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Development strategy of Chinese small and medium sized shipping lines on China-Southeast Asia routes

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Development Strategy of Chinese Small and-Medium Sized Shipping Lines on China-Southeast Asia Routes

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Declaration

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

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

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Abstracts

Title of Research Paper	**Development Strategy of Chinese Small and-Medium Sized Shipping Lines on China-Southeast Asia Routes**
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Financial crisis hit the world which brought about a disaster to the global shipping industry. The progress of containerization and larger-sized vessel strategy worsen the situation. Decreasing container transport on major trading routes, low freight rate and rising fuel cost forced shipping lines to cut the cost, adjust capacity, redistribute the fleet. On the contrary, with a relatively strong transport demand, shipping lines are putting more and more emphasis on regional shipping market and short-sea shipping market. The proactive strategies taken by these large shipping lines makes the business of small and-medium sized shipping lines harder and harder. One of them is to cascade large container vessels from major routes to sub-major routes then cascade sub-large vessels to regional routes. On one side, small and-medium sized shipping lines have to face the fierce competition in the market. On the other side, they are urging to getting stronger.

This paper will focus on the survival and development of small and-medium sized shipping lines on the China-Southeast Asia routes. By analyzing the status quo of and challenges posed to small and-medium sized shipping lines on the routes, development strategies are proposed on the basis of the forecast of container transport demand for the following years.

KEYWORDS: small and-medium sized shipping lines, development strategies, China-S.E Asia trading routes, financial crisis, cascading effect and larger-sized container vessels

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List of Abbreviations

1-AGO	1 time Accumulating Generation Operator
AHP	Analytic Hierarchy Process
ANN	Artificial Neutral Network
ASEAN	Association of Southeast Asian Nations
CAFTA	China ASEAN Free Trade Zone
COSCO	China Ocean Shipping Corporation
CSCL	China Shipping Container Line
CRM	Customer Relation Management
FDI	Foreign Direct Investment
GDP	Gross Domestic Productivity
GM	Gray Model
GP	Genetic Programming
IP	Integer Programming
JIT	Just In Time
LSM	Least Square Method
M&A	Merger and Acquisition
KMTC	Korea Maritime Transport Co., Ltd
RCL	Regional Container Line
RBF	Radio Basis Function
SWOT	Strength, Weakness, Opportunity and Threat
TEU	Twenty-foot Equivalent Unit

Chapter 1 Introduction

1.1 General Background

The global shipping industry was deeply hit by the financial crisis in the fall of 2008. The financial crisis led to the dramatic diving of international trade, while shipping, as the derived market of international trade, was vulnerable to the disaster. The crisis resulted to the decreasing freight rate and container transport volume, as well as the difficulty in financing. Magnates in the industry, such as Maersk and CMA-CGA, suffered a lot, let alone the small and-medium sized shipping lines. Some of them have to be shut down, while some of them are merged by larger ones. Shipping industry experiences a new wave of M&A, or combines to alliances. Under the circumstances, small and-medium sized shipping line could only operate on the single specialized market, be merged or exit the market completely.

The survival of small and-medium sized shipping lines is very hard, while the big vessels entering the short sea markets make it worse. Overcapacity in major liner shipping routes made the leading enterprises suffered great financial loss and they decided to transfer the surplus capacity in long-haul liner services to short sea services within the Asia. The capacity is accumulating within Asian market, and the future of small and-medium sized shipping lines is quite gloomy. ‘To be or not to be, that is a question’. If they loss in the battle, they will disappear in the market for ever. But if they could make effective measures, they will get stronger and be a large regional shipping line when the market recovers.

The paper will focus on the development strategies of small and-medium sized shipping lines on the China-Southeast Asia routes. Under the circumstance of being squeezed by large shipping lines and fierce market competition, it is worthwhile to study the survival and development of small and-medium sized shipping lines on the specific routes. The future development of small and-medium sized shipping lines is not a heated topic, but it will raise more attention.

1.2 Literature Review

1.2.1 Strategies of shipping lines

Through a general view of business and strategies of shipping lines, alliance (Midoro & Pitto, 2000) or agreements seems to be a very important and useful way to tackle the market challenges. But the alliance did not elementarily solve the problem of fiercer competitions, decreasing freight rate and needs of service differentiation (Evangelista & Morvillo, 2000). Shipping lines have to vigorate their business by themselves. Different kinds of strategies are made and many of them are well applicable.

Among all the strategies proposed, port selection, route design, integrated services and alliance stand out. Kjetil Fagerholt studied the optimal weekly routes for a given fleet of ships, which is an IP problem. The best choice is the one that total transportation costs are minimized and the demand at each port is satisfied (Fagerholt, 2004). Several studies were made about the port selection with various methods and concepts. The selection of ports matters the total voyage cost, the cargo sources and liner schedules, so that it is a key operation strategy for the shipping lines. T.C. Lirn et al. studied the transshipment port selection by the means of AHP (Lirn, Thanopoulou, Beynon, & Beresford, 2004). Jose L. Tongzon and Lavina Sawant studied the port choices in a competitive environment based on a revealed preference approach, and found that port charges and wide range of port services to be the only significant factors in their port choice (Tongzon & Sawant, 2007). Young-Tae Chang et al.,

studied port selection problem from views of trunk liners and feeder service providers and proposed that six factors are considered relatively important, including local cargo volume, terminal handling charges and so on(Chang, Lee, & Tongzon, 2008).

In recent years, logistics is recognized as driving force that shapes global transportation. There are mounting pressures on box logistics in light of global supply chains so that ports and liner shipping networks are needed to satisfy the increasing time, reliability and costs requirements of supply chain (Notteboom & Rodrigue, 2008). Antoine Frémont argued that vertical integration in the liner industry remains limited. Shipping lines have to find the correct balance between these three types of logistics, namely freight logistics, vessel logistics and container logistics (Frémont, Global maritime networks:The case of Maersk, 2007).

Because of the financial turmoil, shipping lines are giving more concerns to the problem of empty container repositioning. Container repositioning costs shipping lines a lot and shipping lines cannot get any profit from the act. The reduction of empty container movements will reduce fuel consumption and reduce congestion and emissions, so effective and efficient management of empty container matters to shipping lines. Experts and scholars used many mathematical models to solve the problem so that the total repositioning cost could be dramatically cut (Francesco, 2009). There are some that are much practical. Koichi Shintani et al analyzed the possibility to save container fleet management costs in repositioning empty containers through the use of foldable containers. The study found that foldable containers can substantially save on repositioning costs compared to the use of standard containers (Shintani, Konings, & Imai, 2010). Compañía Sud Americana de Vapores (CSAV) developed an Empty Container Logistics Optimization System (ECO) to manage container imbalance. ECO's multi-commodity, multi-period model manages the repositioning problem, whereas an inventory model determines the safety stock required at each location (Valenzuela , Neely, Weintraub, Valenzuela, & Hurtado, 2012).

1.2.2 Strategies taken by small and-medium sized shipping enterprises

Because of the financial crisis, tremendous transport demand declining causes loss in both liner market and tramp market. Large shipping lines [1] squeezed small and-medium sized ones which forced them to initial a price battle.

It appears that few paper focusing on the survival and development of small and-medium sized shipping lines, but it does not mean that they do not deserve the attention. Fang Zhaoqi found different development phases of private shipping enterprises in China. Most of the private shipping enterprises in China are small and-medium sized ones, while Zhejiang Province habits many private enterprises (Fang, 2004). Zhang Hongjun presented the problems of China's small and-medium sized shipping enterprises: difficulty in financing, backward management style, high operation cost and low core competence of enterprises. The suggestions he proposed, such as using heavy diesel oil to lower voyage cost and employing fish men, have certain limits if the enterprises want to expand the business (Zhang H. , 2006). According to an industrial case, Xue Qinghui analyzed the status quo of the enterprise with SWOT model and purposes customized strategies to the medium sized bulk carrier (Xue, 2008).

After the financial crisis, the suggestions and strategies proposed aimed at how to help small and-medium shipping enterprises cope with the crisis. The financial crisis raised the attention of the central government and the Ministry of Communications of China, Liu Xiaojun stated that it was an good opportunities to adjust the development pattern and structure of container transport industry based on the changes in macro economy and lowering fuel price (Liu X. , 2009). Zheng Yanping studied the development strategies of small and-medium sized shipping enterprises based on the core competence of the enterprises. She uses the SWOT model to analyze the external and internal environment of the shipping enterprises and gives the idea that small

[1] Shipping enterprises here include those which operate liner services and those operate tramp services.

and-medium sized shipping enterprises should take advantages of idle resources in the market and enter the logistics service market step by step (Zheng, 2009). Zhang Xudong studied the small and-medium sized shipping enterprises which operated in Yangtze River Basin. He proposed that they should improve their competitiveness in the regional market by M&A and structure-redesign inside the enterprises (Zhang, 2009). Huang Zhengyue studied the operation strategies of the shipping enterprises in Xia Men, China based on SWOT analysis, he presented that small and-medium sized shipping enterprises should improve customer services, develop logistics-oriented service, build virtual logistics alliance among similar enterprises and strengthen the cooperation with the port sides (Huang Z. , 2010). Wang Chunhao et al. studied the strategies of Shipping Corporation of India[2] to see how differ the strategies being used in other shipping enterprises with different management styles and business environments. Then the shipping line found that its weakness and planned to vigorate its liner business by seeking government supports and partners, expanding fleet, optimize resources and other methods (Wang, Shi, & Zheng, 2010). Ji Bin purposed integrated solutions to small and-medium sized shipping lines based on how to improve the competiveness of these shipping enterprises (Ji, 2011).

In a conclusion, small and-medium sized shipping enterprises have some common problems. The best operation strategies should be customized according to the specific enterprise and macro-economic environment.

1.2.3 Forecasting Model of Container Throughput

Forecast is a very important part of studies of shipping industries. Port authority needs to know the future trend of container throughput so that they could know whether they need to buy more container handling machines or build more container terminals. Shipping lines need to know the future trend of container export/ import volume so that they could better plan the vessel schedule, distribute the vessels and other

[2] Shipping Corporation of India is the largest shipping enterprise in India and it operates 75 vessels.

resources.

Forecast methods could be classified into two parts: qualitative method and quantative methods. The classical qualitative forecast method is Delphi approach. The most common quantative methods are time series approach, trend projection and regression approach. Besides, grey model, neutral network, fuzzy mathematics, Markov chain and composite models approach are also widely used in forecasting the container throughput.

In the early time, major methods used to forecast the throughput of a container port are the single methods, the modified classic prediction models or the comparison between different forecast models. Guan Bin is the first that used the GM theory to predict the throughput of a container port, and made the Hong Kong-Macao service in Port of Guangzhou as an example for cargo throughput forecast analysis (Guan, 1990). Cai Ying applied the time series analysis into the prediction of port throughput. She used a polynomial and trigonometric functions to work out the real function and her method obtained a good fitting degree (Cai, 1991). Wang Hong and Song Fengjie thought that the result of regression analysis was restricted by data, time, predicted costs etc. and the model was made of the raw data whose randomness is larger, and so it is difficult to make a model from these data. Under these circumstances, a fixed time series prediction method is more suitable (Wang & Song, 1995). Because that fuzzy forecasting method based on the Logistics curve has excellent versatility and maneuverability, Lan Peizhen considered that fuzzy forecasting method was also an ideal model to predict the throughput of a port (Lan, 1996).

Because ANN features nonlinear mapping ability, self-adaption and the great tolerance of fault, so it performs well in the forecast of a nonlinear system. Wang Xihuai and Bao Mingzhong used the RBF neural network method to forecast the throughput of a port and successfully applied the method into the forecast of Port of Shanghai (Wang & Bao, 1999). Xu Xing and Shi Xijun applied the BP network

forecast method on forecasting the container throughput of Port of Sheng Zhen (Xu & Shi, 2002). Cheng Rong applied the improved RBF neural network method into the prediction of throughput (Chen, Wu, & Zhang, 2004).

