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The impact of the Asian economic crisis on the regional container lines

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THE IMPACT OF ASIAN ECONOMIC ON THE REGIONAL CONTAINER LINES (RCL)

By

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DECLARATION

I certify that all material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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ABSTRACT

Title of Dissertation: **The impact of the Asian economic crisis on the Regional Container Lines**

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This dissertation is a study of the lessons learnt from the Asian economic crisis that impacted on the Regional Container Lines (RCL) on the Thailand and Singapore trade routes. It compares the repositioning solution that RCL used at that time with other possible repositioning solutions.

A brief look is taken at the correlation between the Asian economic crisis and the imports/exports in volume to/from East Asian countries, particularly in correction with the financial crisis countries that caused the imbalance of trade and the empty container movements. The impact of the Asian economic crisis on RCL is examined in terms of repositioning costs and how much this effected RCL. Benefit cost analysis and weight average analysis are used to analyse the possible repositioning solution with significant criteria such as conflict of interest, cost benefit and service specification in order to recommend to RCL how to prevent high costs by repositioning cost in the future. The Internet packages such as Interbox, SynchroNet, and Greybox are used to compare with Associated Empty Container in order to find the best repositioning solution for RCL.

The dissertation finds Interbox is the best repositioning solution for RCL in overall significant criteria as it gets more average marks than other possible repositioning solutions. However, it has some weakness in the conflict of interest between the owner and management of leased fleets and was less cost effective for the correction of empty container movements in the short-term with empty move transaction. So, RCL staff should read the rules very well and understand the responsibility of the two organisations to prevent these conflicts. It is the author's opinion that RCL should still be a member of Associated Empty Container in order to save more repositioning costs in the short term.

KEYWORDS: Asian economic crisis, Trade imbalance, Empty container movements, Impact on Regional Container Lines.

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LIST OF ABBREVIATIONS

BAF	Bunker Adjustment Factor
CAF	Currency Adjustment Factor
CAS	Cooperative Access System
CFS	Container Freight Station
CY	Container Yard
EA5	East Asia five crisis – affected countries (World bank): Indonesia, Korea, Malaysia, Philippines, and Thailand
FM	Greybox Fleet Management
GDP	Gross domestic product
GIS	Greybox interchange service
GLS	Greybox Logistics Services
GS	Greyslot
IAS	Internal Asset System
ICD	Inland Container Depot
ISL	Institute of Shipping Economics and Logistics
MISC	Malaysian International Shipping Corp
MLOs	Main Line Operations
NIC	New Industries countries
NOL/APL	American President Lines
OOCL	Orient Overseas Container Lines
r	Correlation Coefficients
RCL	Regional Container Lines
South East Asia	Brunei, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam
TEU	Twenty –foot equivalent unit
THC	Terminal Handling Charge
UNCTAD	United Nations Conference on Trade and Development

WB	The World Bank
WMU	World Maritime University
WTO	World Trade Organization
Y	Linear regression equation

Chapter 1
Introduction

1.1 Topic description

This dissertation is based on the lessons learnt of the impact of the Asian economic crisis in mid 1997 on the Regional Container Lines (RCL). In Chapter 2 the dissertation considers the extent of the impact of the Asian economic crisis on trade in East Asian countries particular in financial economic crisis countries and the relationship between the Asian economy and Trade development. Chapter 3 considers the extent of the impact of the Asian economic crisis in container movement and how much this effected RCL. Chapter 4 analyses the possible solution to the problem of empty container movements for RCL and Chapter 5 has conclusion and recommendations.

1.2 Scope of Topic

The scope of the topic of this dissertation will focus on the impact of the Asian economic crisis on RCL in the Singapore and Thailand feeder trade routes since 90% of RCL container movement inward and outward to/from Thailand is involved in this route.

1.3Dissertation objectives

This dissertation has 4 main objectives as follows:

1. To describe, estimate and analyse the impact of the Asian economy on RCL.
2. To generate the possible alternative solutions.
3. To estimate with benefit and cost analysis each possible alternative solution.
4. To recommend the best solution to solve the problem of empty container movements for RCL in the future.

1.4 Difficulties encountered in the investigation.

The difficulties encountered in the investigation in this dissertation are as follows:

1. The difficulties to collect the latest data information for analysis to find the best solution. The latest available data of RCL empty container movements is based on the latest Thailand shipping statistics from 1998. For the data of RCL empty container movements in 1999 it has to be assumed that the average growth rate decreased by 5% per annum from 1998.
2. The difficulties to forecast the possible percentage share of interchange equipment, leased container, or empty move transaction for each solution. This dissertation has to set the possible range of percentage from 10% to 50%.

1.5 The approach or research method

The approach of this dissertation to solve problems is as follows:

1. Collecting secondary data and information from the relevant year book data and various periodicals of journals and magazines.
2. Interviewing key persons related to the topic of this dissertation by email.
3. Conducting literature research in the WMU library, WMU computer room, and ISL library.
4. Consulting with experts at WMU, including visiting professors, visiting lecturers and presenters during field studies.

The research method is based on the regression and correlation analysis, benefit cost analysis, and the weight average credit analysis on the significant criteria factor.

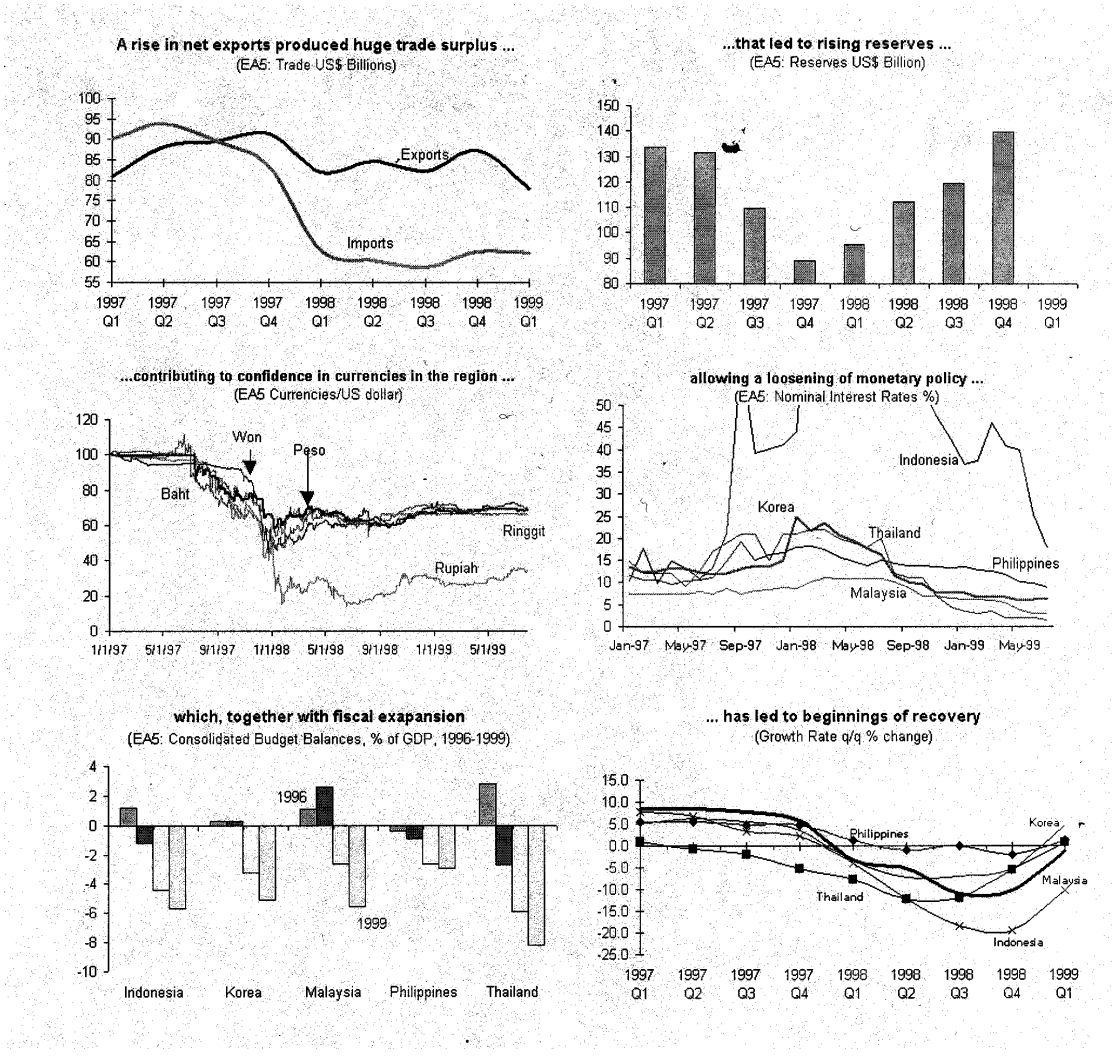
Chapter 2
Asian economic crisis

Chapter two describes the post Asian economic crisis that has signs of recovery in 1999 and 2000, analyses the impact of the Asian economic crisis on trade in East Asia countries particularly, in the financial crisis countries and analyses the relationship between Asian economy and Trade development.

2.1 Asian economy- road to recovery

Asian economic crisis in Asia during 1997-98 has signs of recovery on the beginning of 1999. As Helmut (2000) reported, "The serious economic crisis, which began in Thailand in July 1997, is now abating and there are definite signs of recovery, with positive growth rates forecast in 2000 for all of the affected economies of East Asia". Because of Asian economic crisis countries have trade surplus of export more than import after they decreased their currency that let them to get more rising in their reserves. Theirs currencies are stable and the loan is very low in interest rate, which together with fiscal expansion, that let them to begin of recovery. As Jemal-ud-din Kassum, Vice President East Asia and Pacific Region, The World Bank, (2000) reported, "Throughout the region, external balances remain favorable: exchange rates have been stable, reserves are high, exports are growing, and portfolio and foreign direct investment is picking up steam. Nor have signs of possible internal imbalances emerged: inflation is low and unthreatening, government revenues are rising in most countries, and capacity utilization rates are creeping up in manufacturing". Figure 1 shows that the reserves of the East Asian 5 countries (EA5): Indonesia, Korea, Malaysia, Philippines, and Thailand, which are the five crisis-affected countries (Worldbank) are rising from 90 US$ Billions in Q4 of 1997 to 140 US$ Billions in Q4 of 1998. Because of a huge trade surplus in 1998, export

trades of 85 US$ Billions compared with import trades of 60 US$ Billions produced higher reserves from 90 US$ Billion in Q4, 1997 to 140 US$ Billion in Q4, 1998. Contributing to confidence in currencies in the region, low interest rate and fiscal expansion have led to the beginning of recovery (The World Bank Annual Report [WB], 1999).



source : The World Bank Annual Report 1999.

Figure 1 East Asia the road to recovery

However, the recovery is also fragile with external risks such as Japanese economy, US and European economies, oil price, and interest rate etc. As Masahiro Kawai and Richard Newfarmer, (2000) reported, "A Japanese recovery is crucial to the stabilization and prosperity of Asian economies but the Japanese economy has yet to emerge out of stagnation". European economies, and US if they enter recession, Asian exports would suffer and likely cut short recovery (The World Bank Annual Report [WB], 1999). Some external risks that have quite differential consequences for the diverse national economies such as oil price. If the oil price increases it will hurt Thailand, Korea, and Japan but benefit Indonesia, Singapore and Malaysia. According to the World Bank staff (1999), estimate that oil prices are likely to rise from an average of US$ 18 per barrel to US$23 in 2000. This would impose terms of trade loss on Korea of US$5.9 billion, Thailand would loss US$1 billion. On the other hand, Indonesia and Malaysia would get benefits of US$1.6 billion and US$0.7 billion respectively.

Another external risk is interest rate. If interest rate increases are linked to floating rate foreign debt, these will have the largest gross effects on China, Korea, Indonesia, Malaysia and Thailand. However, earnings on now-substantial reserves cushion the net impacts substantially. The region's recovery might continue, but on a lower growth trajectory (Kassum, 2000).

Table 1 shows that after a year of sharp recession in the EA-5 countries (-7.5 percent in 1998), these economies bounced back in classic " V" fashion to 4.7 percent in 1999. Korea is better in growth rate of GDP than other countries in EA-5, with GDP of 10 percent in 1999. While, Indonesia has growth rate of GDP only 0.5 percent in 1999. World Bank and IMF have forecast on March 2000 that the GDP of EA-5 countries will be more than 5 percent in 2001.

