantages have been directly affected by the current situation. Eventually, as a country's principal container port, Laem Chabang has been expecting to keep concentrating to the perceptions of shipping lines and shippers who are the main container-transferring customers.

This thesis analyzed the container industry's environments and the container ports' services in the region by assessing the attitudes of customers and individuals who are directly concerned in accordance to the competitive advantages which have been incurred by the sample container port including Laem Chabang, Klang, Manila, and Tanjung Priok.

The findings are categorized into two parts. The first is the results of container port's environment competitive analysis. The second is the results of comparing the competitive advantages of each sample container port. The significant findings analyzed from the study in this thesis are separated into two items as follows.

6.2.1 THE SITUATION OF LEAM CHABANG CONTAINER PORT'S ENVIRONMENTS

The qualitative findings indicated that, in terms of domestic territory, Laem Chabang's external opportunities are in a good trend. This is based on the long-term predicted economic growth rates and the government's policy in according to seaborne international trade. However, in terms of external threats, i.e. the impact of crude oil's higher price and increasing roles of Klang port of Malaysia and Da Nang port of Vietnam, have been deteriorating the external opportunities advantages of Laem Chabang container port.

In case of internal environments, there are some advantages in relating to the efficient performance of container handling facilities and utility of Lad Krabang inland container depot. Furthermore, the local resources of labour skill and free of recorded natural disasters have brought some advantages to Laem Chabang as well.

Nevertheless, in terms of the disagreement between the PAT and local communities, management and organizational structure, and majority of foreign companies' terminal control are the internal weaknesses that have been lessening the internal strengths of Laem Chabang.

The quantitative findings of environment analysis of competitive advantages of the four container port's sample showed that the Leam Chabang was ranked the third in comparing with the rest of regional rivals.

6.2.2 THE CONTAINER PORT'S COMPETITIVE ADVANTAGES

The findings disclosed that Laem Chabang's competitiveness has been placed on the second. Otherwise, Klang has been positioned the first followed by Manila and Tanjung Priox respectively. This discovery has reasonably approved the qualitative assumption that Port of Klang has been outperformed Laem Chabang. However, according to the thesis's findings, it is noteworthy to acknowledge some limitations of this research. These includes the insufficiency of some determinants i.e. limiting of

times, financial supports, and the sources of raw data are accumulated only Thailand's domestic boundary.

6.2 RECOMMENDATIONS

The container industry serves the needs of trading partners worldwide, and because of an increasing concentration on maritime trading; container ports have been expected to become a first priority of almost maritime country. As a consequence, the rivals in the Southeast Asian region impact Thailand's Laem Chabang container port with significant challenges.

From the findings of this thesis, it seems that Laem Chabang needs to make more concentration on the business strategies to increase and sustain a competitive edge internationally. In general, container port competition among countries has been getting fiercer than in the past because of technology evolution including the increasing size of containerships implies only a few calls in three or four harbours at each end of the trade, the rest of the traffic being served by smaller feeder-ships.

It is therefore essential for big container ports to be selected as one of these calls by the main shipping lines, consortia and alliances to avoid marginalisation. There has been increasing a severe container port competition in the Southeast Asia region, which they would like to become a regional port including Laem Chabang, Klang, Manila, and Tanjung Priok container ports.

The general policy of seaport development in Thailand should be adopted by the approach of integrated strategy to elevate the prosperity of the supply and demand of cargo throughput, handling facilities, and services. Investment decisions that have underrated the impact of the seaport industry on the national economy from the macroeconomic viewpoint should be revised. Seaport developments in the present global situation are heavily dependent upon the recognition by the central government's authorities to the critical role of seaport for the wealth of national

economy. Consequently, there is the need to make the central government's awareness of the importance of the seaport industry.¹¹⁵

Since the shipping business environment is vulnerable to the impact of global business, the need to establish an appropriate and flexible strategy is very important. Thailand's container port industry should be focused on its organizational structure and management policy. The strategy of customer service should be adopted, specific on logistics service. The higher levels of logistics service for container port's customers are needed. Container ports are needed to understand its performance and realize the customers' expectations.¹¹⁶

The above-proposed strategy should be implemented by the cooperation between government agents and private sectors that are involved in maritime affairs. For instance, the establishment of the cooperation between the existing state-enterprises that provide transport services in the country is a concrete kind of the customer logistics service in Thailand. Those organizations are: the Port Authority of Thailand (PAT); the State Railway of Thailand (SRT); the Express Transportation Organization of Thailand (ETO); and Thai Marine Navigation Co. Ltd. (TMN).