Besides ANN method, other forecast methods are also improved. Huang Rongfu and Zhen Hong developed a forecast model based on three exponential smoothing methods. They proved, by a real case that forecast model based on it was more accurate than the one based on two exponential smoothing methods or regression model (Huang & Zhen, 2003) . Huang Shunquan compared the difference of forecast models between three exponential smoothing methods and the cubic polynomial regression analysis to forecast the throughput of Port of Shanghai. Data used in the regression forecast have a self-correlation, so the model based on three exponential smoothing methods may have a larger error, but it is more suitable to forecast the container throughput (Huang S. , 2003). Le Meilong et al. proposed a simple prediction method based on Genetic Programming (GP) after a deep research on genetic algorithm (Le & Fang, 2003) . According to the relationship between GDP and container throughput, Huang Rongfu et al. proposed a forecast model based on regression method (Huang, Li, & Gu, 2004). But Guo Mei held a doubt view on Huang's model. From Gou's stand point, the volume of foreign trade, the limitation on the port and sudden terrorist event should be taken into consideration as well as the GDP index. Gou also improved the existing regression analysis model (Guo, 2004). According to the fuzzy mathematics method, Chen Lijiang established the fuzzy moving average model and fuzzy polynomial forecast model. Chen also applied the model on forecasting China international container liner shipping market which achieved a relative accurate result (Chen & Su, 2005). Lin Bin and Chen Deli found that under the circumstance of poor information state, grey model also works well in the forecast middle-and-long term container throughput (Li & Chen, 2005). According to relationship between throughput and historical data of container throughput, and between GDP and container throughput, Lu Shaohua forecasted the development trend of China' s sea ports on the basis of the GP model composed by Le Meilong.

Although two forecast models both worked well, Lu found that the former method based on GDP is more accurate (Lu, 2006).

In recent years, the forecasting technology is no longer limited to single mathematical methods and composite models have been widely used. Liu Yanjiao etc. compared the modified GM (1, 1) model, the time series model and the composite model of the two in forecasting the container throughput of a port. It had been proved that the composite model combines the advantages of both two models (Liu & Xiao, 2006). Xie Chengli developed a Gray-trend line composite model (Xie & Liu, 2006). Shi Zejun et al. saw the input and the output of a container port as a grey system , so they used composite model of GM(1,1) and the three exponential smoothing model to forecast the throughput of Ningbo port (Shi & Li , 2008). Jin Jiaohui et al. forecasted the container throughput of Trans-Pacific line by using grey model and by the Markov chains (Jin & Yao, 2007). Chien-Chang Chou though that the existing forecast models which based on economic growth and international container volumes are mainly liner regression models, so he modified the existing regression model which better fit in developing countries (Chou, Chu, & Liang, 2008). Other composite forecast methods include gray-Multiple regression forecast model (Nan & Wang, 2008), gray-liner regression model (Yang & Gu, 2010) and so on.

In a word, though the experts and scholars use different kinds of methods to forecast container throughput, they have not found the best one, and the research is going on. According to existing studies, a good forecast method is proposed case by case and the characteristics of the port should be taken into consideration.

1.2.4 Summary

The literature review summarized the papers and researches on the general strategies of shipping lines, and Strategies taken by small and-medium sized shipping enterprises, especially in China to face the challenges of market competitions and the

financial crisis. We can see that, on one hand, general operation strategies cover a lot of areas of operation, from choosing port to alliance, but on the other hand, few of strategies purposed to small and-medium sized shipping enterprises.

1.3 Objectives of the Study

The main purpose of the dissertation is to propose development strategies to the small and-medium sized shipping lines. There are four objectives in the following will be achieved. The first objective of the paper is to define small and-medium sized shipping lines and investigate the status quo of them. The second objective is to analyze the major challenges posed to small and-medium sized shipping lines. The third objective is to forecast the container transport demands on China-Southeast Asia routes. The fourth objective is to purpose development strategies to small and-medium sized shipping lines in order to figure out a way forward under the fierce competitions in the market.

1.4 Methodology

Some qualitative methods will be used to analyze small and-medium sized enterprises. Small and-medium sized shipping lines are defined according to the standards published. SWOT model will be used to analyze the internal and external environment of small and-medium sized shipping lines and market competition position will be also analyzed by examining the major player, potential entrants, bargaining power of their customers and suppliers. Besides, future demand of container transport on China-Southeast Asia routes will be forecasted by the method of Gray Model (1, 1). Finally, strategies will be purposed to the small and-medium sized shipping lines focusing the large-scale development and service-focused development.

1.5 Outline of the Paper

Chapter 1, introduction, introduces the background of the dissertation, literature

review, the objectives and methodology of the dissertation. **Chapter 2, status quo of small and-medium sized shipping lines on China-Southeast Asia routes**, elaborates the survival and status quo of small and-medium sized shipping lines. **Chapter 3, challenges to the small and-medium sized shipping lines**, provides an overall analysis of small and-medium sized shipping lines under the challenges by different market aspects. **Chapter 4, demand forecast of container transport on China-Southeast Asia routes**, includes the demand forecast of container transport on East Asia-Southeast Asia areas. **Chapter 5, strategy for small and-medium sized shipping lines on China-Southeast Asia routes**, proposes the development strategies for the small and-medium sized shipping lines that operated on the routes based on analysis and forecast in the chapters above. **Chapter 6**, **conclusion**, summarizes of findings, implication and limitations of this study and practical recommendation will be presented.

Chapter 2 Status quo of small and-medium sized shipping lines on China-Southeast Asia routes

Before the further analysis to the small and-medium sized shipping lines on Southeast-Asia routes, a brief definition and introduction will be given, with the status quo of these group of shipping lines followed.

2.1 Reasons to study small and-medium sized shipping lines

In this part, the reasons why the paper focuses on the survival and development of small and-medium sized shipping lines on the Southeast-Asia routes are given.

2.1.1 The definition of small and-medium sized shipping lines

In China, the standards published by central government[3] which definite the small and-medium sized enterprises are based on industry. Shipping lines are enterprises in the transportation industry so small and-medium sized enterprises means: employees less than 1000 or revenue less than 3 billion RMB.

The paper defines the Chinese small and-medium sized shipping line that operate on the China-Southeast Asia routes, so it is defined mostly based on the standards published by Chinese government. The definition is done in accordance with deployment, total capital and total TEU capacity as followed: small and-medium sized

[3] Details can be checked from the website: http://www.sme.gov.cn

shipping line is the one whose total asset is no more than 80 million US dollar (about 500 million RMB) that deploys no more than 1000 employees and owns or operates no more than 15 vessels. Because the objective of the paper is to propose development strategies for the shipping lines operate on China-East Asia trading route, so the shipping line should operate at least one liner service connecting the ports of China and ports of Southeast Asia. The China in this paper specifies to China mainland, Hong Kong, Macau and Taiwan.

The reasons why the paper defines the small and-medium sized shipping lines in such a way are as followed:

1. The limit to total asset is higher than the standards published by Chinese government, because liner industry is a capital-intensive one. No matter the shipping line can or cannot collect enough container cargos to full the ship holds, it has to run the business based on fixed schedule and fixed ports of call. It is also a labor-intensive industry, because every ship needs to be equipped with certain number of seamen and off-shore people to operate the ships and serve the customers. The liner transport put a relative high limits to the number of employees deployed and also the capital.

2. The paper puts the limit to the number of ships owned or operated by a shipping line concerned to the general business scale of a small and-medium sized shipping lines. The fleet should not include more than 15 ships.

2.1.2 The reasons to study small and-medium sized shipping lines

The reasons why the paper studies the small and-medium sized shipping lines are as follows.

1. Small and-medium sized shipping lines are the important part of liner industry
   In the global scale, less than 5% of the shipping lines control 84% liner market shares. The capacity controlled by small and-medium sized shipping lines is far less than that

of a mega shipping line. But there are still a lot of small and-medium sized shipping lines in the market and they try to get stronger, which make them an inseparable part of the industry.

2. Small and-medium sized shipping lines often do not operate on the trunk lines because of the capital and strengths limits so that most of them are the players in the regional liner market. In the market boom, large shipping lines put concentrate on the truck lines which obviously have better economic return, while ignore the regional liner markets. It makes the small and-medium sized shipping lines the most competitive players in the regional markets. In market downturn, large shipping lines refocus on the regional markets, especially the Intra- Asia market, which threatens the positions of small and-medium sized shipping lines.

3. The development of small and-medium sized shipping lines face great challenges
   As more and more large shipping lines refocus the Intra-Asia liner markets, including East Asia-Southeast Asia market, it stimulates fiercer and fiercer completion in this regional market. The survival and development of small and-medium sized shipping lines is exposed to the shadow of those large ones.

4. Small and-medium sized shipping lines deserve the attention from the industry
   Small and-medium sized shipping lines are the vulnerable groups in the liner industry. Large shipping lines attract the attention from industry and academic field for their power, capacity controlled and long-history. They deserve that, for their roles in the market. Compared with them, small and-medium sized ones do not attract so much attention so that there are few studies about them from home and abroad. Their survival and development should also be noticed.

2.2 Features and business pattern of small and-medium sized shipping lines

Features and business pattern of small and-medium sized shipping lines are the basis

of the study and it, to a large extent decides the position in the market, its advantages and disadvantages.

2.2.1 Features of small and-medium sized shipping lines

No matter the small and-medium sized shipping lines have their roots in China or in other places, they share some common points in terms of business scale, business status and level of labor force. The paper below will give details.

1. Small business scale and little capacity controlled

   The business scale and business scope are relatively limited for most of small and-medium sized shipping lines. In fact, some of the shipping lines only have 1-5 container ships to run the regional or near sea liner services. They run limited liner services and call few ports and the total voyages are short. Operating regional services put no limit to the size of container ships. With a container ship with 500 TEU slots, a shipping line can start the business.

2. Poor in anti-risks

   Small and-medium sized shipping lines do poor in anti-risk. That is the very reason why they are the first to bankrupt or close the services when the business environment changes. Compared with large shipping lines, the financial conditions and soft power of small and-medium sized ones are poor. They seldom take effective steps to diversify the business risks, which make them more vulnerable when the outside environment turns bad. That is not strange why they cannot survive the market winter.

3. Financing problems

   Almost all shipping lines have financing problems, big or small ones. Shipping is a capital-intensive industry, financing is vital for each shipping line. Shipping lines need to pay for the ships, assets, seaman and other fixed cost. Besides, they also need to pay the terminal handling cost, bunker cost, supply cost and other voyage costs.

Small and-medium sized shipping lines can hardly borrow much money from banks. Especially in the financial crisis, banks are much more careful when they choose the borrowers and consider the amount of debt. Except for those have strong backgrounds, others, more or less, face the problems of narrow financing channels and limits of credits.

4. Low initial cost, high operating cost and poor economies of scale

   A container ship with 500TEU capacity can start the liner service in this market. The initial cost to start business is far less than the ocean carriers. But in terms of unit transport cost, large container ships, for example a 6000 TEU ship is much cheaper than a 500 TEU ship. It is said that ship smaller than 500TEU is the one with highest unit transport cost. Small and-medium sized shipping lines use small container ships which make them cannot enjoy the benefit of economies of scale. The small ones can also have disadvantages on the freight rates.

5. Poor management skills and lack in human resource

   Many of small and-medium sized shipping lines might have relatively new and large container ship, but they do not do quite well in managing the companies. It is easy to improve the hardware if you have enough money to purchase modern container ships and new equipment. But it is never easy to manage the large ships, seamen or the company. Many of the seamen do not get enough training before they go on board. Neither do some of the other employees. Human resource is always a headache for the employers of small and-medium sized shipping lines. They enjoy the cost-saving by using cheap labor, but at the same time, lack high-level human resource to manage the companies and the fleets.