Table 1

East Asia's performance…and prospects brighten…

Real GDP percent change

		Actual		Estimate	Projection	
	1996	1997	1998	1999	2000	2001
East Asia 5						
Indonesia	8.0	4.5	-13.7	0.5	3.0	5.0
Korea	6.8	5.0	-5.8	10.7	6.0	6.1
Malaysia	8.6	7.5	-7.5	5.4	6.0	6.1
Philippines	5.8	5.2	-0.5	3.2	4.0	4.8
Thailand	5.5	-1.3	-10	4.0	5.0	5.5
Transition Economies						
China	9.6	8.8	7.8	7.1	7.0	7.2
Vietnam	9.3	8.2	5.8	4.7	4.6	4.5
East Asia NIEs						
Hong Kong SAR(China)	4.5	5.3	-5.1	2.0	5.2	4.4
Singapore	7.6	8.4	0.4	5.4	5.7	5.8
Taiwan(China)	5.7	6.8	4.8	5.5	6.5	6.1
Japan	5.0	1.6	-2.5	0.3	0.9	1.6
U.S.A	3.7	4.5	4.3	4.1	4.3	3.1

Source: World Bank, IMF; Consensus Forecast March 2ooo for Hong Kong SAR (China), Singapore, Taiwan (China), Japan and the USA.

2.2 The impact of the Asian economic crisis on Trade

The Asian economic crisis caused a huge imbalance of trade in East Asian countries particular, financial crisis countries. These countries export to the US and European countries more than import.

2.2.1 Trade development in Asia

The Asian crisis resulted in stagnation in Asia's economic output for the first time since World War II. Japan's GDP and EA-5 countries decreased for the first time in more than 25 years, and for some countries in the region the decline was similar to that experienced by the industrial countries during the Great Depression in the 1930s. Hongkong, China and Singapore also did not escape the Asian financial crisis.

Japan's sluggish economy and the Asian financial crisis caused the percent of Asia's merchandise imports to decline in 1998 by 18 percent by value and 14 percent by volume (see Table 2 Trade developments in Asia, 1996-98). Imports from North America and Western Europe declined by less than the average, while imports from regions that export mainly primary products to Asia, such as Latin America, Africa, and the Middle East, decreased by more than one quarter. Asian merchandise exports decreased by nearly 12 percent by value and 10 percent by volume in 1998 due to the sharp contraction of intra-Asian trade.

Japan declined in volume of merchandise imports by 7 percent and exports 14 percent. EA-5 also sharply declined in volume of merchandise imports to nearly 25 percent and 10 percent in exports, which caused an imbalance of trade with Western Europe and North America.

The impact of the Asian economic crisis affected commercial service trade in Asia as much as the merchandise trade. Commercial service exports and imports declined in

value by 20 percent and 13 percent respectively (World Trade Organization Annual Report [WTO], 1999).

Table 2

Trade developments in Asia, 1996-98

	Asia			Japan			EA-5		
	1996	1997	1998	1996	1997	1998	1996	1997	1998
GDP	5.2	3.4	-0.9	2.9	1	-1.1	7.2	4.5	-8.7
Merchandise trade									
Exports(value)	0.7	5.3	-6.2	-7.3	2.4	-7.8	4.9	5.1	-3.9
Imports(value)	4.7	0.4	-17.8	4	-3	-17.2	7.2	-3.1	-30.8
Exports(volume)	4.8	12.6	2.2	1.2	11.8	-1.3	10	19	10
Imports(volume)	5.8	5.9	-8	5.6	1.7	-5.3	7.5	3	-21.5
Commercial services									
Exports(value)	9	5	-15	4	3	-9	16	7	-24
Imports(value)	7	2	-11	6	-5	-9	14	5	-26

Source: World Trade Organization Annual Report 1999.

2.2.2 Imbalance trade

Imbalance trade seems to impact with East Asian countries particular, EA-5 countries more than a global.

2.2.2.1 World merchandise trade by region

In 1998 Asia was the second largest exports merchandise trade region and the third largest imports trade region. Table 3 shows that the Asian economic crisis caused the share of merchandise exports to decline from 26.3 in 1993 to 24.5 in 1998. In the same year Western Europe was the largest export merchandise trade region with

a share of 43.8 in 1993 and 44.5. North America exported with a share of 16.8 in 1993 and 17. Latin America, Africa and the Middle East had export shares of less than 5 in 1993 and 1998.

Table 3

World merchandise trade by region in 1993 and 1998

	1993	1998		1993	1998
	Exports			Imports	
			value		
World	3636	5270		3744	5465
			share		
World	100	100		100	100
North America	16.8	17		19.9	21.1
Latin America	4.4	5.2		5	6.2
Western Europe	43.8	44.5		42.9	43.3
Africa	2.5	2		2.6	2.4
Middle East	3.4	2.6		3.2	2.6
Asia	26.3	24.5		23.5	19.9

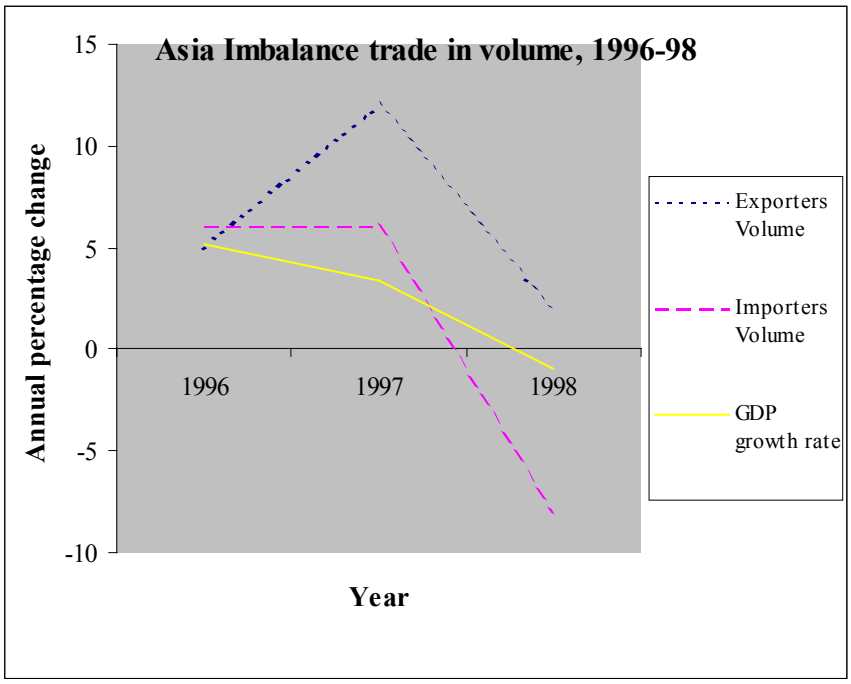
Source: World Trade Organization Annual Report 1999

The Asian economic crisis also caused the Asia Merchandise trade import share to decline from 23.5 in 1993 to 20 in 1998. Western Europe, also, was the largest imports merchandise trade in the world with a share of 43 in 1993 and 1998. North America increased its import share from 19.9 in 1993 to 21.1 in 1998, and was the second largest import region replacing Asia in 1998. Latin America, Africa, and Middle East had import shares of less than 5 in 1993 and 1998.

2.2.2.2 Asia imbalance trade

The Asian economic crisis caused a huge imbalance of trade between Asia and the major importers and exporter regions, Western Europe and North America. The Asian import volume in Annual percentage change declined from 6% in 1996 and 1997 to –8 % in 1998. On the other hand, the Asia export volume in Annual

percentage change increased from 5 % in 1996 to 12 % in 1997 and decreased to 2 % in 1998 (see Figure 2 Asia imbalance trade in volume, 1996-98).



Source: World Trade Organization Annual Report 1999

Figure 2

2.2.2.3 Financial crisis countries Imbalance trade

The Asian economic crisis caused more imbalances in trade in EA-5 countries than Asia. Figure 3 shows that the Annual percentage change in volume imports of EA-5 countries declined from 7.4% in 1996 to 3.3% in 1997 and –21.5% in 1998. On the other hand, the Annual percentage change in volume export of EA-5 countries increased from 9.9% in 1996 to 16.0 % in 1997 and 10.1% in 1998.

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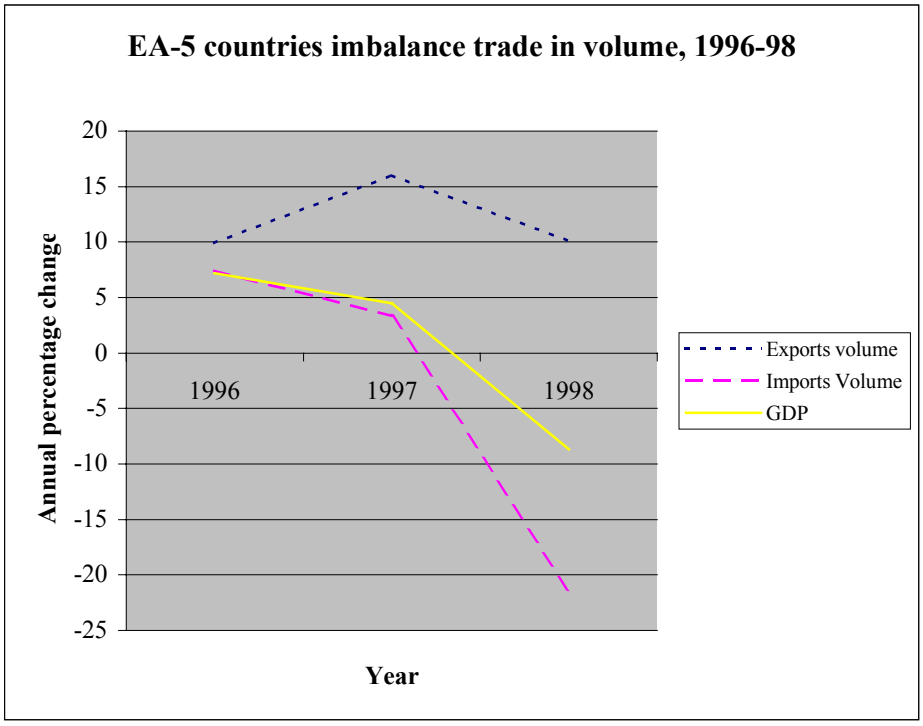


Source: World Trade Organization Annual Report 1999

Figure 3

2.3 Correlation between Asia economic and Trade development

The correlation values between the Asian economic and import/export trade development in 1993- 98 almost go in the same direction of change. When the Asian economy went very sharply in recession in 1998, the GDP declined nearly 5% and both imports/exports declined in the same way. Import volume declined 14% and export volume declined 10%, see Table 4 Asia's GDP and import/export in volume, 1993-98. From Table 4, the Annual percentage change in import/export volume shows that the imbalance in trade started to begin by 1% in 1996, 6% in 1997, and 10% in 1998

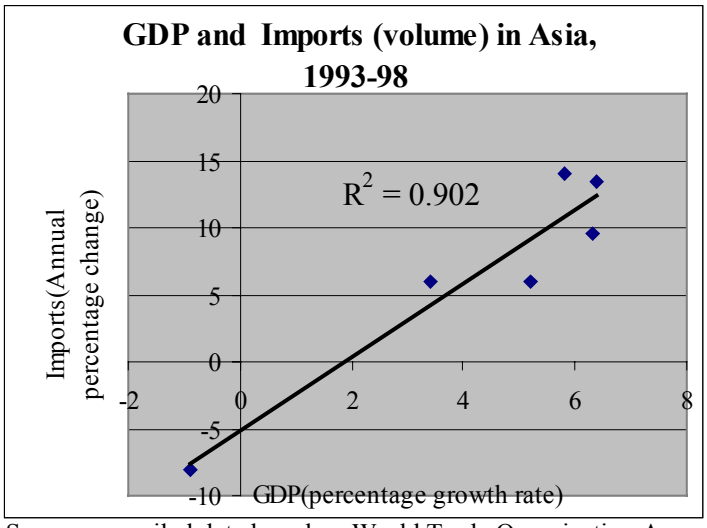
Table 4

Asia's GDP and Import/Export in volume, 1993-98

Annual %change	1993	1994	1995	1996	1997	1998
GDP	6.3	6.4	5.8	5.2	3.4	-0.9
Import	9.5	13.5	14	6	6	-8
Export	5	10	9.5	5	12	2

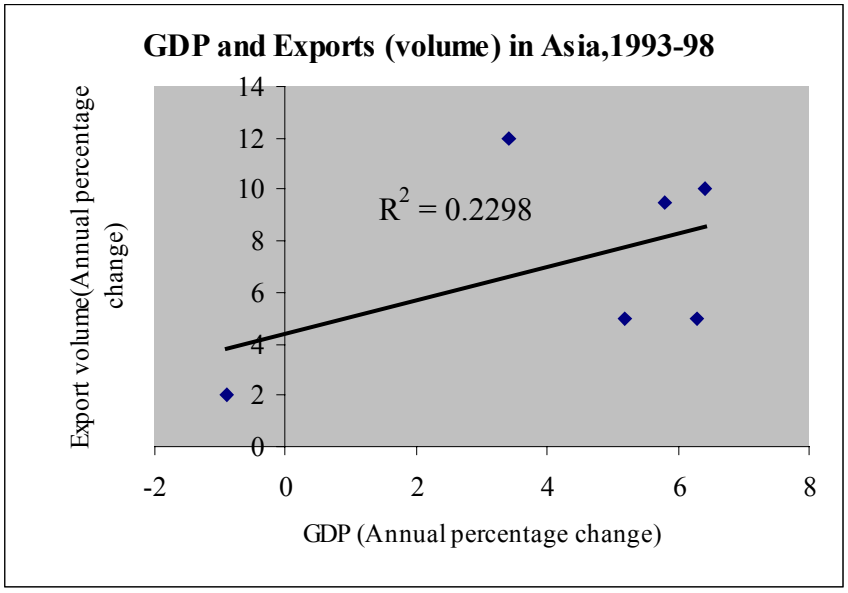
Source: World Trade Organization Annual Report 1999

The regression and correlation analysis method shows that the relationship values between GDP and import volume in table 4 are very close and more confident values. When GDP go down, import volume will go down and GDP go up, the import volume will go up in the same way. Figure 4 shows that the correlation of the two parameters is depend on each other by 95% or correlation Coefficient (r) = 0.95. However, the relationship values between GDP and export volume in table 4 are less close and confident. Figure 5 shows that the correlation of two parameters is depend on each other by only 48% or correlation Coefficient (r) = 0.48.