According to the idea of cooperation between four state-enterprises of Thailand, the establishment of a Memorandum of Understanding (MOU) among them was signed on August 21, 2004. The MOU objective is to enhance the efficiency in cargo transportation in the country border. It has adopted four main strategies: (1) promotion of the Laem Chabang port as a key gateway for international trade in the region; (2) development of hub and spokes for cargo distribution; (3) promotion of modal shifts from roads to railways and waterways and pipelines; and (4) improvement in the surface logistics management service.

¹¹⁵ I. Back, "A Study on Deciding an Optimal Port Development Priority: from the hub port perspective", Doctoral Thesis of Department of Maritime Transportation Science, Korea Maritime University, 2005.

¹¹⁶ T.J. Peter and R.H. Waterman, In Search of Excellence, (New York: Harper & Row, 1982).

However, they have been focusing on the development of utilizing existing infrastructures and trying to accumulate cargo volume flowing to Laem Chabang, another determinant that should be considered is the efficiency and effectiveness of management and operation relating to the cooperation project. Hence, the consistence between transport infrastructures and managements and operations are needed for fulfilling the higher competitive advantages of Laem Chabang container port.

There is a great competition for market shares with relating to the sources of containerized cargo volume (foreland, hinterland, and domestic industrial products). Laem Chabang needs to improve the factors that will possibly bring about a more sustainable advantages including service levels, intermodal linkage, and supporting industries. It is necessary to reformulate the strategy for the competitive performance of the Laem Chabang, which is reflected by the attitudes of the respondents.

The findings affirm that the highest efficiency and effectiveness of Klang container port has mainly based on the long-term attempts and sufficient planning strategies of Malaysian national government. In case of Thailand, even though the government has been employing some policies that try to develop Laem Chabang as a main container port of the country but it is still in the initial stage.

The integrated strategy is needed to adopt for improving and developing the domestic transport infrastructures in all modes (road, rail, waterway, and seaport) as a synergetic system. In terms of management and administration, the reengineering of state-enterprises in which responsible for all modes of transportation should be considered deliberately.

The supporting industries, such as container distribution center, packaging and sorting company, warehousing, insurance company, commercial bank, inland haulage company, hospital, etc. are very important factors to attract the main shipping lines to make directly calls at the container port. The sufficiency of those related industries should be located closely and approached simply by the container port's users.

The modal split is another strategy that Laem Chabang should be adjusted. This is because the customers' perceptions seem currently unsatisfied to the services

provided (based on the analytical findings). The transferring of containerized cargoes between modes has still not reached the expected needs of some shippers and liners. According to the needs of them, times and costs can be reduced by the efficient container movement between modes.

Hence, the questions that should be answered are: (1) Should Laem Chabang more focused on the quality of services rendered? (2) Are the current Laem Chabang's incentives to attract the regularly direct calls by the main shipping lines sufficient?

6.3 FURTHER RESEARCH SUGGESTIONS

A valuable further study would answer the following questions: (1) Should Thailand's seaport industry be fully privatized or not? (2) Should the improvement of the intermodal linkage to/from Laem Chabang be an urgent priority?

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QUESTIONNAIRE

THE FIRST SURVEY

Factor Analysis of the Actual Conditions of Container Port's Competitiveness

This questionnaire is designed to research the perception of the conditions of maritime industry using container ports and the factors of container port's competitiveness in an effort to carry out the thesis of **“Comparative Analysis of Port Competitiveness in Southeast Asia: from the Thai Container Ports' Perspective”**.

To help me in my research I would appreciate it very much if you could complete the enclosed questionnaire. Your replies will be treated in the strictest confidence and will not be released to any organization or individual. All of the findings of this research will be aggregated and published only in a general and anonymous form.