Besides, there are a lot of other common points shared like poor IT solutions and poor marketing skills. They are all fatal to growth of any small and-medium sized enterprises.

2.2.2 Business patterns of small and-medium sized shipping lines

Small and-medium sized shipping lines have some common points on their business pattern. The business patterns of these shipping lines are described as follows.

1. Undiversified container fleets

   Fleet sizes of small and-medium sized shipping lines are much smaller and older compared with larger ones. Because of the high cost of purchasing or chartering large container ships, they always use single class of container ships, which are below 1000 TEU. Single class of ship is easy to manage and it helps improve the bargaining power to their supplier of ships. Sometimes, it shows that the ships are too old to carry the container cargo safely and properly.

2. Few ports of call, short distance and small range of coverage

   Small and-medium sized shipping lines often call few ports and the distance of liner service is short. With the limit of ship number and the features of liner shipping, they cannot run a long distance service or stop too long at a port. Compared with large shipping lines, the large ones provide their customers with several services connecting China and Southeast Asia. Small shipping lines provide few China-Southeast Asia services so that the coverage of the transport network is limited. It is difficult for them to provide a full range of logistics services. Medium sized shipping lines operate more lines so that the coverage is wider but still is quite limited.

3. Minor customer groups

   The target customers of these shipping lines are those who prefer low freight rates than good services, or those who are neglected by large shipping lines. Small sized freight forwarding companies are also the customers of small and-medium sized shipping lines. These freight forwarders can get better freight rates from those small shipping lines.

4. Undiversified service and few value-added services

   Many small and-medium sized shipping lines cannot provide value-added services other than liner services and freight forwarding services. Door-to-door transport is no more a core competency for a shipping line, but a basis to do business. Small and-medium sized shipping lines cannot provide a whole logistics solution make them inferior in the market competitions.

5. Traditional ways of marketing

   Small and-medium sized shipping lines lack the innovation in marketing. Good products and services need good marketing. Small and-medium sized shipping lines do not know well how to popularize their services. Instead, they often do business in a more traditional way. That is not enough in a competitive market and many of them even do not have their own websites.

6. Price battle

   Small and-medium sized shipping lines often attract the customers by low freight rates. Small and-medium sized ones are often the users of price battle and also the ones that suffer from it. Besides, customers and shippers will devaluate the transport services in the end. No one will really benefit from the price battle with no bottom lines.

2.3 Scale of small and-medium sized shipping lines on China-Southeast Asia routes

With the further development of liner transport, the industry becomes more and more centralized in which hundreds of small and-medium sized shipping lines only control less than 10% market capacity. The average capacity controlled by single small shipping lines is meaningless to the whole industry. Generally, China-Southeast Asia trading route faces the same situation.

2.3.1 Business scale of small and-medium sized shipping lines

Small and-medium sized shipping lines face huge challenges from large shipping lines and those share same business scale with them. In recent years, the sea-borne trade on the China-Southeast Asia route experience a rapid growth, but its total container volume is small compared with trunk routes. The export and import container volume from Southeast Asia only accounts for the 10% of the global container volume. Because of the limited container transport, the container ships used are relatively small, which is 2000 TEU ships on average and half of the total are less than 1000 TEU. Some small container ship can only carry 200 TEU before it is full.

It is estimated that there are about 100 shipping lines providing China-Southeast Asia liner services. Half of them are the large shipping lines, while the other is the small and-medium sized shipping lines. The remaining half of the shipping lines is the subject of the paper. After the financial crisis hit the world, the number of small and-medium sized shipping lines shrinks a lot, about 10% of the small and-medium sized shipping lines exit the market. There is a trend of centralization of shipping line on the China-Southeast Asia route.

The paper divides the small and-medium sized shipping lines into three groups. The first one is that own or operate less than 5 container ships, the second group 6-10 container ships and the third group 10-15 container ships.

The unit capacity of one single ship that operated by the first group is below 1000 TEU. These shipping lines have permanent office, several tens of seamen and below 200 onshore employees. These shipping lines have regular customers but have a problem in developing the market. They provide limited services. Besides, they may also provide China-Japan/Korea services or China-Hong Kong/Taiwan services. Most of the container cargo comes from the regions. The business scale is small without good service network and value-added service.

The shipping lines in second group have wider reputation. They have limited big customers. The organization of the second group shipping lines is complete. Their service coverage is wider than first group of shipping lines. Many of them provide about 3 China-Southeast Asia services. They have several domestic branch offices. Some of the shipping lines also involved in the diversified business such as financing, hotels or real estate. One example of the group is a Hong Kong based shipping line-Mainland Navigation Company.

The third group of shipping lines, in fact, has a quite large business. They have a good reputation in different regions and may get a large market share in the region where the company locates in. It could be a listed company or state-owned company. They provide more than 5 liner services. The average age of the fleet is 10 years and unit carrying capacity of the ship is about 1000 TEU. They can provide diversified transport services and customer-oriented transport solutions. They have domestic branch offices and the overseas associates. This group of shipping lines may cooperate with larger shipping lines through slot-charter or exchange of slots to expand their business.

2.3.2 Capacity of small and-medium sized shipping lines

In the world scale, liner industry is more and more centralized. According to the list-Top 100 shipping lines published by Alphaliner in 2010, the Top 20 shipping lines controlled about 84% of the total container capacity which was 14% more than 10 years ago. According to the latest rank published by the same consultant organization, top 100 shipping lines control about 94% of the world container capacity. It is obvious that the capacity controlled by small and-medium sized shipping lines is shrinking.

The information of large ones presents the market situation. Table 1 shows the

capacity deployed by top 20 shipping lines on the Intra-Asia services[4] and their rankings. All the top 20 carriers in the table run the China-Southeast Asia liner services. The capacity deployed in China-Southeast Asia services accounts for one-third of the total capacity they deploy in the Intra-Asia services. From the table we can see that the top 6 carriers compete with the regional carriers in the Pan-Asia container market whose main battlefield is the East Asia-Southeast Asia trading routes. Wanhai Shipping ranks the first based on the capacity deployed in the Intra-Asia services, although its total container capacity is far more less than some global shipping lines. Some of the shipping lines, such as Hapag-Lloyd and CSAV, they do not employ many container ships on the Intra-Asia services.

Table 1- Top 20 Pan-Asia container carriers

Top 20 Pan-Asia container carriers-Based on container fleet capacity			
(Top Pan-Asia Carriers by Capacity）			
Rank	Name	TEUs	Capacity Share
1	Wanhai	103,700	7.5%
2	CSCL	95,600	6.9%
3	COSCO	95,100	6.8%
4	Maersk	81,800	5.9%
5	Evergreen	71,700	5.2%
6	OOCL	52,700	3.8%
7	TS Lines	48,800	3.5%
8	APL	41,400	3.0%
9	KMTC	40,400	2.9%
10	RCL	38,700	2.8%
11	SITC	38,600	2.8%
12	CMA-CGM	36,000	2.6%
13	Yang Ming Line	31,900	2.3%

[4] Intra-Asia services include China (China mainland, Hong Kong and Taiwan)-Southeast Asia services, East Asia costal, Japan/Korea-Asia services and Intra-Southeast services.

14	Sinokor	26,700	1.9%
15	MOL	26300	1.9%
16	STX Pan Ocean	25,500	1.8%
17	PIL	23,900	1.7%
18	K-Line	22,600	1.6%
19	Grand China Logistics	22,300	1.6%
20	Samudera	22,100	1.6%

Source: Alphaliner，2011

It is estimated that the total capacity deployed by small and-medium sized shipping lines is only about 55000 TEU. In such a fierce competition, it is not hard to imagine that how crude is the survival of small and-medium sized shipping lines.

For these shipping lines with thousands of container capacity, the share of each of them in the market is always neglectable. But with the rapid growth of trade between East Asia and Southeast Asia, some of the small and-medium sized shipping lines are ready to purchase larger container ship which is over 3000 TEU carrying capacity to expand their fleets in the market downturn. It is reasonable to say that the container capacity controlled by small and-medium sized shipping line might increase a lot in the following years and larger container ships will replace the ones below 1000 TEU.

2.4 Summary

The Chapter discusses and analyzes the status quo and business of small and-medium sized shipping lines. Firstly, the paper identifies the subjects of the studies and defines the liner trading routes and services. The reasons to study the small and-medium sized shipping lines are also explained. Secondly, the paper describes the features and business scale of small and-medium sized shipping lines so that people could have a vivid image of them. Then, the scale of the small and-medium sized shipping lines is given to show the general situation of them in the market.

Chapter 3 Challenges to the small and-medium sized shipping lines

In this chapter, the three major challenges, namely trend of larger-sized container ships, imbalance of supply and demand and market competition faced by small and-medium sized shipping lines are given.

3.1 Challenges of larger-sized container ships entering China-Southeast Asia routes

The liner service is created by the father of container transport –Malcolm McLean over 50 years ago. After that, container ship maintains a rapid growth and experience revolutions of container ships as the Table 2 shown. We can see how fast the pace of container ship generation, especially when Maersk ordered thirteen 18000TEU ships from Samsung Heavy Industrial in 2011. Maersk said that ships of this kind could be the upper limit of container ship in the foreseeable future.

Table 2- Container ship revolution

Generation	TEU	Length(m)	Bean(m)	Draught(m)
1st generation	up to 1500	225	24.5	9.00
2nd generation	Up t03000	275	27.5	10.00
3rd generation	Up to 4500	300	32.2	11.50
4th generation	Up to 6000	320	40.0	14.30
5th generation	ca [1]8300	347	42.6	14.50
6th generation	ca 12500	398	56.4	16.00
2011	ca 18000	400	59	14.5

ca[1]: capacity

Source：Various sources

Shipping lines intend to purchase larger container ships to cut down the unit transport cost, increase the capacity and garb the market shares. It is estimated by Maersk that the per-TEU construction cost of new 3E ships is saved by 26% compared with regular 13100 TEU ships if calculated the $600/ton banker oil, fuel cost, operation cost and capital cost. However, many scholars do not think like that. Nevertheless, the trend of larger-sized container ship could not be stopped. In 2010, 29 10000+TEU ships have been delivered. By the end of the first quarter of 2011, total of 46 container ships over 10000TEU were operated on different trading routes and there were 146 remaining 10000+ TEU ships to be delivered. It is believed that the number of 10000+TEU mega container ships that are put into used will be doubled in the following two years (ISL:Institute of Shipping Economics and Logistics, 2011).

3.1.1 Phenomenon of larger vessels entering China-Southeast Asia routes

With larger and larger container ships being deployed in the trunk routes, 10000+TEU ships will become the dominant size of ship in these routes, which will speed up the update of container ships in sub-trunk and regional routes. The container ships on the China-Southeast Asia trading routes are faced with the challenges from the ships cascaded from elsewhere. There are many benefits for large shipping lines to do so. They could update the ships in the sub-trunk routes or regional routes and grasp the market shares quickly. For small and-medium sized shipping lines, that is a bad thing. Small and-medium shipping lines with capital power are forced to follow the larger ones to purchase or charter in larger ships. The ones that have not enough capital are in the danger of being exited from the liner markets. The cascading effect has taken place in every trading route and 3000-4500 TEU ship will be finally cascaded to China-Southeast Asia routes.

The sized of container ships on the China-Southeast Asia routes is getting bigger and bigger from 2000. During 2001-2003, the total number of ship on the routes remains the same level, but the total capacity of these ships increase form 486000 TEU to 582000 TEU and the ships in the range of 2000-3000TEU increased a lot.