Source: compiled data based on World Trade Organization Annual Report 1999

Figure 4



Source: compiled data based on World Trade Organization Annual Report 1999

Figure 5

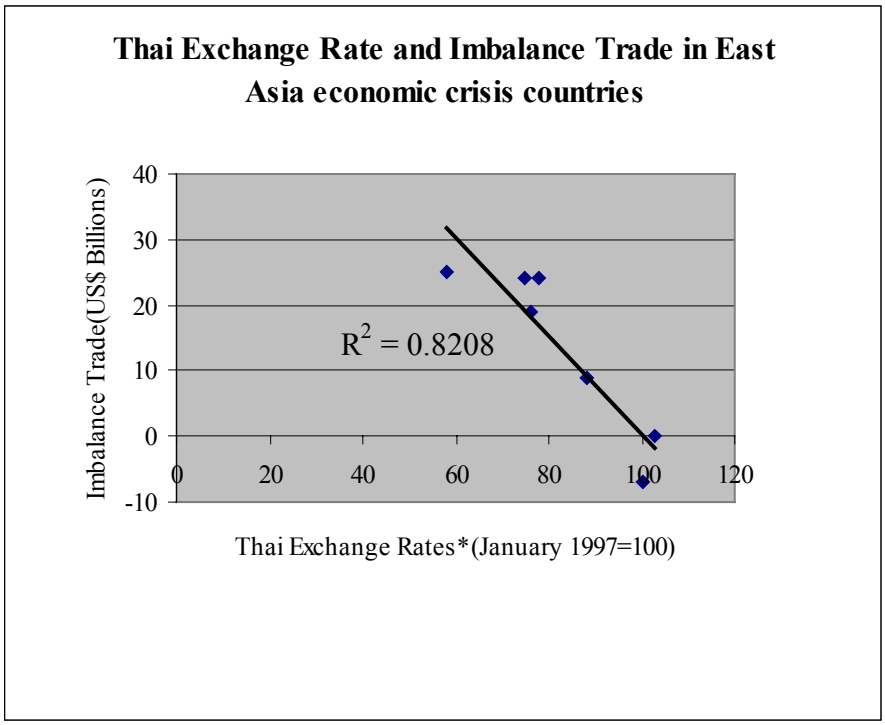
The significant variable that makes the relationship between GDP and export volume to less in their relationships is the exchange currency rate. In mid year 1997, EA 5 countries devalued their currencies by nearly 40% except Indonesia in which devalued its by more than 60% (J.P. Morgan). The consequence of a devaluation of money was a rise in net exports and producing a huge trade surplus. Table 5 and Figure 6 show the correlation values between the index of Thailand exchange rate/US dollar and trade imbalance in US$ billions for the EA-5 countries. The data in Table 5 shows that in Q1 of 1998, Thailand devalued the Thai Baht by 42 % and the trade imbalance in EA-5 countries increased to 25 US$ billion in which exports was larger than imports. The regression and correlation analysis method shows that the correlation between the Thai exchange currency rate and trade imbalance in EA-5 countries is very close and more confidence value with the Correlation Coefficient (r) = 0.91 or the two parameters are depend on each other by 91%.

Table 5

Thai exchange currency rate and trade imbalance in EA-5 countries

	1997				1998		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Thai exchange rate*	100	103	88	76	58	75	78
Trade imbalance US$ Billion	-7	0	9	19	25	24	24

January 1997 = 100, Source J.P. Morgan.
Source: World Trade Organization Annual Report 1999



January 1997 = 100, Source J.P. Morgan.
Source: World Trade Organization Annual Report 1999

Figure 6

Chapter 3
The impact on Regional Container Lines

Chapter 2 has already explained and analyzed the impact of the Asian economic crisis which caused the rise in the imbalance in trade where exports from Asia were greater than imports to Asia. This chapter will identify the impact of the imbalance in trade to the Regional Container Lines (RCL), the feeder operating the main route between Thailand/Singapore.

3.1 Regional Container Lines (RCL) fleet and operation

Regional Container Lines (RCL) is one of the largest and best known of the common-user feeder companies operating in Asia, particularly on the Thailand and Singapore trade routes. RCL operated the first feeder containership in 1979 between Bangkok and Singapore and increased and expanded its feeder services and container liner business in intra-Asia. Currently the Bangkok-listed, but Singapore-operated, carrier offers service to 17 countries (78 destinations) with a fleet of 35 ships, including four time-chartered units, aggregating almost 30,000 TEU. According to Containerisation International's Liner Shipping Network data, this makes it the 38th largest container carrying line in the world. Its Annual lifting amass is 1.4 millions TEU.

RCL has set up regional operations centres in Singapore, Bangkok and Hong Kong to manage its shipping activities and to oversee development of its expanding regional network. RCL has agents in 17 countries such as Australia, Cambodia, China, Hong Kong, India, Indonesia, South Korea, Malaysia, Philippines, Singapore,

Sri Lanka, Taiwan, Thailand and Vietnam (Regional Container Lines [RCL], 20th Anniversary).

RCL fleet size ranges from 600 TEUs to 1500 TEUs with registries both in Thailand and Singapore. Since 1990, RCL's policy has been to phase new ships into service approximately every one/two years (RCL, 20th Anniversary).

RCL has deployed 9 vessels, with an aggregate of almost 8,000 TEUs or 30 % of the RCL total fleet. Its fleet size on this route ranges from 600 TEUs to 1100 TEUs and the fleets average age is 10 years (see Table 6 RCL's containership fleet in Thailand and Singapore).

Table 6
RCL' s containership fleet in Thailand and Singapore

Vessel name	TEU	Reefer slot	Year of build	Deployment
Anan Bhum	1018	100	1995	Singapore/Thailand
Lila Bhum	740	100	1997	Singapore/Thailand
Mathu Bhum	1080	100	1990	Singapore/Thailand
Nanta Bhum	1080	100	1990	Singapore/Thailand
Ratha Bhum	628	60	1998	Singapore/Cambodia/Thailand
Siri Bhum	540	60	1980	Singapore/Cambodia/Thailand/ Malaysia
Vira Bhum	504	30	1974	Singapore/Malaysia/Thailand
Xetha Bhum	1080	60	1993	Singapore/Thailand
Yantra Bhum	1080	60	1993	Singapore/Thailand

Source: RCL, 20th Anniversary.

RCL operates 6 feeder routes from Singapore/Thailand/Singapore in different frequencies such as one trip per week, two trips per week, three trips per week, or four trips per week. The total of carrying capacity is 16,000 TEUs per week (see Table 7 RCL' s Feeder service network in Thailand and Singapore).

Table 7

RCL' s feeder service network in Thailand and Singapore

Route	Frequency	Capacity	Ports of call
Singapore/Thailand/ Singapore	Four a week	4*1000	Singapore, Bangkok (KlongToey), Singapore
Singapore/Thailand/ Singapore	Two a week	2*1080	Singapore, Bangkok(Thai Prosperity Terminal),Singapore
Singapore/Thailand/ Singapore	Four a week/ Three a week	4*570/ 1,000	Singapore, Laem Chabang, Singapore
Singapore/Thailand/ Singapore	Weekly	1*1018	Singapore, Bangkok(Siam Bangkok Port), Singapore
Singapore/Thailand/ Singapore	Weekly	1*1080	Singapore, Map Ta Phut, Singapore
Singapore/Thailand	Three a week	3*504/ 540/628	Singapore, Songkhla, Singapore

Source: RCL, 20th Anniversary

3.2 The impact of the Asian economic crisis on container movements

The impact of the Asian economic crisis in container movements seems not to be very serious on a global basis, 19 – 20 % of empty/total container movements from 1990 – 1998. But for the Transpacific and Asia – Europe trade routes it seems to be very serious in imbalance trade, 80% growth rate of the container imbalance movement in Transpacific in both 1997 and 1998, and 40% growth rate in Asia –

Europe trade in 1998. The imbalance trade of container movements between South East Asia and US is also very high with a 135% growth rate in 1998 and 30% growth rate in 1997.

3.2.1 Asian container movements

The Asian container movement seems to be very serious in imbalance trade as a result of the impact of the Asian economic crisis, particularly on the transpacific routes. Cargo movements from Asia to the United States increased from 4,1 *mil TEUs* in 1996 to 5,2 *mil TEUs* in 1998, but on the other hand trade, decreased from 3,5 *mil TEUs* to 3,3 *mil TEUs.* This caused an imbalance in cargo movements between the eastbound and the westbound trade routes from 584 *thousand of TEUs* in 1996 to 1,9 *mil TEUs* in 1998 or almost 80% of the growth rate in both 1997 and 1998; it is estimated to be 2,5 *mil TEUs* in 2000 (see Table 8 Asian container movements). The imbalance of container movements on Asia – Europe trade routes, also increased from 558 *thousand TEUs* in 1996 to 777 *thousand TEUs* in 1998 or almost 40% of the growth rate in 1998 and an estimated 911,000 *TEUs* in 2000.

3.2.2 South East Asian container movements

The imbalance of trade of container movements in Intra – Asia between South East Asia and Japan, NIC, China is not so bad. Table 9 shows that the imbalance trade was not so high compared with container movements between the Transpacific and Asia – Europe. The imbalance of container movements was only 185 *thousand TEUs* in 1997, 67 *thousand TEUs* in 1998, and 106 *thousand TEUs* in 1999. However, the imbalance of container movements between Southeast Asia and the United States seems to be more serious than that of Intra Asia.

Table 8

Asian container movements

(Thousands of *TEUs*)

Year	Asia-USA				Asia-Europe			
	Asia - USA	USA - Asia	Imbalance	% change	Asia-Europe	Europe-Asia	Imbalance	% change
1996	4104	3520	584		3142	2584	558	
1997	4662	3615	1047	79.3	3290	2734	556	-0.4
1998	5221	3326	1895	81.0	3487	2710	777	39.7
1999	5466	3266	2200	16.1	3633	2713	920	18.4
2000	5838	3328	2510	14.1	3811	2900	911	-1.0

Sources: UNCTAD secretariat on the basis of data supplied by the Japan Maritime Research Institute; DRI/McGraw-Hill, World Sea Trade Service Review, various issues; Containerisation International, various issues, and other specialized sources. * Forecasts for 1999 and 2000.

Note: European trades do not include the Mediterranean.

Table 9

Intra-Asia containerised traffic moving to/from South East Asia*

(Thousands of *TEUs*)

	1997	**1998**	**1999**
Imports			
From Japan	565	454	435
From NIC	530	530	565
From China	325	310	336
Total	1420	1294	1336
Exports			
To Japan	374	341	323
To NIC	630	649	667
to China	231	237	240
Total	1235	1227	1230
Imbalance Trade	-185	-67	-106

Source: DRI World Sea Trade Service *South East Asia = Brunei, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam.

Table 10 shows that the imbalance of container movement was increased from 175 *thousand TEUs* in 1996 to 531 *thousand TEUs* in 1998 or 30% growth rate in 1997 and 135% growth rate in 1998. Consequently, the Asian economic crisis caused an imbalance trade in container movements between South East Asia and the United States which was more than Intra Asia.

Table 10

South East Asia and US container movements, 1996-98

(Thousands *TEUs*)

	1996	1997	1998
US - South East Asia	545	566	400
South East Asia - US	720	792	931
Imbalance	175	226	531
% change		29.1	135.0

Source: PIERS/Journal of Commerce (New York)

3.3 The impact of the Asian economic crisis on RCL

The Asian economic crisis caused a huge number of empty container movements on RCL, particularly in major trade route between Singapore and Thailand. In 1998, RCL had to carry the empty container movements almost 20,000 empty container boxes or 26% of the empty/total container movements. This increased from 16,451 empty container boxes or 18% of the empty/total container movements in 1996, before the Asian economic crisis. Therefore, the empty container movements caused a high repositioning cost for RCL in 1998, estimated to be 223 mil Baht or almost 2.5% of the total expense.