I would like to thank you in advance for your cooperation.

Yours faithfully,

Mana Chaowarat
Ph.D. Candidate, Korea Maritime University, Republic of Korea.

☀ **Please send the questionnaire to the following address.**

Mana Chaowarat
Maritime College, Burapha University
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Tel: 66-3874-5900
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I. BACKGROUND INFORMATION

1-1. What is your position with in your company? ()

1-2. What are your responsibilities? ()

1-3. How long have you been engaged in the maritime industry? () years

II. RELATED VARIABLES FOR CONTAINERPORT'S COMPETITIVENESS

This survey is to assess your opinion regarding the related variables of container port's competitiveness. Please mark an X in the appropriate column for weighting each variable, due to your opinion.

Variables	1	2	3	4	5
Total throughput					
Inland cargo advantage					
Foreland cargo advantage					
Transnational corporation's industrial Products (FDI)					
Number of visiting vessels					
Transshipments					
Infrastructures: berth length; number of berths; depth; container yard; warehousing space; staging area; etc.					
Superstructures: gantry cranes; other handling equipments; EDI system; technology know-how; etc.					
Port geographical location					
Service level: a speedy and reliable of information transaction					
Hinterland access					
Maritime access					
Intermodal interfaces					
Skilled labour					
Supporting industries: customs; shipping agent; ship and container repair companies; insurance, land transport company; bank; packaging and sorting; hospital; etc.					

Note: "1" refers to **not at all important**, "2" refers to **not very important**, "3" refers to **fair**, "4" refers to **important**, and "5" refers to **very important**.

THANK YOU VERY MUCH FOR YOUR COOPERATION

THE SECOND SURVEY

Analytic Hierarchy Process Analysis of the Actual Conditions of Container Port's Competitiveness

This questionnaire is designed to research the perception of the conditions of maritime industry using container ports and the factors of container port's competitiveness in an effort to carry out the thesis of **“Comparative Analysis of Port Competitiveness in Southeast Asia: from the Thai Container Ports' Perspective”**.

To help me in my research I would appreciate it very much if you could complete the enclosed questionnaire. Your replies will be treated in the strictest confidence and will not be released to any organization or individual. All of the findings of this research will be aggregated and published only in a general and anonymous form.

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I. BACKGROUND INFORMATION

- 1-1. What is your position with in your company? ()
- 1-2. What are your responsibilities? ()
- 1-3. How long have you been engaged in the maritime industry? () years

II. PAIR COMPARISON OF CRITERIA AND ALTERNATIVES FOR CONTAINER PORT’S COMPETITIVENESS

This survey is to assess your opinion regarding the criteria and alternatives in terms of container port’s competitiveness. The group of criteria and alternatives are as follows:

1) Criteria;

- 1.1 “Throughput” includes total throughput, number of visiting vessels, transshipment, transnational corporation’s industrial products, inland cargo advantage, and foreland cargo advantage.
- 1.2 “Services” includes skilled labour, supporting industries, and service level.
- 1.3 “Facilities” includes intermodal interfaces, maritime access, infrastructures, and superstructures.
- 1.4 “Location” includes hinterland access, port geographical location.

2) Alternatives include Laem Chabang, Klang, Manila, and Tanjung Prio container ports.

Please mark an X in the specific column for weighing each factor that you think is appropriate.

Example 1:

Factor	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Factor
A											X							B

Note: The example shown above indicates that factor **B** is more important than factor **A** by 3 points.

2.2 Services

Alternatives	Intensities																		Alternatives
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9		
LP																			KP
LP																			MP
LP																			TP
KP																			MP
KP																			TP
MP																			TP