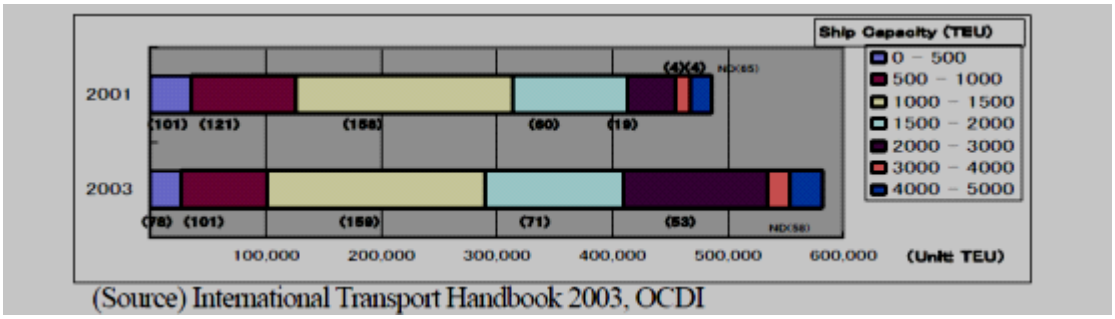

Figure 1-Characteristics of Container Ship Size in Inter-Asian Routes

Source：International Transport Handbook 2003, OCDI

In recent years, many large shipping lines have a quite good faith in the Intra-Asia liner markets and started to open more liner service inside Asia so that more container capacity is being put into the liner services. They start to deploy 3500-6000 TEU container ships and deployed more 2000-3500TEU ships in the China-Southeast Asia services. In the near future, CSCL, COSCO and APL will deploy larger container ships than which are used now on the routes to increase market shares. The future of China-Southeast Asia liner market is very promising in this point of view.

3.1.2 Limits of large vessels on China-Southeast Asia routes

Although the ships that operated on the China-Southeast Asia routes are getting bigger, the enlargement of the ship is never unlimited. When planning new capacity added and new services, shipping lines will consider their current arrangement of the ships, development strategies as well as the limits coming from port infrastructure, foreign trade and feeder services support will make the full enlargement of ship size could not be realized in the short term.

Generally speaking, countries of Southeast Asia are all developing ones and the

infrastructure of the ports cannot keep the pace of world development. Many of the port infrastructures of these countries are too poor to berth the 2000+TEU ships. The limits on the draft really matter a lot. The draft of a 3000TEU container ship is about 10 meters, while that of many old ports in the area is less than 10 meters so as not to berth very large ships. Moreover, handling facility in some ports is out of date. Large container ships need modern gantry cranes to handle the containers in a short time. But it takes time to build new terminals and arrange the facility. Collection and distribution system of the ports is another problem. Lacking of trains, trunks and logistics supports cost longer time and more costs to distribute the container cargos from ports to the final destinations. If the distance between a port and an origin of the cargo is very long, then well-built land transportation system, railways system and other supporting facilities are very much needed. Lack of distribution systems and inefficiency of the ports are the major reasons for the congestions of the ports. They also lead to the loss of the shipping lines and shippers as well as the handling capacity of the ports.

The trade volume of Southeast Asia countries is the second limit. Both the academic world and experts in the shipping field have big faith in the continuing growth of the external trade. But whether is the growth could overwhelm the growth of capacity coming from larger container ships is a mystery.

Feeder network within the Southeast Asia is the third limit. Large container ships require more to the feeder network. Few ports could berth large container ships over 3000TEU, which means another kind of transportation is needed to transship the container cargos. At the same time, feeder networks are important in terms of collecting the cargo and improving the slot utilization. Currently, the networks within the Southeast Asia are still not well-built enough to support the liner services. Relatively few feeder services, limited capacity and poor transport services remain the problems to be solved.

The three major limits on the larger-sized container ships to be introduced on the China-Southeast Asia trading routes need to further looked into and should be carefully taken care.

3.1.3 Impact on the China-Southeast Asia liner market

The larger-sized container ships being used on the China-Southeast Asia routes have both positive and passive impacts on the shipping lines. The positive impact is that it promotes the port development and shipping industry at large. The passive impact is that it results to fiercer market competition and imbalance of supply and demand in the market.

Using larger container ships will undoubtedly promote the large scale of port in Southeast Asia. Port authorities will build more terminals, larger container yards and more berths in order to meet the increasing demands of the ships. In recent years, there is a trend in Southeast Asia to build large container terminals. For example in Viet Nam, the ports and terminals are fundamentally changed. Cai Mep port which is near Ho Chi Minh City, opened several deep water container handling facilities to berth and handle the Super Post Panamax ships that are assigned to the Far East-Europe services and Pan-Pacific services. Three terminals in the Port of Cai Mep will open this year. At the same time, MOL, NYK and Vinashin Lines are building container terminals in the Hai Phong port which will be finished in 2015. The infrastructure construction in the area also obtains the supports and notices of governments in Southeast Asia. Many of them are trying best to improve the infrastructure and distribution systems. It is believed that 4000-5000TEU container ships could be assigned to every liner services in the near future. As the Figure 2[5] shown, the container handing volume of Southeast Asian ports sustains a rapid growth.

[5] The bar shows the container throughput in Southeast Asia and the line shows the total capacity of container feeder services in Southeast Asia.

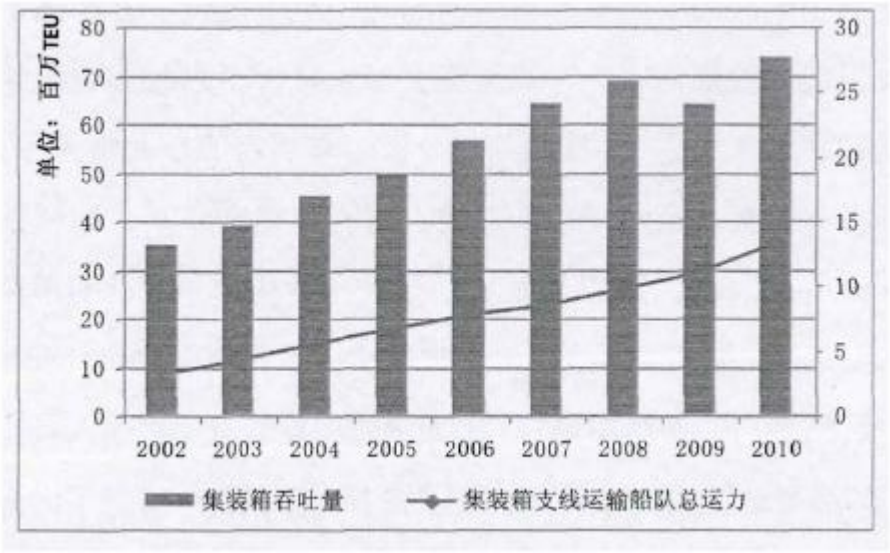

Figure 2- Container throughput volume and fleet capacity of Southeast Asia (Million TEU
Source：The study of the feeder network in Southeast Asia (Chen F. , 2011)

Larger container ships deployed will strengthen the competition in the shipping market. When only few shipping lines take the strategy of deploying large container vessels in marker, they will gain a big advantage because the larger container ships cut the unit shipping cost in a large scale. When every shipping line takes the same strategy, the supply of capacity will be redundant, and the competition among shipping lines will get severer and severer. One way to survive the competition is to cut the freight rates. The larger container vessel deployed in a large scale may also trigger the M&A in the market. Looking back into the 1990s, one of the reasons for the M&A among large shipping lines is the deployment of large container ships. Although the M&A has not taken place in the shipping line that provide China-Southeast Asia liner services yet, a fiercer competition might be the trigger of the M&A in the future.

The deployment of larger container ships sure will update the dominant size of container ships on the China-Southeast Asia routes. In a decade ago, the dominant size of container ship in these routes is the one below 1000TEU. In the year of 2004, the dominant size is 1000-2000TEU ship, while the dominant size is 2000-3000TEU ship in nowadays. The ships cascaded from sub-trunk routes that is below 4000TEU

will be widely used in the regional liner services including China-Southeast Asia services in the near future, marking a new high in the average capacity of container ships developed in these routes.

3.1.4 Impacts on small and-medium sized shipping lines

There are two aspects of impacts on the small and-medium sized shipping lines as followed.

1. The sizes of container ships deployed by small and-medium sized shipping lines are updating. As the trend of larger-sized shipping lines is deepening, larger shipping lines are deploying larger container ships on the China-Southeast Asia services. Followed by the large shipping lines, the small ones will update the sizes of the ships developed. The container capacity per unit ship they deploy will be bound to increase, only much lower than larger shipping lines. Deploying larger container ships will increase the capacity of small and-medium sized shipping lines remarkably. The unit operation cost of an 1800TEU ship is much lower than that of a 5000TEU ship. Larger container ships could help them enlarge their market share and improve their competitive advantages and power.

2. Small and-medium sized shipping lines are forced to play a fiercer market competition. Large regional and global-sized shipping lines are the ones that develop biggest number of large container ships and largest amount of carrying capacity. While small and-medium sized shipping lines are forced to play in the market that is dominated by the large ones. They have to accept the market roles initialed by large shipping lines and involve in the market competition. The larger ship deployed might have a passive impact on the small ones. If they are not strong enough, they will be cascaded from the market. That is survival for the fittest. What's more, the competition among small and-medium sized shipping lines is another problem. There is a rule that the larger one squeezed smaller ones in any market and in many group,

even among the small and-medium sized ones. Whatever, small and-medium sized ones should always have a sense of crisis. Otherwise, they will be washed out from the liner business.

3.2 Challenges of imbalance of supply and demand of container transport on China-Southeast Asia routes

3.2.1 Demand of container transport

Southeast Asia is composed by 11 countries and with 900 million people which has a great potential to further development. These 11 countries are 10 ASEAN members and Timor-Leste. The major ports in the area are such as Port of Bangkok, Port of Laem Chabang, Port of Kelang, Port of Singapore and Port of Tanjung Pelepas.

The huge potential and economic vigor in Southeast Asia lead to the increasing container trade in this area. After the financial crisis hit the world in 2008, United States and Europe are in the economic recession, while Southeast Asia markets exampled by Singapore and Viet Nam have quite good performance. In the past 10 years, the container transport between Southeast Asia exampled by ASEAN and its major export and import market kept climbing as Table 3 and Table 4 shown. But it also shows that there is a trade imbalance which the export volume is larger than the import volume. China has a good bi-lateral relationship with ASEAN members and is the biggest trade partner of ASEAN. United States, as the world most power country, remains the major target market of developing countries in Southeast Asia.

Table 3-Container Volume of ASEAN

From ASEAN TO	1995	2000	2005	2006	2007	2008	2009	2010
China	5%	8%	14%	16%	15%	12%	14%	16%
Japan	14%	12%	11%	10%	9%	10%	9%	10%
Korea	4%	4%	5%	4%	4%	4%	4%	5%
America	15%	14%	12%	11%	10%	10%	10%	12%
World(Million Tons)	32	60	94	103	111	114	106	124

Source：Global Insight

Table 4--Container Volume of ASEAN

To ASEAN From	1995	2000	2005	2006	2007	2008	2009	2010
China	9%	9%	18%	20%	22%	21%	22%	20%
Japan	15%	12%	13%	12%	12%	12%	11%	12%
Korea	7%	6%	6%	6%	5%	6%	6%	6%
America	15%	11%	8%	7%	8%	10%	9%	22%
World(Million Tons)	37	46	76	87	96	105	106	121

Source：Global Insight

Table5-Import and export of external trade of Southeast Asia in 2010 (100 million dollars)

Country	Total Volume	y-o-y① Increase	Import	y-o-y Increase	Export	y-o-y Increase
Singapore	6630.5	28.60%	3109.7	26.50%	3520.8	30.40%
Thailand	3798.2	32.60%	1845.2	37.10%	1953	28.70%
Malaysia	3631.5	18.30%	1644.5	21.70%	1987	15.60%
Indonesia	2934.4	37.60%	1356.6	40.10%	1577.8	35.40%
Viet Nam	1536	21.50%	828	18.40%	708	24.00%
Philippines	1002.4	23.30%	476.9	10.90%	525.5	37.20%
Brunei	136.5	21.05%	35.7	18.10%	100.8	22.20%
Myanmar	118	11.45%	42	14.56%	76	9.83%
Cambodia	76.1	18.60%	44.8	22.00%	31.3	16.00%
Lao	24.7	12.78%	12.53	1.58%	1.38	29.42%
Timor-Leste	3.6	7.25%	1.36	5.74%	2.14	8.92%

①：Year-on-year increase

Source: ASESAN Yearbook

Import and export of external trade of Southeast Asia countries in 2010 is shown in Table 5. Even hit by the financial crisis, Southeast Asia keeps a relatively quick growth in external trade, which should be envied by many countries. The large imports and exports ensure the growing demand of sea-born container transport. Intra-ASEAN trade maintains the biggest one among all others. In 2010, about 26%

imports and exports took place inside ASEAN members. Besides, China, Europe-27, US, Japan, South Korea, Australia, India and UAE are the top 10 trade partners of ASEAN. Over 90% of the imports and exports of Southeast Asia countries is realized by ocean shipping. East Asia-Southeast Asia liner services cover sea-borne trade between ASEAN and other countries and region, which gives the shipping lines the best chance to do business. The surging trade will certainly facilitate the demand of container liner services. Table 6 is the container throughput of major countries in Southeast Asia, in which ports in Singapore, Malaysia and Indonesia are top ports in the world. Expect for the year of 2009, container throughput of major the countries keeps a sustainable growth. It is believed that the growth rate of container throughput is among the fastest in the world.