According to Sumate Thantuwanit, group president of RCL of Bangkok, the imbalance between imports and exports was huge in Thailand. This is the main trouble for lines coming to Thailand but on the positive side, the country has just had

three consecutive months of trade surplus after 1997 of trade deficits (see 'Leading owners report major impact of economic troubles on ports and lines', Lloyd's list, February 26, 1998, p.16).

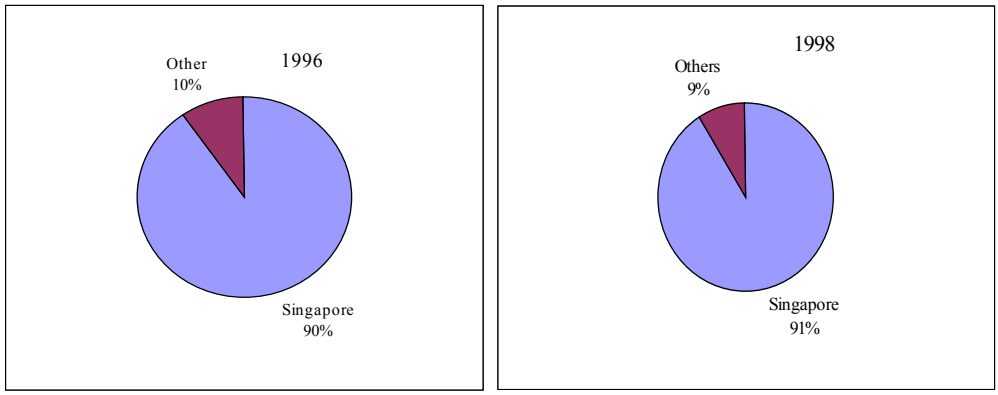
Chan Tuck Hoi, executive vice-president of the RCL group, explains: 'Inbound cargo volumes into South East Asia declined significantly and container imbalance became more acute with the result that over capacity plagued all operators during the year,' he said. 'This resulted in revenues being eroded and costs being increased' (RCL, 20th Anniversary).

As Lloyd's list reported, a company such as RCL, which is widely regarded as one of the strongest Asean intra-Asian trade feeder operators, has seen import cargoes to Indonesia, Thailand, and Malaysia shrink to levels not seen for years, but with containerised export cargoes, the picture is somewhat different. RCL, Samudra, WanHai Lines and other intra-Asian containership operators, are all reporting increased loading for cargoes out of ports such as Laem Chabang in Thailand, Port Klang in Malaysia, and various container-handling facilities across Indonesia. The weakness of the local currencies has been a temporary boon to exporters who now have a distinct advantage with cheaper goods bound for the major US and European markets (see 'Box trades recovery under way', Lloyd's List, December 1999, p.11).

3.3.1 RCL empty container movements

RCL's empty containers move in only one direction from Singapore to Thailand because Thailand exported to the US and Western Europe more than imported from them, during the Asian economic crisis, as already discussed in chapter 2. RCL is the major feeder operator between Thailand and Singapore in which 91% of container movements inward to Thailand come from Singapore and the other only 9% come from other countries such as Malaysia, Vietnam, Hong Kong, Japan, or others in Asia. The percentage of container movements from Singapore increased from 90% in 1996 at the beginning of the Asian economic crisis, to 91% in 1998

(See Figure 7 RCL container movement inward to Thailand). This figure was compiled from data in Thailand Shipping Statistics 1996 and 1998, Office of the Maritime Promotion Commission, Ministry of Transport and Communications.

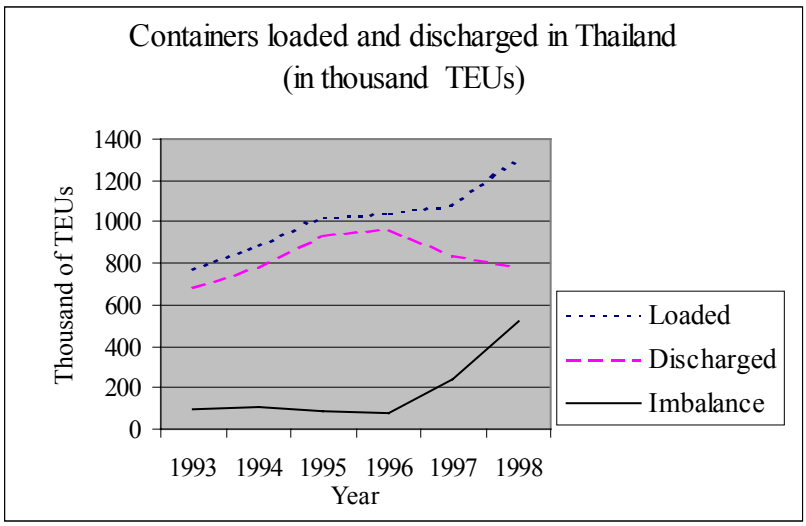


Source: compiled with data from Thailand Shipping Statistics 1994 – 1998.

Figure 7 RCL container movements inward to Thailand

Since Singapore is the hub port in the SouthEast Asia region, RCL moves container cargo from South East Asia countries to Singapore port in order to carry it via the main liner operators in the Transpacific and Asia – Europe trade routes.

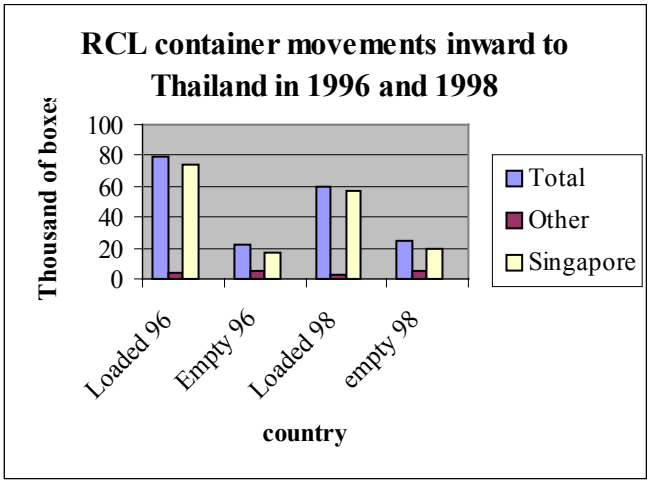
During the Asian economic crisis, containers loaded in Thailand increased from 1,041 *thousand TEUs* in 1996 to 1,300 *thousand TEUs* in 1998 but containers discharged in Thailand decreased, in the opposite direction, from 963 *thousand TEUs* in 1996 to 779 *thousand TEUs* in 1998. Consequently, it caused a rise in imbalance container movements from 78 *thousand TEUs* in 1996 to 521 *thousand TEUs* in 1998 (see Figure 8 containers loaded and discharged in Thailand). This seems to result in big trouble for container lines inward to Thailand with empty container movements. RCL also had a bad situation just like the other container lines.



Source: compiled with data from ISL, Shipping Statistics Yearbook, 1999.

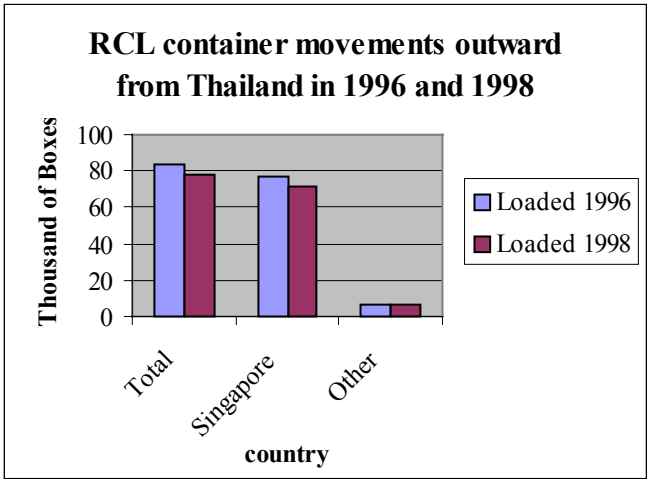
Figure 8

The empty container movements inward to Thailand was very high during the Asian economic crisis. It increased from 21,981 boxes (22% of empty/total) in 1996 to 25,003 boxes (30% of empty/total) in 1998 or increased by 14% from 1996 to 1998, particularly on the Singapore - Thailand feeder trade route. The empty container movements on the Singapore – Thailand trade route increased from 16,451 boxes (18% of empty/total) in 1996 to 19,954 boxes (26% of empty/total) in 1998 or increase by 22% from 1996 to 1998. Total container movements were reduced from 90,736 boxes in 1996 to 77,259 boxes in 1998, a reduction of 15%. On the other hand, there were almost no RCL empty container movements outward from Thailand (see Figure 9 and Figure 10 the movements of containers carried by RCL inward and outward to/from Thailand).



Source: compiled with data from Thailand Shipping Statistics 1994 – 1998.

Figure 9



Source: compiled with data from Thailand Shipping Statistics 1994 – 1998.

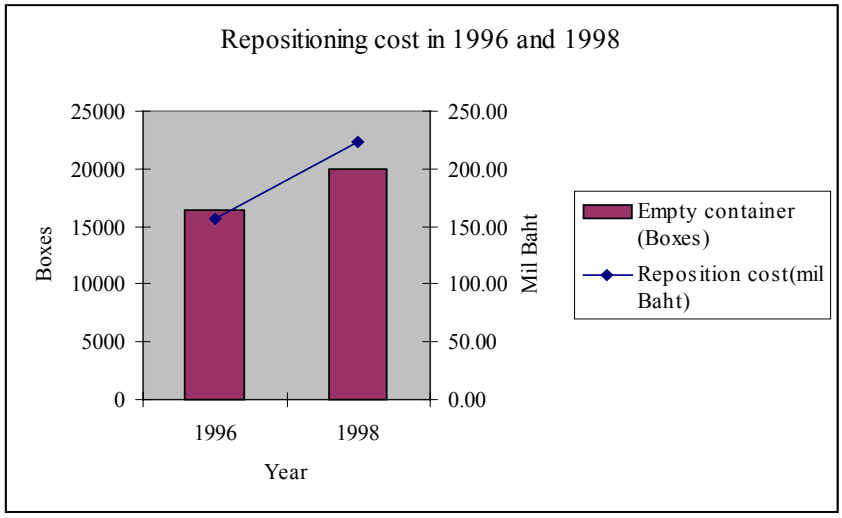
Figure 10

3.3.2 Repositioning cost

The empty container movement from Singapore to Thailand as already discussed above, caused RCL to pay higher expenses for repositioning costs. It is estimated that the repositioning cost increased from 156.8 mil Baht in 1996 to 222.88 mil Baht in 1998 an increase of 66.7 mil Baht or 43% (see Figure 11 Repositioning cost in 1996 and 1998). The higher repositioning cost was almost 2.5% of RCL's total expense in 1998.

This figure was compiled by data from Thailand Shipping Statistics 1996 and 1998, Office of the Maritime Promotion Commission, Ministry of Transport and Communications, based on the freight rate Singapore/Thailand. The basic freight rate of a 20-ft container was 4,730 Baht in 1996 and 7,470 Baht in 1998, and for a 40-ft container it was 9,890 Baht in 1996 and 12,490 Baht in 1998. The additional charges which included Bunker Adjustment Factor (BAF), Currency Adjustment Factor (CAF), Terminal Handling Charge (THC), Container Yard Charge or CY charge and Container Freight Station Charge or CFS charge, was 53.04% of the basic freight rate in 1996, and 10.59% of the basic freight rate in 1998.

Table 11 shows that the total expense of RCL was increased from 6,356 mil Baht in 1996 to 10,321 mil Baht in 1998 an increase of 60%. The repositioning as discussed above is one of the major factors which caused an increase in RCL's total expenses. However, if looking at the total loaded boxes movement to/from Thailand, it will be seen that both directions decreased, loaded boxes to Thailand decreasing by 25% and out of Thailand decreasing by 6%. The total revenue increased from 7,066 mil Baht in 1996 to 10,542 mil Baht, an increase of 50% because the basic freight rate was very high. According to Lloyd's List, June 2, 1998, shippers exporting merchandise to northern Europe through regional Asian ports will soon be paying a premium to compensate for the extra cost of repositioning empty containers. Because of the high cost of moving empty containers to feeder ports, the carrier is now asking shippers in those locations to contribute towards these repositioning expenses.



Source: compiled data from Thailand Shipping Statistics 1996 and 1998, Office of the Maritime Promotion Commission, Ministry of Transport and Communications.