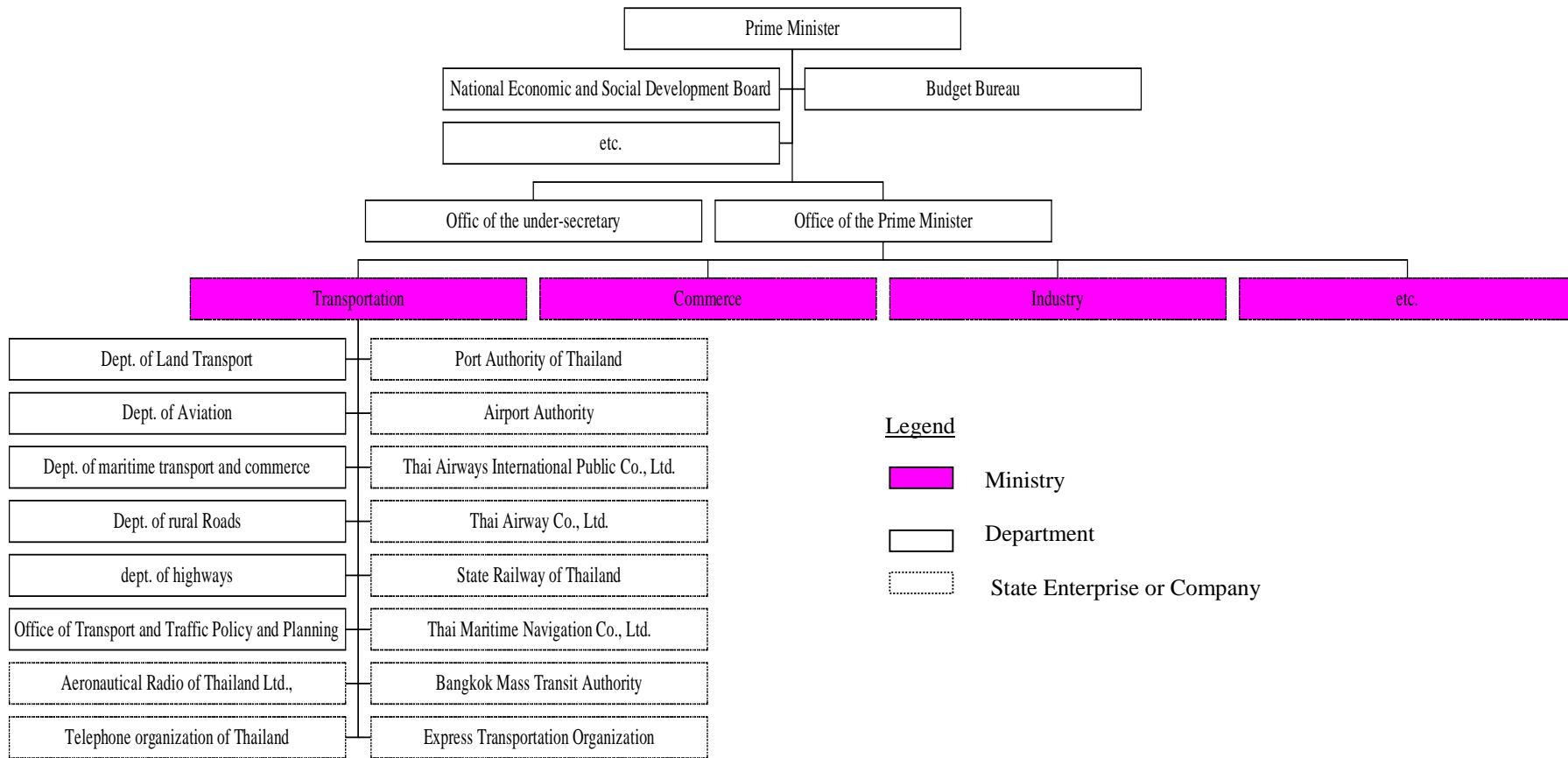
2.3 Facilities

Alternatives	Intensities																		Alternatives
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9		
LP																			KP
LP																			MP
LP																			TP
KP																			MP
KP																			TP
MP																			TP

2.4 Location

Alternatives	Intensities																		Alternatives
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9		
LP																			KP
LP																			MP
LP																			TP
KP																			MP
KP																			TP
MP																			TP

THANK YOU VERY MUCH FOR YOUR COOPERATION



Source: Reproduced from the office of the Permanent Secretary, Ministry of Transportation of Thailand.

FIGURE 2.3

THE STRUCTURE OF GOVERNMENT AGENCIES INFLUENCING TRANSPORTATION