Table 6- Container Throughput of main countries in Southeast Asia (million TEUs)

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010
Singapore	16.94	18.41	21.33	23.19	24.97	27.94	29.92	25.87	28.43
Malaysia	8.63	9.91	10.8	11.36	12.85	14.33	15.46	16.37	18.4
Thailand	3.65	4.12	4.74	5.22	5.42	6.2	6.56	6.05	7.06
Indonesia	1.97	2.42	3.17	3.73	3.85	4.16	4.58	3.97	4.87
Viet Nam	0.49	0.73	1.31	2.12	4.01	5.76	6.13	5.85	6.57
Philippines	3.01	3.14	3.36	3.24	3.86	4.05	3.77	3.58	4.01
Myanmar	0.23	0.41	0.76	1.13	1.86	2.24	2.61	2.48	2.96

Various sources

From the statistics above, we can see that the sea-born container trade remains a good up-warding momentum which relied on the fast development of external trade of Southeast Asia, especially trade with China, Japan, Korea and India. In 2011, 5 of Southeast Asia ports is in the list of Top 25 container ports in the world and others are keeping the pace of the growth which all promises a brighter future of Southeast Asia sea-borne trade

3.2.2 Supply of container transport

The supply of container transport on China-Southeast Asia routes mostly come from the liner services provided by shipping lines. The capacity deployed in the China-Southeast Asia services accounts for the one-third of the total capacity deployed in the Intra-Asia liner services. According to CI-Online, there are about 280 container ships with different sizes are deployed on the China-Southeast Asia routes with a total capacity of 543565TEU. Other liner services connecting Southeast Asia with other regions deploy a range of 70-190 container ships with a total capacity ranging from 122807TEU to 354314TEU. The capacity deployed in the China-Southeast Asia services tops all the other routes (Deployment Stats, 2012). These four trading routes[6] connecting Southeast Asia with other countries and regions cover 55% of the trade volume of ASEAN. Figure3 shows the general situation of capacity deployed in the four routes mentioned above from same reporting date (1st, April) of 2006 to 2012. The changes of capacity deployed in these four routes after the year 2008 are flat. The capacity deployed currently is about one-fifth of the peak capacity deployed in 2007. It is obviously that the financial crisis has a huge passive impact on the global shipping market, and even the regional services are heavily impacted. Capacity deployed in the East Asia-Southeast services sharply dived during the financial crisis, but from the year of 2010, the capacity deployed started to recover and maintains an up-warding momentum, which might be a positive signal to the regional shipping market.

[6] The four major routes herein are East Asia-Southeast Asia services, Northeast Asia-Southeast Asia services, Southeastern Asia coastal and Australasia-Southeast Asia. East Asia herein include China mainland, Hong Kong and Taiwan only.

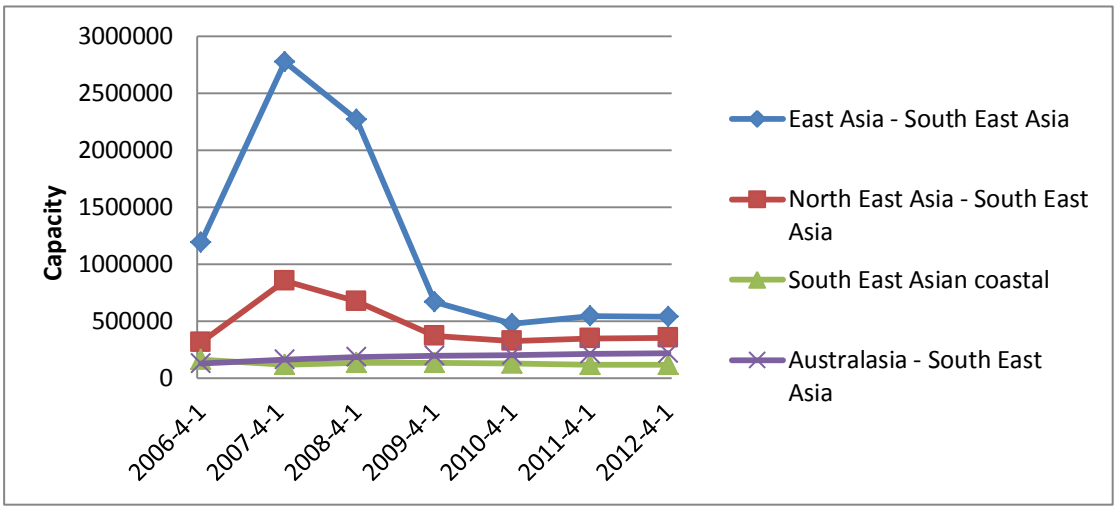

Figure 3- Change of capacity deployed in part of liner services（2006-4-1—2012-4-1）
Source：CI-Online

On the China-Southeast Asia routes, the capacity deployed ranking of shipping lines is mostly the same as the ranking of Intra-Asia services. Some of them are global-wide shipping lines and others are the regional ones. Wanhai Line, MCC Line, CSCL, COSCO and Evergreen deploy more container capacity in their respective services than others. Regional shipping lines deploy less capacity but also provide competitive service options. It is estimated that the total capacity deployed by large regional shipping lines accounts for 30% of the market total capacity and capacity deployed by small and-medium sized shipping lines accounts for only 5% of the total. On the other side, the size of ships deployed by regional shipping lines and small and-medium sized ones is smaller than that of large ones partly because they cascade larger container ships than which are ordinarily used in the China-Southeast Asia routes from other trading routes. Although the capacity deployed by the total of small and-medium sized shipping lines is only a small part of the total, they remain the most active group in the region markets. Table 7 shows the container capacity and vessels deployed[7] in the East Asia-Southeast Asia services by shipping lines by the start (January) of the year from 2006 to 2012. The ups and downs of capacity deployed are the best guide of the market situation.

[7] It should be mentioned that different consulting organizations may have different figures for the same route, limited to the source of data and ways of calculations.

Table 7- Services and capacity deployment on the East Asia①-Southeast Asia

East Asia-Southeast Asia	Start						
Deployment	2006	2007	2008	2009	2010	2011	2012
Services	37	43	45	45	48	49	49
Vessel deployed	85	84	92	90	91	109	102
Cap.deployed('000 TEU)	92.3	87.4	103.2	117.1	116.9	163.9	132.8
capacity y-o-y change	36%	-5%	18%	14%	0%	40%	-19%

①:East Asia includes China Mainland, Hong Kong and Taiwan

Source: Clarkson

3.2.3 Imbalance of supply and demand on China-Southeast Asia routes

According to the latest report of Clarkson, the capacity deployed in the China-Southeast Asia services is decreased by 40% of the peak capacity before 2008. Notwithstanding that fact, there is still an over-supply on the China-Southeast Asia routes. One reason could be the cascading effect, and another reason is that the refocus on the Intra-Asia services by the shipping lines. They would like to update their fleets with larger and newer container ships in the market downturn to enlarge market shares.

With the proactive strategies taken by large shipping lines on the Intra-Asia services, which includes China-Southeast Asia services but not limited to it, shipping lines will open more liner services, deploy more and larger ships. At the same time, container slots from ships in other trading routes will be saved for ports of call in Southeast Asia for the purpose of transshipment and improving the slot utilization. In this case, more capacity is bound to be deployed on the China-Southeast Asia routes, which will stress the small and-medium sized shipping lines a lot. Currently, there is no such over-supply like trunk routes and the freight rate keeps a relatively flat trend for the past few years except the year of 2009 which shown in the Figure 4. But shipping lines should keep in mind that there is a risk to deploy too much container capacity in

the China-Southeast Asia services when the demand has not fully recovered from the financial crisis yet.

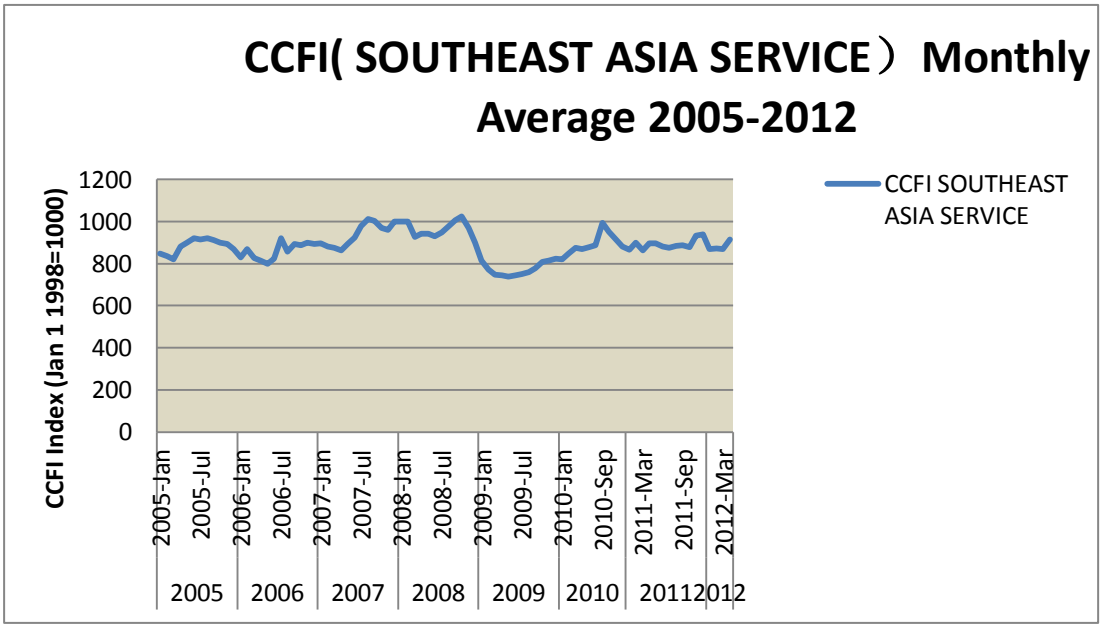

Figure 4- CCFI-Southeast Asia Service Monthly Average from Jan-1-2005 to Apr-27-2012

Source：SSEFC and other sources

Freight rates for China-Southeast Asia services are much lower than that of trunk routes. Some large shipping lines say that they can get a profit from the China-Southeast Asia services because the average slot utilization is fairly good. Large shipping lines could make a profit for the sake of economies of scale. But the imbalance of supply and demand might be a headache for the small and-medium sized shipping lines. The anti-risk ability of them is poor which make them more sensitive and vulnerable to the market imbalance. So they have to be flexible enough to comply with the changes of the market. Some small and-medium sized ones make profits with the help strengthening trade relation among Southeast Asia countries and East/Northeast Asia countries and regions. But some of them went to bankruptcy or exit the market because of the stress. Moreover, it is easy to find out that M&A takes place more frequently when the market is in turmoil. While there might be a wave of M&A in the China-Southeast Asia liner market someday if the over-supply to a certain extent.