Figure 11

Table 11

RCL year record (in millions of Baht)

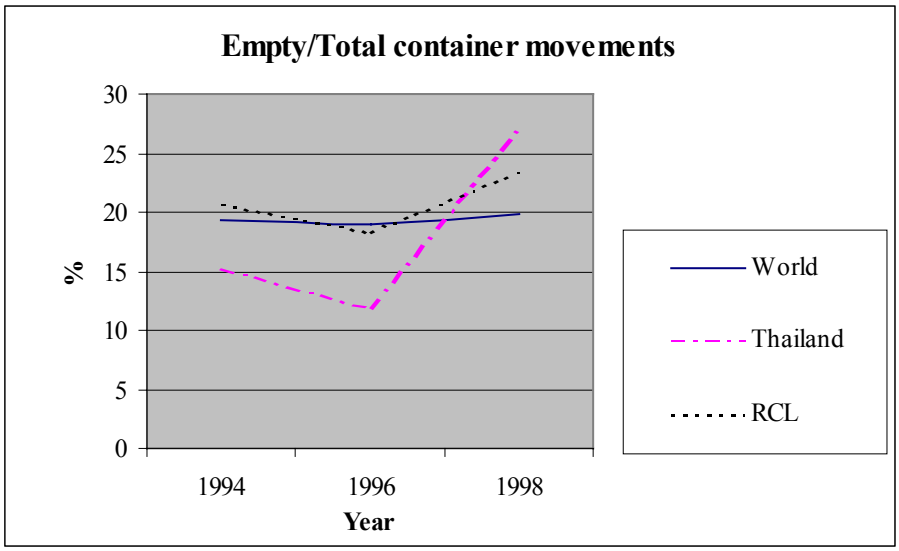
	1996	**1997**	**1998**
Total revenues	7,066	9,552	10,542
Total Expenses	6,356	10,321	10,251
Pre-tax profit/loss	710	-770	291
Net profit	706	-1,109	285
Earnings/loss per share	31.95	-31.16	4.51
Total shareholders equity	4,982	4,923	5,012
Total assets	14,081	23,752	19,555

Source: RCL Group

However for the worst situation, RCL has been doing better than other lines because it has emerged as a stronger and fitter company. According to Chan Tuck Hoi, executive vice-president of RCL, "RCL took immediate action to deal with the harsher and new operating environment created by the Asian currency crisis and that the company was now fitter and trimmer to take advantage of new opportunities and expand the service network".

According to Kua Phek Long, chairman of RCL, this action included hedging the company's foreign currency exposure, thereby avoiding the worst effects of the slide in the value of the local Thai baht and Singapore dollar against the US dollar. In addition to the usual controls being placed on salaries, fleet operating costs and administrative expenses, the chairman highlighted the company's investments in improving its telecommunications and data management systems and training programs. In particular, this consisted of improved data processing in the areas of container booking, preparation of shipping documents, container control and terminal operations, as well as integration of marketing information with clients' databases for enhanced service (RCL, 20th Anniversary).

Figure 12 shows the percentage of empty and total container movements to Thailand by container lines which increased very sharply from 12% in 1996 to 27% in 1998. The percentage of empty and total container movements carried by RCL inward to Thailand also increased from 18% in 1996 to 23% in 1998. Compared with the percentage of world empty and total container movements, 19 - 20%, the Asian economic crisis caused liner containers and RCL to carry empty containers amounting to a higher percentage than the worldwide average.



Source: complied with data from Containerisation International Yearbook data, and Thailand Shipping Statistics 1994 – 1998.

Figure 12

Chapter 4
Repositioning solution

Chapters 2 and 3 have already explained and analyzed the Asian economic crisis which caused the huge imbalance on trade between Asia - North America, and Asia – Europe. Imbalance trade between these areas resulted in many container liners and feeder operations getting in to trouble since they had to move empty containers to where there was a shortage and had to pay extra expense for the repositioning cost. RCL also has a problem with empty container movements as do other liner.

This chapter will generate a possible repositioning solution for RCL to solve the problem of empty containers on the Singapore and Thailand feeder routes and use cost/benefit analysis to find the best solution.

4.1 Associated Empty Containers.

RCL solved the empty container movement problem by joining the Associated Empty Container which is the group of Main Line Operations (MLOs) and fellow feeder carriers carried container on the South East Asia trade routes and faced with the same problem of empty container movements after the Asian economic crisis. The associated members include the Malaysian International Shipping Corp (MISC), American President Lines (NOL/APL), Maersk, Orient Overseas Container Lines (OOCL), Advance Container Lines, Pacific Eagle Lines and Gemartrans.

RCL had to pay for loading empty containers on the MLOs less than loaded boxes (Chan Tuck Hoi, executive vice – president of the RCL group, 1999).

As Chalermkiat T. Paiboon, Asst. Regional Marketing Manager of RCL, June 2000, confirms empty positioning from Singapore is still going on today just like what was happening 10 years ago. Currently, the cost of empty positioning is around US $.180-210 per 20ft container and US $330-370 per 40ft container. However, many shipping lines are now trying to solve this problem by offering very low rates. Presently freight rates for laden containers is around US$.50 /teu plus THC in Thailand. Chalermkiat stresses that with the emergence of Port Klang, now many lines start to move to Malaysia because of cheaper port operation costs compared with Singapore. In this way, many lines have their empty stock at Port Klang and they sometimes move their empties by rail from Port Klang direct to Bangkok and Lad Krabang (container depot ICD, 25 km east of Bangkok) with low cost (approximate US$. 150/teu) but small volume. Normally the maximum capacity of a train is 30 teus per trip and no space guaranteed by the rail operator. In case they can solicit a laden box, they will remove empties due to better pay.

The associated empty equipment repositioning on behalf of the MLOs and fellow feeder carriers seems to be a good solution at this time because RCL can save repositioning costs of around US$.130-160 per 20ft container and US$280-320 per 40 ft container. To move empty containers by rail from Port Klang directly to Bangkok and Lad Krabang, RCL can save repositioning costs of only US$30-60 per 20ft container and US$180-220 per 40ft container excluding expense from Singapore to Malaysia. So, the benefit of saving empty container movement cost by rail is less than the associated empty equipment repositioning on behalf of the MLOs and fellow feeder carriers.

According to Thailand Shipping Statistics, 1998, RCL had to carry empty containers from Singapore to Thailand amounting to almost 20,000 boxes (9,500 for 20ft container and 10, 454 for 40ft container), with an estimated repositioning cost of around 5 mil US$ in 1998.

Assuming the empty container movement decreased from 1998 with an average growth rate of 5% per annum because of increase in the Thai GDP as already discussed in chapter 2 and 3. RCL will save repositioning costs of around 376-439 thousand US$ in 2000, if their empty containers were carried by MLOs and fellow feeder carriers only 10% of the total empty container movements. If RCL can join the Associated Empty Container to 50%, RCL will save repositioning costs of around 1.9-2.2 mil US$ (see Table 12 Associated empty container saving costs).

Table 12

Associated empty container saving costs in 2000

Possible joining	10%	20%	30%	40%	50%
Empty container 20ft (Boxes)	857	1715	2572	3430	4287
Empty container 40ft (Boxes)	943	1887	2830	3774	4717
Repositioning saving costs (thousand US$)	376-439	751-878	1127-1317	1503-1756	1878-2195

Source: compiled data from Thailand shipping statistics 1998 (office of The Maritime Promotion Commission, Ministry of Transport and Communication) and RCL group.

During the Asian economic crisis, the empty container movements inward from Singapore to Thailand was just only one direction because exports from Thailand were more than imports caused by the devaluation of the currency, as already discussed in Chapter 3. The volume of imports and exports, also, decreased from the beginning of the Asian economic crisis. Many shipping lines had the same problem with a very low load factor on this trade route. According to Thailand Shipping Statistics, 1998, the load factor of shipping lines inward from Singapore to Thailand was very low, almost 20%. RCL seems to be better in load factor than many other shipping lines inward from Singapore to Thailand with 32%. So, when shipping lines came to a joint agreement to carry empty containers with a lower price than loaded boxes, it will benefits both parties for these shipping lines that trade on

this route. The empty container lines will get a benefit from a lower repositioning cost, as already discussed above, and the shipping lines that offer to carry empty containers will get a benefit from better utilization in their load factor.

RCL do not have to pay a fee to a broker for finding other shipping lines to carry empty containers from Singapore to Thailand in order to reduce repositioning costs. In the case of Internet packages such as InterBox, SynchroNet or Greybox to provide information for matching interchange equipment, RCL have to pay fee for each matching equipment as will be discussed later.

However there is no guarantee that this solution will be good in the long term, since shipping lines will not be happy to carry empty containers, with low revenue when the market is good. They want to carry loaded boxes with higher revenue. As Chan said, "Although the movement of empty containers on behalf of MLOs pays less than loaded boxes, RCL's lean cost base means that a marginal rate of return is still manageable on this traffic". In the Longer – term though, the company has seen an equalisation process taking place in the price paid by MLOs for the relay of empty and loaded feeder boxes as making a further positive contribution to the company's fiscal performance.

4.2 InterBox solution

InterBox is an on-line marketplace, accessible via the Internet, where shipping lines, leasing companies, and other container users can trade container availability to reduce operating costs by increasing container logistics efficiency. On the InterBox exchange, members post or search for offers that meet their needs (deficit or surplus), then create binding contracts to interchange equipment, leased container, or empty moves transaction. (http://www.Interbox.com).

InterBox ®, The International Container Exchange™, is a secure, neutral, web-based marketplace where members can cost effectively source and reposition marine cargo

containers. The secure system enables members to control with whom they do business by setting their own priority status of fellow members and rigorous contracting disciplines are a key to the Interbox regime. Members provide details of their surplus and demand locations, and, once logged on, other members registering a reciprocal matching requirement can activate a contact within moments (Tim Power, VP of marketing IAS, 1999).

The benefit of InterBox to RCL is as follows. Firstly, RCL will get a benefit from the open wide range of container owners and operators comprising deep-sea lines; leasing companies; regional, short sea and cabotage operators; and domestic Intermodal carriers. InterBox covers both global and regional markets, including positioning requirements within the US and intra Asian markets. The major users are CMA-CGM Group, HLX-Hub Group, Hapag-Lloyd, Hamburg Sud, Matson Intermodal, Mitsui OSK Lines, Mark VII Transport, OT Africa Line, P&O Nedlloyd, Riss Intermodal, Sea-Land (Domestic), Triton and Textainer (IAS, 1999). So, it is a good opportunity for RCL to find matching equipment with other variety members.

Secondly, RCL will get a benefit from the Internal Asset system (San-Francisco-based International Asset Systems or IAS has a mission to develop Internet based business-to-business solutions), as InterBox enables container owners, operators, and transport service provides access to a dynamic, global business-to-business exchange. They can source and reposition containers, search and post surplus or deficit containers, or search and post container vessel slots capacity (Blair W. Peterson, Commercial V.P of IAS, June 2000). Blair, also, stresses that InterBox completes transactions directly through a real-time bid/ask offer/counteroffer process in an on-line marketplace. InterBox is directed towards the broad market of container owners, operators, and transport providers. Since the Asian economic crisis caused a one way direction empty container movement from Singapore inward to Thailand, to solve the problem of repositioning, resolution is very complicated. So, the on-line marketplace with InterBox, accessible via the Internet, is very useful

for RCL because it can use a wide open range market to respond to their need. Therefore, RCL has already invested heavily in new equipment and IT system in the beginning of 2000, so it can use InterBox to improve utilization in the IT system to get opportunities and marketplace via the Web. As Tanthuwanit Sumate, president of the RCL Group, (1999) says "RCL has made investment in developing an e-commerce customer service called 'BHUM' net". To use InterBox connect via the Web is very simple. As Blair, (2000) says all that is needed is a computer connected to the internet and a password – no client server software is necessary to install as in the case of some competitors. InterBox also enables a user control order/bid process, which ensures that the economics of any transaction are driven to the natural market level, giving both the container supplier and receiver the best possible deal.

Thirdly, InterBox can save repositioning costs for RCL through IAS which generates its revenue on the basis of successful transactions. It charges around US$20 for each particular deal. A 'nominal' monthly access fee is also applicable for use of the exchange database (Timothy J Power, vice president of IAS). The pricing of moving containers depends on an agreement between InterBox and its members. The system allows for on-line offer/counter offer negotiation, so, it is purely dependent on the market (Blair Peterson, Commercial vice president of IAS)

Since the Asian economic crisis resulted in caused one direction empty container movements from Singapore to Thailand, it is difficult to interchange containers with other lines. RCL has to pay a fee of around US$20 for each particular deal and negotiate with members for a leased container (currently, US$1.30/20ft, and $2.30/40ft per day). The average number of days for leasing containers on the Thailand/Singapore trade route is 4 days. Table 13 shows that RCL will save repositioning costs for different program of InterBox such as leased container, empty moves transaction, and execute interchange program. Assuming the average growth rate of the empty containers in 1999 and 2000 decreases from 1998 by 5% per annum. RCL will save repositioning costs of around 417-480 thousand US$ for

leased containers 10% of the total empty container movement and 2.1-2.4 mil US$ for leased containers 50% (see table 13 A leased container). In the case of RCL using empty moves transaction, it has to pay a fee of US$ 20 for each box and negotiate a price of empty moves with other lines, currently around US$50/box. RCL will save repositioning costs of around 339-403 thousand US$ for 10% of the total empty container movement and 1.7-2 mil US$ for 50% (see table 13 B Empty moves transaction). In the case of RCL using execute interchange program with other lines. RCL will save repositioning costs of around 429-493 thousand US$ for 10% of the total empty container movement and 2.2-2.5 mil US$ at 50%(see Table 13 C Execute interchange program).