3.3 Competition challenges faced by small and-medium sized shipping lines on China-Southeast Asia routes

After the financial crisis hit the world in the fall of 2008, many shipping lines refocus on the East Asia/North Asia-Southeast Asia liner services. Based on the competition analysis bellowed, we could know better about the market position of small and-medium sized shipping lines.

3.3.1 Major shipping lines on China-Southeast Asia routes

Global shipping lines, majorly Maersk, COSCO, CSCL, Evergreen, APL, MOL and Wanhai Line are not only the services providers on trunk routes but also have quite good performance on the East Asia-Southeast Asia routes. Some of them have roots in the East Asia and some of them have roots in Southeast Asia. Even if Maersk, his wholly-owned subsidiary MCC is a Singapore based shipping line. MCC overtook almost of the business of Maersk in Asia and expand Maersk's liner business inside Asia. These global shipping lines have a wide coverage of transport network. They have good reputation around the world and provide the best customer-oriented transport solutions. They are major players on the East Asia-Southeast Asia trading routes and they challenge the positions of large regional shipping lines.

The regional shipping lines, majorly TS line, RCL, SITC, KMTC, PIL, root in different countries of Asia. The regional shipping lines have larger fleets and business scale than the small and-medium sized ones. They have relatively large transport network and good reputation and they have regular customers. When choosing the liner services, especially the discharging ports are the base ports, shippers prefer to choose large shipping lines. Except for the competition on the China-Southeast Asia routes with global carriers, they also compete with them on feeder services market. Regional shipping lines have advantages in offering cheaper freight rates than global shipping lines. They are the direct competitors of small and-medium sized shipping

lines.

Small and-medium sized shipping lines themselves have some kind of competition, but the indirectly one. Because the business of small and-medium sized shipping lines is more local-based, the shipping lines belong to this class will not compete with each other directly unless they have bases in the same areas. On the contrary, the small and-medium sized shipping lines belong to same class could cooperate with each other to make up for the low service coverage so that they could face the crude market competitions together.

3.3.2 Potential entrants on China-Southeast Asia routes

Potential container capacity which will be added on China-Southeast Asia services can be divided in two groups: one comes from the new shipping lines that are ready to run China-Southeast Asia services, and the other is the new container capacity added by existing shipping lines.

For global shipping lines, entering the Southeast-Asia shipping market is risky and requires a huge initial investment. Global liner industry faced great loss in 2009 and 2011, so entrant on China-Southeast Asia routes will cost much human resources and capital resources. It is also risky to develop the new market while maintaining the existing market share in other services at the same time. Exceptions also can be found. It is possible that some shipping lines might cut down other services and spare no effort to entering the new market. At present, no one single large shipping line has a dominant market share in the East Asia-Southeast Asia services, it attracts more shipping lines to enter the market that many shipping lines are taking an aggressive market strategies, which put huge hinders in the way to the potential markets.

Under current circumstance, both small and-medium sized shipping lines and the global shipping lines are probably to enter the China-Southeast Asia liner market.

Small and-medium sized ones are the most active player in every liner service. They can enter any market segment, because the big shipping can't take every route and port of call into consideration. Besides, there is little restriction for a shipping line to run a China-Southeast Asia liner service. The cost of entrance is lower than any other liner markets. The small and-medium sized shipping lines can begin the business by purchasing or chartering a 500TEU container ship and recruiting several seamen. Liner industry is said to be the industry with high entrant barriers, because shipping lines should satisfy the schedule density, purchase the ships, and create the service network, which are all costly. But things are different in the China-Southeast Asia liner market. In this market, the distance of voyage is relatively short, which does not require large size container ships or well equipment. The requirement for the sea crew is relatively cheap which further lower the fix cost and operation cost of the shipping lines. If the shipping lines could get enough container cargo supply, it can make profit. Additionally, the operation of small and medium-sized shipping lines is more flexible than the larger ones. If the market goes downwards, they can make change in the liner service, schedule and the ports of call easily while the large ones. The large shipping lines have a bigger exiting barrier, which means they may face a huge debt when exiting the market. MISC is a typical example, which lost 400 million US dollars after the announcement of exiting in Nov. 2011.

The new container capacity added by the existing shipping lines is another reason for the potentially increasing of the market total capacity, which is embodied in the following two aspects:

1. Shipping lines expand their capacity. Influenced by the market boom years ago, shipping lines expand the capacity on each service by chartering in or ordering new container ships. Shipping lines operating on the China-Southeast Asia routes also do that. Shipping lines update the container capacity into the market. Even the small and-medium sized shipping lines purchased bigger ships or chartered in more ships when the market is rising few years ago.

2. Capacity cascaded from long-distance ocean services. With the 10000+ TEU mega container ships being put in the long-distance ocean services, the average size of container ships on the trunk routes are updated to 8000+ TEU. The container ships below 8000 TEU are cascading from trunk routes to sub-trunk routes. Many large shipping line are doing like this now. The capacity cascaded from trunk routes to sub-trunk routes such as North-South routes or Far East-India Subcontinent routes. The capacity will be further cascaded from the sub-trunk routes to regional routes like China-Southeast Asia routes. That imposes great stress on the small and-medium sized shipping lines.

In a word, for small and-medium sized shipping lines that are ready to run China-Southeast Asia services, they enjoy a relative low starting cost to run the liner service. The entering barriers for them are much lower. On the contrary, for those large shipping lines that want to enter the market, the entering barriers are higher. They need to balance the new-entering market and the markets they focus on previously. A vigorous liner market like China-Southeast Asia is very attractive for the potential entrants, especially in the market downturn.

3.3.3 The bargaining power of small and-medium sized shipping lines and bargaining power of their customers

Bargaining power of supplier is based on the differences of service provided by the suppliers, namely the shipping lines. Bargaining power of the buyers is high. Small and-medium sized shipping lines are sensitive to the volume of goods shipped and they will try their best to satisfy their customers. The freight rate is lower and services are better if considering the long-term business corporation relationship with the customers

Customers drive down the freight rates to keep the market competitive, requiring the

better quality of the services and pursuer more services. Taking the advantages of competitions between different shipping lines, customers can threaten the shipping line and get a lower price. Customers get the lower price at the cost of the decreasing profits which would be obtained by shipping lines.

At present, the difference on the quality of service provided by the shipping lines is not significant. Shipping schedule, the port of call, the speed of shipping, logistic services and the service quality shows the difference among these shipping lines. Customers have a wide choice when deciding the shipping lines. Some shipping lines can provide a good freight rate while others have advantages in the service but asking for higher freight rates. Customers could enjoy a low transfer cost in the China-Southeast Asia liner market. Furthermore, the Internet and the e-commerce make the information about the freight rates and the service provided spread freely. Customers know about the services provided by shipping lines in an easy way and then they get advantages in the bargaining.

The bargaining power of shipping lines and customers are complementary. Although, in the theory, the shipping market is an oligopoly market, so the shipping lines have advantages in bargaining, many shipping lines operating in the market providing relatively different services. Shipping lines also have to face the potential threats from passenger-cargo vessels, the RO-RO ships and the land transportation services providers. All of these threats restrict the bargaining power of shipping lines. In addition, there are other suppliers such as ship yards, ship charters seamen forwarders and shipping companies providing fuel, supplies and terminal services. The shipping lines have a different bargaining power when corporate with them, especially with the shipyards, charters, and the suppliers of fuel.

Once a shipping company finds some customers who have a lot container cargo to ship, the company will do its best to obtain the customers by providing preferential price and enthusiastic services. A large proportion of the customers of these small and

medium sized shipping companies are sensitive to the freight rates. The limitation also explains the reasons why they choose the small and-medium sized shipping companies instead of the larger ones. To obtain these customers, these small and-medium sized shipping lines have price battles. It is the price battles that give the customers the advantage in bargaining. What's more, the bargaining power of the shipping lines to the ship yards depends a lot on the market performance. If the market depresses, even small shipping lines can be a big customer to the shipyards or charters, and enjoy a low cost of obtaining a container ship. If the market booms, shipyards and charters have a wide range of choice of customers, they always prefer large ships orders. In addition, the fuel cost accounts a lot in the operation cost, normally 30%. Because the price of crude oil skyrockets in recent years and there is no sign showing that the price will decrease in the following years. Even the large shipping lines have a disadvantage in the negotiation with the fuel provider, the small and medium sized shipping lines' situation will be much worse.

All in all, the bargaining power of the small and medium sized shipping lines is low, which has a deep impact on the competitiveness of them.

3.4 Summary

In this chapter, three major competitions composed by trend of larger-sized container ships, imbalance of supply and demand and market competitions faced by small and-medium sized shipping lines are discussed in details. From the discussions, the competitive advantages and disadvantages are given as follows.

Chapter 4 Demand forecast of container transport on China-Southeast Asia routes

4.1 Economic development of Southeast Asia countries

In this Chapter, future demand of container transport on China-Southeast Asia routes will be studied. First, economic development of Southeast Asia countries is discussed and then forecast model is introduced and used. The results will be given at last.

4.1.1 General economic development in Southeast Asia

Southeast Asia occupies an area of 4.45 million square kilometer with almost 600 million people. Experienced the rapid economic growth during 1970s-1980s, and then the area were heavily hit by the Asia economic crisis in the end of the 1990s. It started to recover from the crisis in the 21st century and maintains a sound economic growth.

The larger economies like Singapore, Malaysia, Philippines, Viet Nam and Indonesia lead the economic rise in the Southeast Asia with an annual GDP growth of more than 8%. The Total GDP of Southeast Asia in 2010 is over 1.8 trillion USD with a GDP per capital of about 3100 USD. Figure 5 shows the total GDP of Southeast Asia countries in 2011. It GDP is only 3% of the world GDP, but it enjoys the highest GDP growth rate of over 7% in the consecutive couples years. It was estimated by OECD that Southeast Asia countries will maintain the annual GDP growth rate of about 6% during 2011-2015.

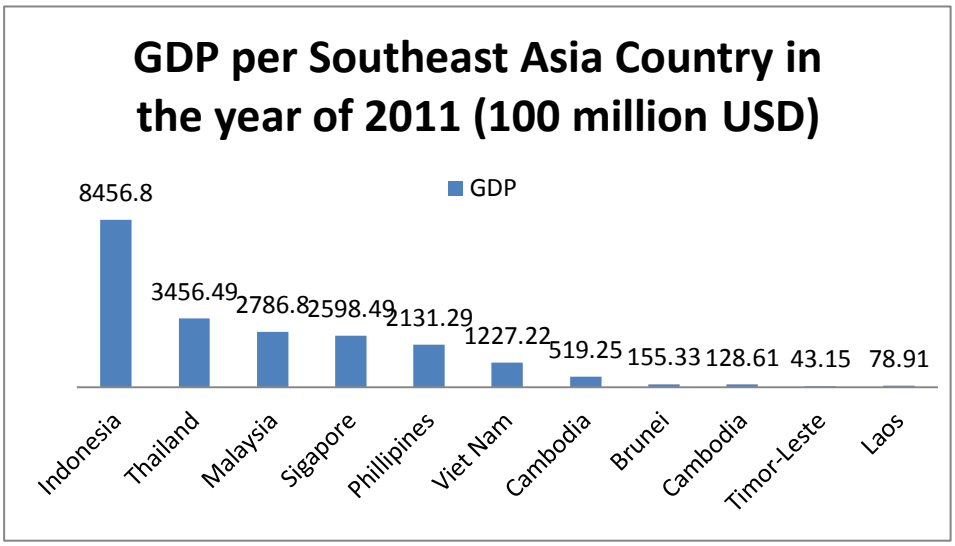

Figure 5- GDP of Southeast Asia

Source: World Bank

The foreign trade of Southeast Asia grows rapidly in the past few years. Each government of Southeast Asia countries is trying their best to promote the foreign trade. They actively adjust the commodity structure of foreign trade, focusing on diversifying the trade structures and promote the development of service trade. By doing so, the foreign trade volume, commodity structure and market distribution are all updated gradually, although many of them are still manufacturing-oriented economies. Total external trade of Southeast Asia reached 2.043 trillion USD in 2010 that is 1.5 times of figure of 5 years ago. The rate of growth of ASEAN trade is 32.9% in 2010. The trade with its major partners also maintains a rapid growth in the past years which shown in the Figure 6. It is important to mention that the ASEAN which first founded in the 1961 laid a solid foundation to the trade bloom afterwards.

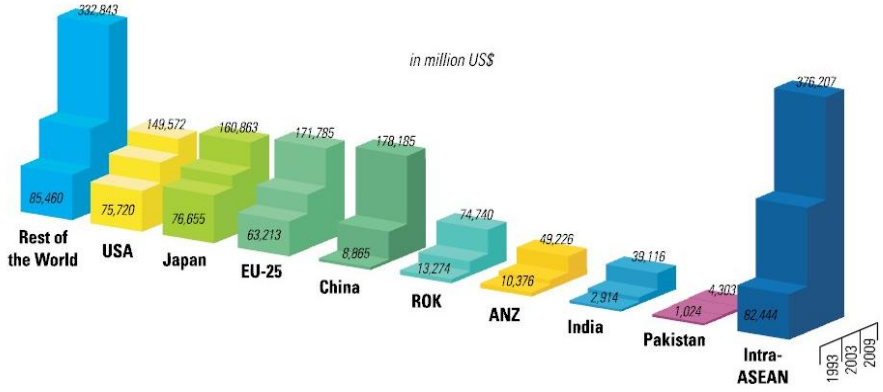

Figure 6- ASEAN trade with selected trade partners countries/regions

Source: ASEAN Trade Database

When the economies become more and more attractive, the foreign direct investment (FDI) is increasing although there were ups and downs. The total FDI inflow is 74081 million USD with a remarkable year-on-year increase of 95% in 2010 and the FDI net flow to ASEAN from 1995 to 2009 is shown in the Figure 7. 80% of the FDI comes from the extra-ASEAN countries in 2010. FDI is an important indicator to show the economic vigor of a country. The high FDI inflow shows that the sound economic situation of Southeast Asia countries.

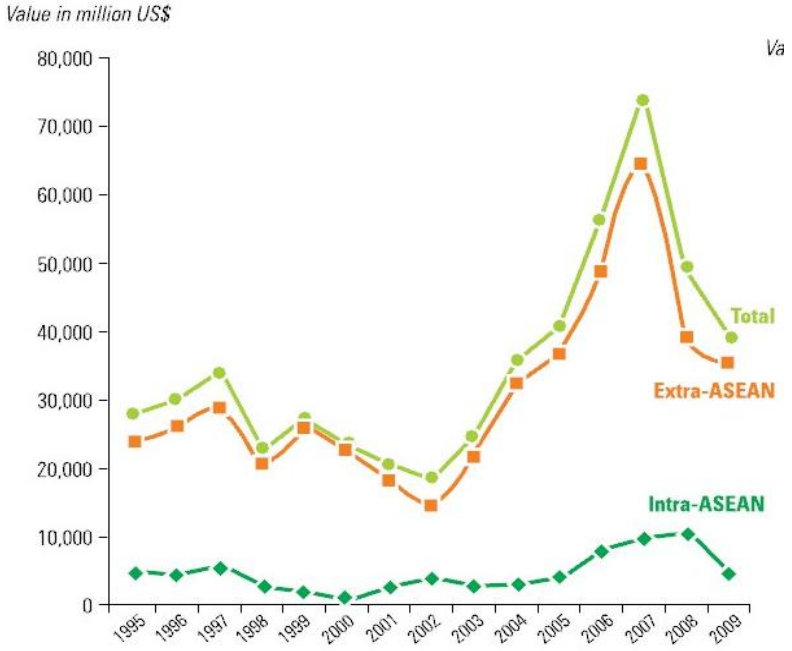

Figure 7- Total FDI inflow in ASEAN
Source: ASEAN FDI Database

Although the financial crisis in the 2008 resulted to the decreasing trade volume and FDI inflows, it rapidly recovered afterwards. Half of the Southeast Asia countries, namely Thailand, Cambodia, Malaysia, Singapore and Brunei experienced negative economic growth in 2009 and the total economic growth of the region was about 1.2. But, the import and export trade and FDI increased again and the growth rate came back to 5.1%. In a conclusion, Southeast Asia is one of the most vigorous economic regions in the world and its economy is on its way of sustainable rapid growth.

4.1.2 Trade structure of Southeast Asia countries

As mentioned above, the economic growth in the Southeast Asia experienced ups and downs in the past decades after the World War II. Shortly after the war, Southeast Asia countries relied on export of limited agriculture products and mineral products and the total foreign trade value is about 5.5 billion USD. In the beginning of 1970s, governments of Southeast Asia countries started to encourage foreign trade and export-oriented industry so that the foreign trade expands thereafter. In 1998, most of the Southeast Asia counties experienced negative foreign growth and sharp trade decline happened in major export countries. After 2002, the economy recovered again and maintained the good momentum till now.

Moreover, the trade commodity structure is changing gradually with the passing time. First of all, the share of industrial products is rising and share of primary products is decreasing. Southeast Asia countries export majorly agriculture and mineral products. Indonesia exports majorly rubber, petrol and natural gas. Thailand and Myanmar export rice to many countries. From 1980s, the industrialization in the Southeast Asia promoted the export-oriented industry. During 1983-2001, share of export-oriented industrial projects in major countries in Southeast Asia overpass the share of primary products. The export value of industrial products and directions of trade is shown in the Table 8.

Table 8-Trade of industrial products of ASEAN-6 (million USD)

Import / Export	Year	Japan	China(HK)	ASEAN-6	China,Korea,Taiwan+ASEAN-6	World
ASEAN-6	1995	27352	19971	48831	110321	240805
	2000	37654	30962	66666	163210	343949
	2005	42570	76862	89951	240755	496626
	2009	43720	96023	102280	270404	572439

Source: HIS Global Insight: "World Trade Navigator"

Second, the trade of mechanical and electrical products is rising and trade of IT

products is rising as the new force. Nowadays, exports of mechanical and electrical products accounts for the half of the total ASEAN-6 exports and office devises and telecommunication products also tripled from 1993-2007.

Finally, the share of medium and high tech products is rising and share of low tech products and primary products is decreasing. It is estimated by average share of medium-high tech products reached about 70% of the total export-oriented industrial products in 2005.

4.1.3 The trade between China and Southeast Asian Countries

The trade between China and Southeast Asia could be traced back to hundreds of years ago. In Ming dynasty, Zheng He[8] brought cargoes from China to Southeast Asia by ocean shipping and also brought back the local cargo back which was the start of the close trade partnership between two regions. Nowadays, ASEAN is the third largest trade partner of China and China is the biggest trade partner of ASEAN. In Jan, 1st, 2010, the largest free trade zone- China ASEAN Free Trade Area (CAFTA) was established. In the CAFTA, tariff is decreased by stages until zero-tariff is implemented which will benefit sea-borne trade a lot in the near future.

The major exports to ASEAN from China are mechanics and electronics products, daily consumption products, textile, herb, automotive products and home appliances. The top 5 exports and imports to China are shown in the Figure 8 and Figure 9.

[8] Zheng He (1371–1433), was a Hui-Chinese mariner, explorer, diplomat and fleet admiral, who commanded voyages to Southeast Asia, South Asia, the Middle East, East Africa, and the Horn of Africa collectively referred to as the Voyages of Zheng He or Voyages of Cheng Ho from 1405 to 1433.(From Wikipedia)

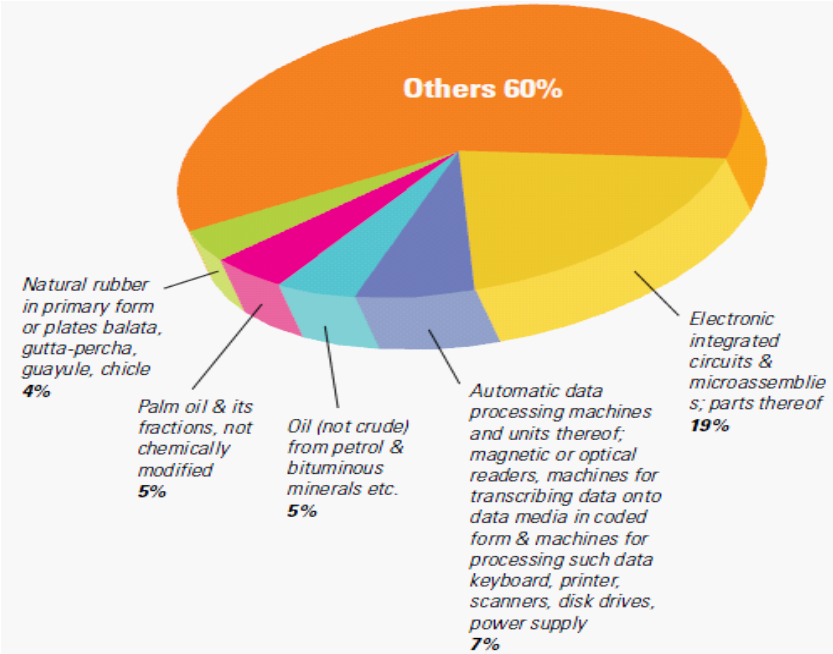

Figure 8- Top 5 exports to China, 2009

Source: ASEAN Trade database (by 4 digit HS code)

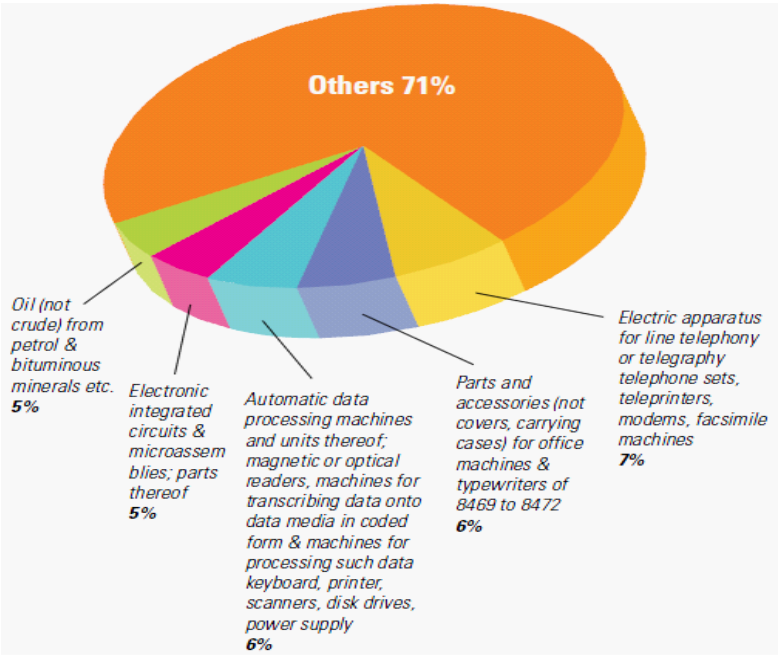

Figure 9- Top 5 imports to China, 2009

Source: ASEAN Trade database (by 4 digit HS code)

The trade between China and ASEAN sustains rapid growth which shown in the Table 9. China-ASEAN trade realized leap-and-frogs development in recent years and the bi-lateral trade value is as high as 3.6 trillion USD in 2011. In terms of the sea-borne

container transport between China and ASEAN-6[9], it maintains the pace of swift development both from and to ASEAN which is shown in the Table 10. The ASEAN-6 is the major ASEAN countries and it represents the whole trade situation of ASEAN countries in the statistics of consultant agencies or customs of major countries. The container transport from China (included Hong Kong) to ASEAN-6 in 2009 was 4.6 times that of in 1999 and the container transport for the opposite direction was 1.9 times during the same period.