Table 13

Repositioning saving costs with InterBox in 2000

A. Leased container

Possible Leasing	10%	20%	30%	40%	50%
Leased container 20ft/year (Boxes)	857	1715	2572	3430	4287
Leased container 40ft/year (Boxes)	943	1887	2830	3774	4717
Fee charge 20US$/container (Thousand US$)	36	72	108	144	180
Leased container costs (Thousand US$)	13	26	39	53	66
Repositioning saving costs (thousand US$)	417-480	833-960	1250-1440	1666-1920	2083-2400

B Empty moves transaction

Possible empty move transaction	10%	20%	30%	40%	50%
Empty container 20ft (Boxes)	857	1715	2572	3430	4287
Empty container 40ft (Boxes)	943	1887	2830	3774	4717
Fee charge 20US$/Boxes (Thousand US$)	36	72	108	144	180
Empty moves transaction (Thousand US$)	90	180	270	360	450
Repositioning saving costs (thousand US$)	339-403	679-806	1019-1209	1359-1612	1698-2015

C. Execute Interchange program

Possible Interchange	10%	20%	30%	40%	50%
Empty container 20ft (Boxes)	857	1715	2572	3430	4287
Empty container40ft (Boxes)	943	1887	2830	3774	4717
Fee charge (20US$)/boxes (Thousand US$)	36	72	108	144	180
Reposition saving costs (thousand US$)	429-493	859-986	1289-1479	1719-1973	2148-2465

Source: compiled data from Thailand shipping statistics 1998 (office of The Maritime Promotion Commission, Ministry of Transport and Communication), RCL and InterBox information.

4.3 SynchroNet solution

Founded in 1996, SynchroNet Marine, Inc. the premier business-to-business container exchange, delivers solutions that use innovative and database technology to help carriers reduce the costs of empty positioning and the need for box leases (http://www.synchronetmarine.com). SynchroNet's secure and neutral on-line container exchange offers operators a central market place enabling users to increase utilisation and reduce costs. Through the Internet-based Cooperative Access System (CAS), SynchroNet offers a direct business-to-business container exchange platform where domestic and international container operators can recognise, activate and manage high volumes of controlled container exchange opportunities. Currently, the

SynchroNet offering comprises three distinct services, International Service, AsiaMax and US overland, (see 'The SynchroNet solution', container Management Supplement, March 2000, P.S6-S10).

The heart of the SynchroNet advantage is the Cooperative Access System ™ (CAS), a sophisticated, highly secure database engine developed by SynchroNet. This engine is used to regularly combine and analyze confidential container flow and imbalance data from different international carriers to recognize every opportunity for controlled cooperation that exists among potential partners. SynchroNet's CAS software connects users to their own segments of a dynamic, real-time system to review, select and manage high volumes of controlled container exchange among a broad range of partners (http://www.synchronetmarine.com).

SynchroNet is acting as a facilitator, the 'deal' itself is actually between the two carriers directly. It has 35 international shipping lines involved, which together represent 40% of the world's fleet. Mark Kadar, vice president of Mercer Management Consulting feels that SynchroNet is offering a more distinctive system than its competitors because it is not just posting bulletin-board information. It is receiving data, analysing it and reporting back to the carriers where their problems actually are (see 'Synchro-savings', Containerisation International, August 1999, P.65-67).

The benefit of SynchroNet solution to RCL is as follows. Firstly, SynchroNet offers the very lowest cost solution. The cost is nominal, being only US$30 per transaction and no other charge (Ron Fuentes, staff Vice President of Sales, SynchroNet Marine, Inc, June 2000). Table 14 shows that SynchroNet can save repositioning costs to RCL in different possible percent of interchange equipment with the total empty container movements. Assuming the average growth rate of the empty container in 1999 and 2000 decreases from 1998 by 5% per annum. In the case of RCL can exchange container with its members only 10% of the total empty container

movements, RCL will save repositioning costs of around 412-475 thousand US$. In the case of RCL can exchange container with its members at 50%, they will save repositioning costs of around 2.1-2.4 mil US$.

Secondly, RCL will gain from the interchange of equipment with other lines through Internet with a simple connection. It is easy to get started with BHUM net in which RCL have already invested in the beginning of 2000, as already discussed above. SynchroNet need only an Internet connection and email facility (Container Management Supplement, March 2000, p. S6). So, RCL can use SynchroNet for added value with their IT network system. With the data pooling technology of SynchroNet, RCL can view all potential available interchange opportunities.
In 1999, SynchroNet through its client server database provided a relational database (SQL) that matched over 85 thousand containers globally, giving an industry saving of over US$ 25 mil (Ron, June 2000).

Table 14

Repositioning saving costs with SynchroNet in 2000

Possible Interchange	10%	20%	30%	40%	50%
Empty container 20ft (Boxes)	857	1715	2572	3430	4287
Empty container 40ft (Boxes)	943	1887	2830	3774	4717
Fee charge (US$30)/Boxes (thousand US$)	54	108	162	216	270
Repositioning saving costs (thousand US$)	412-475	823-950	1235-1425	1647-1900	2058-2376

Source: compiled data from Thailand Shipping Statistics 1998 (office of The Maritime Promotion Commission, Ministry of Transport and Communication), RCL and SynchroNet information.

Thirdly, RCL will exchange equipment in a Real-time, communication tool to send instant messages or e-mails to partners and branch offices. The SynchroNet system is the only client server application with a Real-time exchange of equipment and the

best protocol with multiple partners and multiple opportunities visible at 100% of the time (Ron, June 2000). In the case of RCL having a surplus in Singapore, and a deficit in Bangkok, at the same time, the CAS will recognise a surplus and deficit of RCL and the system also recognises that Maersk has a need of equipment in Singapore and their routes via Bangkok. In this case, both companies would select the deal because it would save RCL from having to empty position these units to Bangkok, while Maersk could secure the necessary containers to move cargo to Bangkok, thus avoiding the probability of positioning or leasing units in Singapore. SynchroNet is also quick to respond. In such a case where RCL wants to cancel the agreed booking, RCL can cancel the selected deal and indicate the reason in the "If Cancelled, please provide reason below". The CAS imbalance field for Singapore would then change automatically.

Fourthly, RCL will gain by interchanging its equipment with other lines through SynchroNet in which it has 35 international shipping lines involved, which together represent 40% of the world's fleet (Stig Sevaldsen, VP of SynchroNet Marine, 1999). SynchroNet' s aim is to develop the product as a trading system effectively operated by the shipping lines themselves. It should be noted that Interbox and Greybox provide a great value service to a leasing company's customer.

Nonetheless, SynchroNet seems to be useful for deep-sea operators more than short sea. The SynchroNet concept is to balance the correction of both the origin and destination imbalance without empty position (http://www.synchronetmarine.com). Since the Asian economy causes container lines carry its empty container only in one direction from Singapore to Thailand, so, it is difficult to interchange equipment in order to balance both Singapore and Thailand. Anyway SynchroNet is one that provides email to solve the complicated repositioning.

Chalermkiat says that SynchroNet is an excellent idea, but not realistic. It seems that SynchroNet does nothing than offer information technology. In the case where

RCL gets a container from Maersk line from Singapore to Bangkok, Maersk line can reduce its reposition cost, but RCL shall encounter a container deficit in Bangkok immediately because there will be no RCL's container flow into Thailand. Ron Fuentes says, however, that all units are tracked by SynchroNet, all units are 100% contracted to be back to the customer in a fixed time period as well as cost and penalties if lost or damaged.

4.4 Greybox solution

Greybox provides to all shipping lines a computerized trading environment via its electronic Bulletin Board offering a secure and neutral brokerage service. This service proactively assists members in identifying interchange opportunities with its unique matchmaking capability. Greybox co-ordinates all terms and conditions of Membership via an addendum to Transamerica Leasing 's master lease contract which regulates the terms and conditions for Members, as both suppliers and users of Greybox interchanges. The Greybox service also includes a comprehensive tracking and billing administration (http://www.tradexonline.com).

The benefit of Greybox to RCL is as follows. Firstly, Greybox Logistics Services (GLS) Inc. hosts a variety of different flexible product offerings that both individually and together can offer many cost and administrative savings to container operators. The services employed can be generalised as:* Greybox Interchange Service (GLS)- to match and promote the use of container interchange between operators. * Greyslot (GS)- to match available vessel space (slots) with the need to position empty containers. * Greybox Fleet Management (FM)- to outsource partly or wholly container logistics management to Greybox, providing people, systems and vast industry know-how to provide a cost guarantee based upon budgeted container flows and imbalances (Stephen Fletcher, Commercial Director-Gleybox Logistics Services Inc., June 2000). RCL can use Greybox Interchange Service (GIS) to supply or use their equipment on the Singapore/Thailand route, or Greyslot (GS) to

match available vessel space (slots) with the need to position empty containers with members.

Secondly, RCL will gain from the fully managed administrative process of GLS's network. As Paul Crinks, 1999, VP of GLS says the company's ability to fully manage the administrative process is extremely important. "Once the match between clients has been made it is seamless for them as we did the tracking, invoicing, collection, etc, and delivery to the contributing line's preferred drop-off point. GLS's network of dedicated service centres has also been expanded, the company functioning out of eight offices located in New York, Chicago, London, Singapore, Hong kong, Auckland, Brisbane and Sydney. Currently, a team of 20 persons is dedicated to the company's activities worldwide" (see 'Greybox refined', Containerisation International, September 1999, P.75-77). Crinks says "The main benefit of Greybox over Interbox or SynchroNet is that we as well as having systems employed on-line and available to our customers. We also have people in place to deal directly with our customers if they prefer not to use the systems provided" (S. Fletcher, June 2000).

Thirdly, RCL will gain from the support of Transamerica Leasing 's worldwide organization, committed to quality and value added. Transamerica is the world's largest lessor of marine container and intermodal freight equipment, with approximately 1.2 million *Teu* under its control. Internet leasing opportunities through Tradex 1 Value-added management products are offered through its subsidiary company Greybox Logistics Service division (Containerisation International, September 1999, P.75-77). As a Greybox is the new Interchange Service from Transamerica Leasing operating under the brand name Tradex. Since there is only one direction empty container movement from Singapore to Thailand, as already discussed in chapter 3, it is difficult to find matching interchange equipment with other lines. So, leasing containers is one of the best

ways to use in order to reduce the repositioning cost and the cost benefit will be compared later.

Fourthly, RCL will gain from saving repositioning costs when using programs such as Interchange or Greyslot. For the Interchange program to supply equipment from Singapore to Bangkok, RCL has to pay US$25 when supplied and US$25 when returned. All the time the unit is being supplied RCL will receive US$1.00/20ft, and US$2.00/40ft per day. The average supply unit in Singapore/Thailand is normally 4 days. So, RCL will save repositioning costs of around US$ 386-450 thousand in the case of RCL supply empty container 10% of total empty container and around US$ 2-2.3 mil for 50%, in 2000. For the Interchange program to use equipment from Bangkok to Singapore in order to reduce empty containers at Singapore, RCL will pay US$25 when picking up the box and US$25 when returning it. All the time while using the unit RCL has to pay US$1.30/20ft and US$2.30/40ft. RCL will save repositioning costs of around US$ 362-426 thousand in the case of using equipment 10% of total empty container and around US$ 1.8-2.1 mil for 50%. Using Greyslot from Singapore to Thailand, Greyslot will charge a $10 per box transaction fee to both the slot provider and slot user. The freight rate agreed between the parties will be settled directly. The average freight rate for carrying empty containers between Singapore/Thailand is around US$50 per box. So, in 2000, RCL will save repositioning costs of around US$ 357-421 thousand for 10% and US$ 1.8-2.1 mil for 50% (see Table 15 Saving repositioning costs with Greybox).

Table 15

Repositioning saving costs with Greybox in 2000

A. Interchange program when supplying equipment

Possible Interchange	10%	20%	30%	40%	50%
Empty container 20ft	857	1715	2572	3430	4287
Empty container 40ft	943	1887	2830	3774	4717
Fee charge (US$50)/Boxes (thousand of US$)	90	180	270	360	450
Receive US$1/20ft and US$2/40ft per day	11	22	33	44	55
Repositioning saving costs (thousand US$)	386-450	773-900	1160-1350	1547-1800	1933-2250

B. Interchange program when using equipment

Possible Interchange	10%	20%	30%	40%	50%
Empty container 20ft	857	1715	2572	3430	4287
Empty container 40ft	943	1887	2830	3774	4717
Fee charge (US$50)/Boxes (thousand of US$)	90	180	270	360	450
Pay US$1.3/20ft and US$2.3/40ft per day	13	26	39	53	66
Repositioning saving costs (thousand US$)	362-426	725-852	1087-1278	1450-1704	1812-2130

C. Greyslot.

Possible Greyslot	10%	20%	30%	40%	50%
Empty container 20ft	857	1715	2572	3430	4287
Empty container 40ft	943	1887	2830	3774	4717
Fee charge (US$10)/Boxes (thousand of US$)	18	36	54	72	90
Empty move(US$50)/boxes (thousand of US$)	90	180	270	360	450
Repositioning saving costs (thousand US$)	357-421	715-842	1073-1263	1431-1684	1788-2105

Source: compiled data from Thailand shipping statistics 1998 (office of The Maritime Promotion Commission, Ministry of Transport and Communication), RCL and Greybox Logistics Services information.

4.5 Repositioning solution Analysis

Repositioning solution analysis will be discussed in terms of conflict of interest, cost benefit and service specification as follows.

4.5.1 Conflict of Interest

Conflict of Interest for RCL as follows will be analysed in terms of the conflict between ownership and management of a container lease fleet, data sharing limitation, absolute neutrality and security, and control of equipment.

4.5.1.1 Ownership and Management of a container lease fleet

Greybox and InterBox are possible to come into conflict with the ownership and management of a container lease fleet, since both products have provided leasing service to a leasing company's customer (Sevaldsen, VP of SynchroNet Marine, 1999). InterBox has strict rules to control their members (Tim Power, VP marketing of InterBox, 1999) and Greybox has their ability to fully manage the administrative process (Crinks, VP of Greybox Logistics Services, 1999). RCL does not like more control of management in their equipment since more control by strict rules of Interbox or more takes care of control by Greybox with the chance of conflict occurring between RCL management and the management of a container lease fleet. Associated Empty Container and SynchroNet do not provide leasing services.

4.5.1.2 Data Sharing Limitation

Associated Empty Container has to share data with only their members and has a limited scope of sharing data in the Southeast Asian region. InterBox and Greybox focus on leasing customer, even though they provide open wide range and variety services of container with deep-sea lines, regional operators, short sea and cabotage operators, and domestic intermodal carriers. However, if compared with SynchroNet, they have their focus on only container liners and with 35 international shipping lines involved, which together represent 40% of the world's fleet (Sevaldsen, VP of SynchroNet Marine, 1999). SynchroNet uses the Cooperative

Access System or CAS to provide data pooling that helps users to view all potential available interchange opportunities. RCL seems to gain from data sharing with SynchroNet more than with Greybox, InterBox, and Associated Empty Container.

4.5.1.3 Absolute Neutrality and Security

Associated Empty Container with MLOs and fellow feeder carriers is only an agreement among liners, who want to reduce their repositioning costs and improve their load factor caused by the Asian economic crisis, to carry empty containers at a lower price than loaded boxes. Some liners compete on the same trade route but get both benefits of a win-win situation. When they join agreements in same association. Greybox was support by Transamerica world's largest lessor of marine containers and intermodal freight equipment. So, their interest is in the leasing business, while, InterBox was operated by International Asset System or IAS-based in San Francisco and has a mission to develop an internet–based, business-to-business solution. SynchroNet is a San Francisco–based, wholly owned subsidiary of SynchroNet Marine AS of Norway. It is a private, venture-funded company that has one simple aim–to use innovative Internet and database technologies to help carriers reduce their empty repositioning costs. SynchroNet and InterBox seem to give more absolute neutrality and security than Greybox and Associated Empty Container.

4.5.1.4 Control of equipment

Greybox needs to pool equipment, the sum of all equipment interchanged via Greybox and still in use by its members. RCL was unhappy with the lack of control their equipment. As Chalermkiat, Asst. Regional Marketing Manager, 2000 said that in case where RCL gets a container from Maersk line from Singapore to Bangkok, RCL will encounter container a deficit in Bangkok immediately because there will be no RCL container flow into Thailand. Furthermore, the service concept of short sea as RCL offers is totally different from the deep-sea carrier of Maersk line. Interbox and SynchroNet need not pool equipment but have some

strict rules to control their members to return equipment back to a customer in a fixed time period, as well as cost and penalties to be paid if lost or damaged. They have full control and visual contact with the units in their system. Compared with Associated Empty Container, RCL can fully control its equipment by loading its empty containers on behalf of MLOs.

4.5.2 Cost Benefit

Cost Benefit as follows analysed in terms of RCL can solve the problem of repositioning cost for the short-term and long-term with cost-effective solutions.

4.5.2.1 Correction of repositioning solution in the short-term

Since the Asian economic crisis caused an imbalance of trade in which Thailand exported more than it imported, empty container movement inward from Singapore to Thailand was only a one way direction, as already discussed in chapter 3. Containers loaded in Thailand increased from 1,041,000 *TEU* in 1996 to 1,300,000 *TEU* in 1998 but containers discharged in Thailand decreased, in the opposite direction, from 963,000 *TEU* in 1996 to 779,000 *TEU* in 1998. Consequently, increase of loaded in Thailand but a decrease in discharged caused by the rise in empty container movements from 78,000 *TEU* in 1996 to 521,000 *TEU* in 1998. The empty container movement from Singapore inward to Thailand was very high, increasing from 18% of empty/total in 1996 to 26% of empty/total in 1998. The total container movement was reduced from 90,736 boxes in 1996 to 77,259 boxes in 1998, or a reduction of 15%. Many shipping lines have the same problem with a very low load factor, almost 20%, but RCL has a better load factor than other shipping lines inward from Singapore to Thailand with 32%. On the other hand, there was almost no RCL empty container movement outward from Thailand.

As discussed above for correction of reposition solution in the short-term, to match available vessel space (slot) with the needs to position empty containers from the liners inward from Singapore to Thailand. It should be possible to solve the

problem of empty container movement, since the liners will get more revenue from loading empty containers inward from Singapore to Thailand and want to improve its load factor that was very low during Asian economic crisis. While leasing and interchange equipment with other lines seems to be less possible to solve the problem because almost every line has the same bad situation with empty containers on similar trade route.

Associated Empty Container, Interbox with empty moves transaction, and Greyslot seem to be better to correct the repositioning solution for RCL in the short-term period.

4.5.2.2 Correction of repositioning solution in the long-term

Empty container movement has been the problem of RCL not only during the Asian economic crisis but also before and after the Asian economic crisis. As Chalermkiat, Asst. Regional Marketing Manager of RCL, 2000 has confirmed that empty position from Singapore is still going on today just like what was happening 10 years ago. Imbalance trades cause empty container movements either to export more than import or export less than import. Therefore, chapter 2 has already discussed that the correlation between GDP and import volume are very closely and more confident values with Correlation Coefficients (r) = 0.95 but the correlation between GDP and export volume are less closely and confident, with Correlation Coefficients (r) = 0.48. Because of the exchange currency rate that made the relationship between GDP and export volume less confidence, with the Correlation Coefficient being very high as (r) = 0.91. The GDP of Thailand was consensus forecast in March 2000 by the World Bank and IMF is estimated to be 4.0 in 1999 and forecast to be 5.0 and 5.5 in 2000 and 2001 respectively. It increased from –10 in 1998 and at the same as level in 1996 which was before the Asian economic crisis. Imports to Thailand will be more in volume in 2000 and 2001 making less imbalance trade and it is possible for Thailand import in volume more than export after 2001.

The empty container movements will change to the opposite direction, from Thailand to Singapore trade route.

For correction of repositioning solution in the long-term, Interbox with a variety of different flexible products such as leasing container, empty moves transaction, or interchange program should be a better solution for RCL to solve the problem in the long term period than other solutions, since Interbox offers more opportunities and a flexible method for RCL to solve empty container movement problems. Greybox is also good at solving the problem in the long-term with leasing containers and empty move transactions, while SynchroNet offers only an interchange program with liners, and Associated Empty Container can solve only empty move transactions with its members.

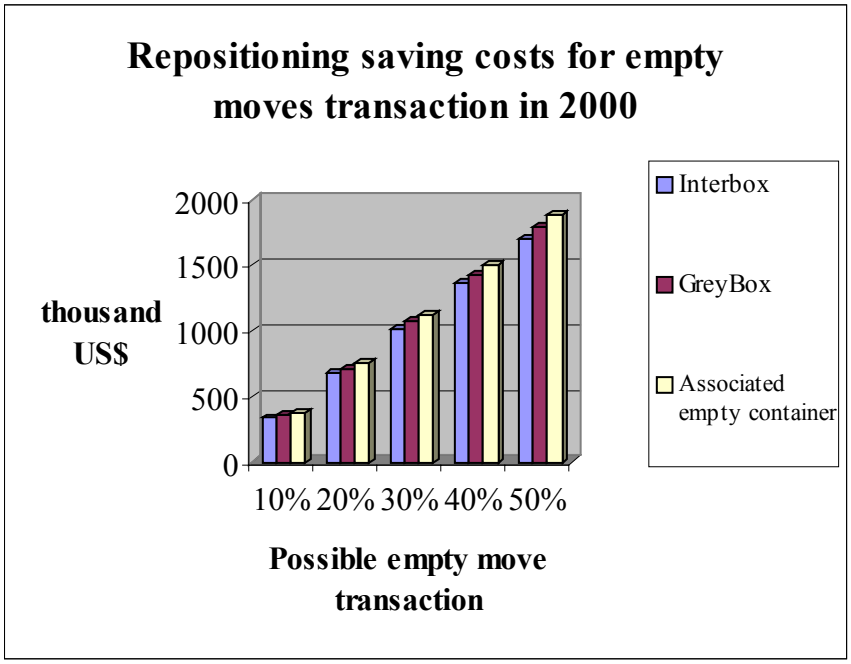
4.5.2.3 Cost effectiveness

The Cost effective analysis as follows compares saving repositioning costs for RCL when using empty move transaction, leased container, and interchange equipment with associated empty container, Interbox solution, SynchroNet solution, and Greybox solution.

4.5.2.3.1 Empty move transaction

Associated Empty Container can save repositioning costs more than Greybox and InterBox when RCL uses empty move transaction. In the case of 10% of empty move transaction, Associated Empty Container can save US$ 376,000, Greyslot saves US$ 357,000, and Interbox saves US$ 339,000 (see 4.1 Associated Empty Container with MLOs and fellow feeder carriers, 4.4 Greybox solution, and 4.2 InterBox solution). In the case of 30% of empty move transaction, Associated Empty Container can save US$ 1,127,000, Greyslot saves US$ 1,073,000, and Interbox saves US$ 1,019,000. In the case of 50% of empty move transaction, Associated Empty Container can save US$ 1,878,000, Greyslot saves US$

1,788,000, and Interbox saves US$ 1698,000 (see Figure 13 Repositioning saving cost in empty move transaction in 2000).

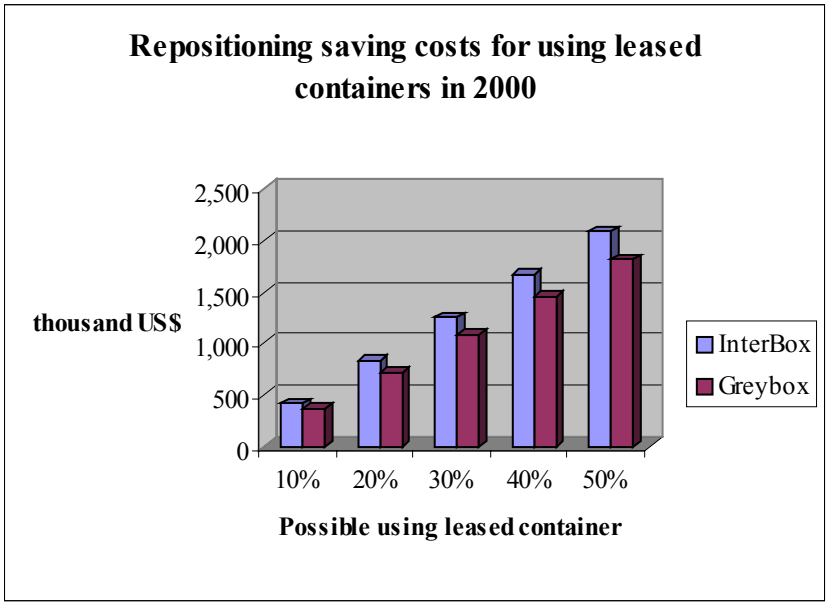


Source: compiled data from Thailand Shipping Statistics 1998, RCL, GreyBox Logistics Services information, and Interbox information.

Figure 13

4.5.2.3.2 Using leased containers

InterBox can save repositioning costs more than Greybox when RCL uses leased containers in 2000. In the case of using leased containers to 10%, InterBox will save US$ 417,000, Greybox saves US$ 362,000 (see 4.2 InterBox solution and 4.4 Greybox solution). In the case of using leased containers to 30%, InterBox will save US$ 1,250,000, Greybox save US$ 1,087,000. In the case of using leased containers to 50%, InterBox will save US$ 2,083,000, Greybox saves US$ 1,812,000 (see Figure 14 Repositioning saving costs for using leased containers in 2000).

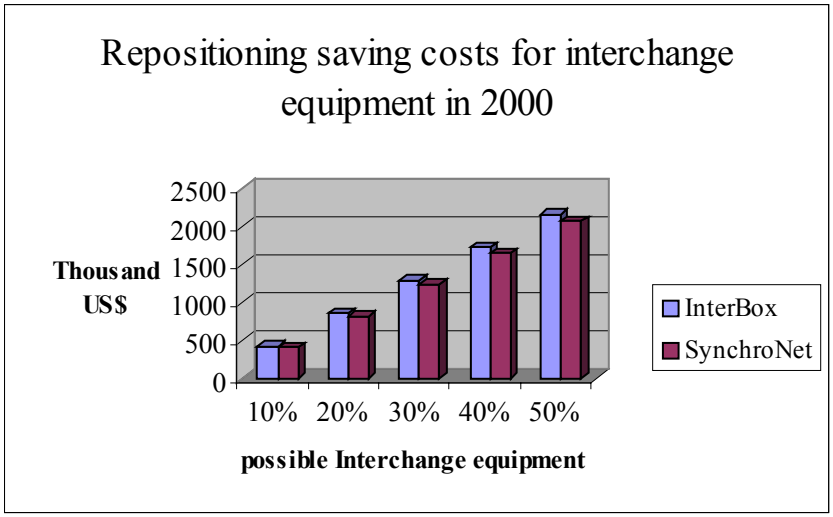


Source: compiled data from Thailand Shipping Statistics 1998, RCL, Greybox Logistics Services information, and Interbox information

Figure 14

4.5.2.3.3 Interchange equipment

InterBox will save repositioning costs more than SynchroNet when RCL uses Interchange equipment in 2000, but not too much. In the case of using Interchange equipment to 10%, InterBox can save US$ 429,000, SynchroNet saves US$ 412,000 (see 4.2 InterBox solution and 4.3 SynchroNet solution). In the case of using Interchange equipment to 30%, InterBox can save US$ 1,289,000, SynchroNet saves US$ 1,235,000. In the case of using Interchange equipment to 50%, InterBox can save US$ 2,148,000, SynchroNet saves US$ 2,058,000 (see Figure 15 Repositioning saving costs for interchange equipment in 2000).

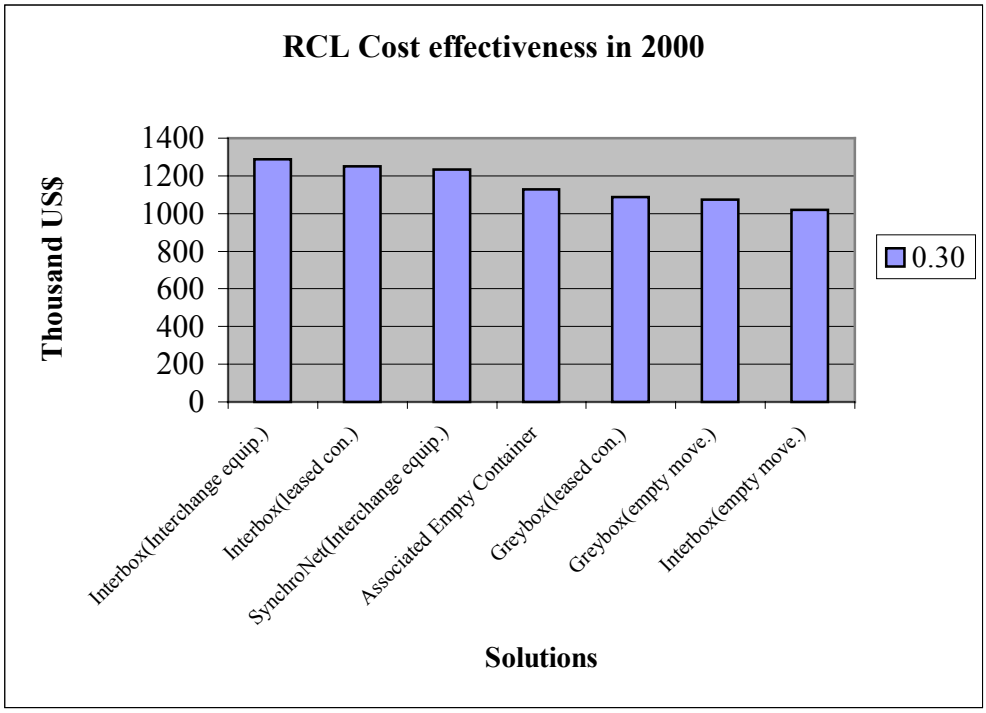


Source: compiled data from Thailand Shipping Statistics 1998, RCL, InterBox information and SynchroNet information.

Figure 15

4.5.2.3.4 Cost effectiveness

To compare saving costs between different solution above, we can see that Interchange equipment with InterBox can save more than other solutions. While InterBox (using leased containers), SynchroNet (Interchange equipment), empty move transaction by Associated Empty Container with members, or using leased container with Greybox and other solutions save RCL less than Interchange equipment with InterBox. Anyway, empty move transaction with Interbox can save less than other solutions. Figure 16 shows an example of RCL cost effectiveness using various solutions where the percentage of interchange equipment, leased containers, or empty move transaction is 30% of total RCL empty container movements.



Source: compiled data from Thailand Shipping Statistics 1998, RCL, InterBox information, SynchroNet information and Greybox information

Figure 16

4.5.3 Service specification

Service specification as follows analyses in terms of real-time information exchange and transaction administration, pooling and analysis capabilities, and cargo-based (start-to-finish) transaction recognition that will benefit RCL to solve repositioning costs.

4.5.3.1 Real-time Information exchange and transaction administration

InterBox, Greybox, and SynchroNet have the same concept to use a real-time on line communication to access a dynamic, global business-to-business exchange where they can source and reposition containers, search and post surplus or deficit containers, or search and post container vessel slot capacity. They complete transactions directly through a real-time bid/ask offer/counter offer process in an on-line marketplace. While associated empty container is less in real-time information

exchange and transaction administration than other solutions, their transactions depend on the IT system of individual members.

4.5.3.2 Pooling and Analysis Capabilities

SynchroNet seems to be better in data pooling and analysis capabilities than InterBox and Greybox, since SynchroNet system is the only one to use client server application with a real-time exchange of equipment. SynchroNet has the best protocol in the industry, with multiple partners and multiple opportunities visible 100% of the time. They are the only one that identifies multiple opportunities for equipment with multiple partners in a real-time system environment. SynchroNet marries up, through sophisticated algorithms, data from a multitude of carriers in 6 continents and filters the contents to provide them with a 100% solution to the imbalance of the industry. According to Ron Fuentes, 2000, "last year SynchroNet through our client server data base provided a relational database (SQL) that matched over 85 thousand containers global. An industry saving of over US$ 25 million." Interbox and Greybox seem to be providing only electronic bulletin board information.

4.5.3.3 Cargo-Based (start-to-finish) Transaction Recognition

The SynchroNet system with CAS seems to be better in the comprehensive tracking system than InterBox and Greybox. All units are tracked by CAS to monitor and steer active opportunities towards completion by coordinating cargo flows with the most extensive range of redelivery locations in the industry, while InterBox and Greybox only concentrate on the Web-site Internet market as facilitators.

4.6 The best repositioning solution

According to 4.5 repositioning solution analysis which has already been discussed above in terms of conflict of interest analysis, cost benefit analysis, and service specification analysis for RCL, we see that Associated Empty Container is very good as there is no conflict of interest between the owner and management leased fleet, and RCL can fully control of their equipment. It is also a good solution for correcting empty container movements in the short-term period and fair about the cost effectively analysis. However, associated empty container is very poor in absolute neutrality and security in which some members are competitors on the similar trade routes. It is poor for correction of empty container movements in the long-term period because some members do not want to carry empty containers when the market is good. It is also poor on data sharing exchange information and service specification analysis. InterBox is better than other solutions in cost benefit analysis. It is also very good in service specification analysis and absolute neutrality. InterBox is good in data sharing exchange information, but it is very poor in conflict between the owner and management leased fleet. SynchroNet is the best in conflict of interest analysis and service specification analysis. It is also good in cost effective analysis but poor for correcting empty container movements in the short-term and fair for correcting in the long-term. Greybox is very good in service specification analysis and correcting empty container movements in the short-terms and long-terms. It is also very good in data sharing exchange information. However, Greybox is very poor in possible conflicts between the owner and management leased fleet, and lacks control of equipment because RCL has to put its equipment in a pool asset. Greybox is poor in absolute neutrality and cost effective analysis.

The weight average analysis of overall significant criteria factor of each solution, is the tool to analyse these possible solutions in order to find the best repositioning solution. Since the main point of this topic is to solve the problem of empty container movements for RCL where the Asian economic crisis had an impact, the

weight credit of Cost Benefit analysis should be double conflict of interest analysis and service specification analysis. The average mark of each significant criteria factor is from 5 (very good) to 1 (very poor). Table 16 shows that Interbox gets the highest mark from weight average analysis with 4.23 marks. SynchroNet, Greybox and Associated Empty Container get 3.88, 3.25 and 2.81 respectively. Therefore, Interbox should be the best repositioning solution for RCL to solve the problem of the Asian economic crisis impact.

Table 16

Weight average analysis

marks	**Associated. Empty containers.**	**InterBox**	**SynchroNet**	**Greybox**
Conflict of Interest(1)	**3.25**	**3.25**	**4.50**	**2.00**
Owner/management lease Fleet	5	1	5	1
Data sharing limitation	2	4	5	4
Absolute Neutrality	1	5	5	2
Control of equipment	5	3	3	1
Cost Benefit(2)	**3.00**	**4.67**	**3.00**	**3.33**
Correction in short term	4	4	2	4
Correction in long term	2	5	3	4
Cost effectiveness	3	5	4	2
Service specification(1)	**2.00**	**4.33**	**5.00**	**4.33**
Real-time Information Exchange	2	5	5	5
Pooling and Analysis Capabilities	2	4	5	4
Cargo-Based Transaction	2	4	5	4
Total	**2.81**	**4.23**	**3.88**	**3.25**

Chapter 5
Conclusion

5.1 Conclusion

The Asian economic crisis in mid-1997 caused a huge imbalance of empty container movements, in which East Asian countries particularly in financial crisis countries loaded containers more than discharged containers. As a consequence of the Asian economic crisis, shipping container lines and feeder operators on Thailand and Singapore trade routes had the same problem with empty container movements from Singapore to Thailand.

Chapter 2 found that the Asian economic crisis had an impact on countries in East Asia and a financial crisis with a huge imbalance of trade for Asia – North America and Asia – Western Europe trade route, and the relationship of the Asian economy and trade development was close. The Regression and correlation analysis in Chapter 2 has shown that the relationship of Asian GDP growth rate percentage and import in volume is very close. However, the relationship of Asian GDP growth rate percentage and export in volume was not quite as close because of the significant factor of the currency exchange rate. Therefore, the relationship of currency exchange rate and trade imbalance was very close.

Chapter 3 found that the Asian economic crisis seems not to be very serious on a global basis but for the Transpacific and Asia – Western Europe trade route it seems to be very serious in empty container movements. RCL had the same problem with empty container movements as other container lines. It had to carry a lot of empty containers from Singapore to Thailand and pay a lot of repositioning costs during the Asian economic crisis.

Chapter 4 analyzes the possible repositioning solutions in order to get the best solution to solve the problem of empty container movements. It found that associated empty containers with MLOs and fellow feeder carriers, InterBox solution, SynchroNet solution or Greybox solution could be a possible solution. Weight average analysis in Chapter 4, with significant factors such as conflict of interest analysis, cost benefit analysis and service specification analysis shows that the InterBox solution is the best solution in solving the problem of empty container movements.

5.2 Recommendations

This dissertation shows that the InterBox solution was the best solution for RCL to solve the problem of empty container movements in over all significant criteria. However, the analysis in Chapter 4 found that the Interbox solution had some weakness in the conflict of interest between owner and management of leased fleets and was less cost effective for the correction of empty container movements in the short-term with empty move transactions. Some strict rules to control their members of Interbox will bring to get conflicts between owner and management of leased fleets, since RCL's owner and staff does not always like any body to control them. RCL staff who should read the rules very well and understand the responsibility of the two organizations can prevent these conflicts. For less cost effective correction in the short-term, RCL should still be a member of Associated Empty Container as it used to be in 1998 and 1999 in order to save more repositioning costs.

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