Table 9-China-ASEAN Bilateral Trade (million USD)

Year	2005	2006	2007	2008	2009	2010	2011
Total Trade Value	130,374	160,844	202,548	231,117	213,011	292,777	362,854
China Export to	55,3712	71,318	94,179	114,143	106,297	138,207	170,083
China Import from	75,002	89,523	108,369	116,974	106,714	154,570	192,771

Source: China Customs Statistics

Table 10- Southeast Asia-China Container Volume (thousand TEU)

Year	2004	2005	2006	2007	2008	2009	2010	2011
From Southeast Asia to China	2011.9	2372.3	2424.6	1961.8	2138.5	2546.3	2840.4	3011.2
From China to Southeast Asia	1292.5	1608.4	2001.7	2171.9	2092	2531.3	2823.9	2989
Total	3304.4	3980.7	4426.3	4133.7	4230.5	5077.6	5664.3	6000.2

Source: IHS Global Insight

4.2 Demand forecast of container transport on China-Southeast Asia routes

4.2.1 Introduction of forecast model-Gray Forecast Model (1, 1)

The mathematic model used to forecast the demand of sea-borne container transport is the Gray Forecast Model (1, 1)-GM (1, 1). Chinese scholar-Deng Julong first came up with the Gray Model in 1982 which is the one of the few theories by Chinese scholars. Gray Model was set up based on theory of cybemetics. In the theory of

[9] ASEAN-6 here includes Singapore, Thailand, Malaysia, Philippines, Indonesia and Viet Nam.

Cybemetics, the amount of information is expressed by the shade of colors. Rich and definite information (known information) is expressed by color white, poor and indefinite information (unknown information) is expressed by color black and part definite and part indefinite information is expressed by color gray. If a system is fuzzy in its hierarchy and organization, if it is dynamically random and if its indicating data is indefinite and incomplete, then it is a gray system. The port is an example of gray system and the transport system of a region is another example.

Gray Forecast Model is a forecasting mathematic tool built by little and incomplete information. It is a model to forecast a gray system. The forecast model which is usually used like regression model needs big sample of data. If the sample is not big enough, it turns that the forecast result is not that accurate and error of the result is big. Gray Forecast Model needs little information. It is easy to calculate and the accuracy of the model is high enough so that it is widely used and is an effective method to deal with forecasting problems with small samples of data.

The paper considers the container transport between China and Southeast Asia as a gray system. When forecasting the demand of container transport, we do not study inner reasons and mutual relation within the China-Southeast Asia container transport which is actually affected by many reasons. Instead, the container transport is considered as a gray time-dependent variable changing in certain ranges. By using the actual data of sea-borne container transport between China and Southeast Asia for the past years, the model is built so as to forecast the demands of container transport for the following five years. The steps to build the forecast models are as follows.

Original data sequence is $X^{(0)} = \{x_1^{(0)}, x_2^{(0)}, ..., x_n^{(0)}\}$, and the steps to build the first-order Gray Forecast Model -GM (1, 1). Before building a model by Gray theory, the conditions should be such as non-negative and the dynamic randomness of data sequence.

1. Accumulate the time sequence (1-AGO) to develop a new sequence to abate to random and wave property of original time sequence. The new sequence is as followed:

   $X^{(1)} = \{X_1^{(1)}, X_2^{(1)}, \ldots\ldots X_n^{(1)}\}$, which $x_i^{(1)}(t) = \sum_{k=1}^{t} x_i^{(0)}(k)$

2. Build data matrix B and vector X_n.

$$B = \begin{bmatrix} -\frac{1}{2}\left[x_1^{(1)} + x_2^{(1)}\right] & 1 \\ -\frac{1}{2}\left[x_2^{(1)} + x_3^{(1)}\right] & 1 \\ \vdots & \vdots \\ -\frac{1}{2}\left[x_{n-1}^{(1)} + x_n^{(1)}\right] & 1 \end{bmatrix} \qquad X_n = \begin{bmatrix} x_2^{(0)} \\ x_3^{(0)} \\ \vdots \\ x_n^{(0)} \end{bmatrix}$$

3. Calculate a and u by the model by LSM.

$$\hat{a} = \left(B^T B\right)^{-1} B^T X_n = \begin{bmatrix} a \\ u \end{bmatrix}$$

4. Build and discretize time response function.

$$\frac{dx^{(1)}}{dt} + ax^{(1)}(t) = u$$

   The accumulate time sequence forecast model is:

$$\hat{x}_{k+1}^{(1)} = \left(x_1^{(0)} - \frac{u}{a}\right)e^{-ak} + \frac{u}{a}, k = 0,1,2,..,n-1$$

   The original time sequence forecast model is:

$$\hat{x}_{k+1}^{(0)} = \hat{x}_{k+1}^{(1)} - \hat{x}_k^{(1)} = \left[x_1^{(0)} - \frac{u}{a}\right]\left[1 - e^{a}\right]e^{-ak}$$

5. Check accuracy of model by the method of posterior-variance-test.

4.2.2 Demand forecast

China-Southeast Asia liner market is regarded as a gray system so that Gray Forecast Model could be used to forecast the future demands of the liner services. The original time sequence is built by using the actual data of China- Southeast Asia container transport from 2004 to 2011. Southeast Asia countries hereunder include the

ASEAN-6 which is Singapore, Thailand, Malaysia, Indonesia, Philippines and Viet Nam to represent the demands of the whole area. The actual container transport is shown in the Table 11.

Table 11- China-Southeast Asia Container Volume (thousand TEU)

Year	2004	2005	2006	2007	2008	2009	2010	2011
From S.E Asia to China	2685.7	3031.8	3070.7	2588.6	2690.7	3177.7	3496.9	3691.2
From China to S.E Asia	1843.6	2174.9	2649.7	2881.7	2681.5	3343.6	3659.6	3851.3
Total	4811.3	5206.7	5700.4	5552.3	5656.2	6388.3	7156.5	7322.5

Source: IHS Global Insight

The original time sequence is built through inputting the actual data of total container transport from China to Southeast Asia or from Southeast Asia to China during 2004-2011:

$$X^{(0)} = \{4811.3, 5206.7, 5700.4, 5552.3, 5656.2, 6388.3, 7156.5, 7322.5\}$$

1. Build the 1-AGO time sequence:

$$X^{(1)} = \{4811.3, 10018, 15718.4, 21270.7, 26926.9, 33315.2, 40471.7, 47794.2\}$$

2. Build matrix B and vectorX_n.

$$B = \begin{bmatrix} -7414.65 & 1 \\ -12868.2 & 1 \\ \vdots & \vdots \\ -44132.95 & 1 \end{bmatrix} \quad X_n = \begin{bmatrix} 5206.7 \\ 5700.4 \\ \vdots \\ 7322.5 \end{bmatrix}$$

3. Based on the formula $\hat{a} = (B^T B)^{-1} B^T X_n = \begin{bmatrix} a \\ u \end{bmatrix}$, the value of a and u could be calculated as follows.

$$a = -0.060001 \quad u = 4648.761259$$

4. Then the Gray Forecast Model can be presented as follows.

$$\hat{X}^{(1)}_{k+1} = 77478.225036 * e^{-0.060001*k} - 77478.225036, k = 0,1,2,..,n-1$$

5. The accuracy of model should be carefully checked. If the accuracy of the model is not high enough, then the forecast value is meaningless. The method used is posterior-variance-test. The accuracy of the model is examined by the method of posterior-variance-test whose formula is shown as follows. Table 12 is the appraisal standard of the accuracy and Table 13 shows the details of the procedure of examining the accuracy of the model.

Residual error: $E(k) = X^{(0)}(k) - \hat{X}^{(0)}(k), k = 2,3,..., n$

Average of $X^{(0)}$: $\overline{X} = \frac{1}{n}\sum_{k=1}^{n} X^{(0)}(k)$

Variance of $X^{(0)}$: $S_1^2 = \frac{1}{n}\sum_{k=1}^{n}\left(X^{(0)}(k) - \overline{X}\right)^2 = 710347.937$

Average of residual error- $E(k)$: $\overline{E} = \frac{1}{n}\sum_{k=1}^{n} E(k) = -4.3093$

Variance of residual error- $E(k)$: $S_2^2 = \frac{1}{n}\sum_{k=1}^{n}\left(E(k) - \overline{E}\right)^2 = 59495.7$

Mean square error ratio: $C = \frac{S_2}{S_1} = \frac{243.9174}{842.8215} = 0.2894 < 0.35$

The probability of little error:

$$P = p\left\{\left|E(k) - \overline{E}\right| < 0.6745 S_1\right\} = p\left\{\left|E(k) - (-4.3093)\right| < 568.483\right\} = 1 > 0.95$$

Because of the fact that C[10] <0.35 and P [11]>0.95, so the Gray Forecast Model above achieve the good accuracy of the model which shows that the model has good forecast

[10] C and P are the two important indicators of the posterior-variance-test. Indicator-C is the smaller the better which means S1 is large while S2 is small. If S1 is a large number, it means that the variance of original time sequence is large, namely a large degree of dispersion. Small S2 shows that the variance of residual error is small, namely a low degree of dispersion of the error. Small number C means that although the original time sequence is disperse, the dispersion of data calculated from the model and the actual data is not very disperse.

[11] Indicator-P is the larger the better. If the P is larger, it means that more numbers of the differences of the residual error and average residual error are smaller than the fixed value-0.6745, namely a relative uniform distribution of the value forecasted from the model. C and P could appraise the accuracy of the forecast model in a comprehensive way.

results. The appraisal standard of the C and P is shown in the Table 13. The accuracy level of the model equals to the maximum level of C or P.

Table 12- Appraisal standard of Indicator-C and P

Level of accuracy	Mean Square error ratio-C	Probability of small error- P
First (Good)	C<=0.35	P>=0.95
Second (Qualified)	0.35<C<=0.5	0.80<P<=0.95
Third (Pass)	0.5<C<=0.65	0.70<P<=0.80
Fourth (Fail)	C>0.65	P<0.70

Source: various sources

Table 13-Container Demand Forecast and Relative Error (thousand TEU)

Year	Actual container volume	$\hat{X}^{(1)}$	Forecasted container volume	Residuals	Relative error（%）
2004	4811.3	4811.3	4811.30	0.00	0.0000
2005	5206.7	10018	5088.58	-118.09	2.2680
2006	5700.4	15718.4	5403.24	-297.16	5.2129
2007	5552.3	21270.7	5737.36	185.06	3.3331
2008	5656.2	26926.9	6092.15	435.95	7.7074
2009	6388.3	33315.2	6468.87	80.57	1.2612
2010	7156.5	40471.7	6868.89	-287.62	4.0190
2011	7322.5	47794.2	7293.64	-28.86	0.3941

Source: Calculation results based on the forecast model

6. After examining accuracy of the forecast model, it could be used to forecast the demand of China-Southeast Asia container transport during 2012-2016 as Table 14 shown. From the forecast we can see that the trend of increasing liner service demands will be well maintained for at least following 5 years.

Table 14-Container volume forecasted during 2012-2016 (thousand TEU)

Year	2012	2013	2014	2015	2016
Volume	7744.665	8223.576	8732.100851	9272.072	9845.433

Source: Calculation results based on the forecast model

4.3 Result of the demand forecast

The results of the demands forecast of the sector above shows that the demands for the liner services from China to Southeast Asia will be further grown up, which means

more and more container transport will be originated from China to Southeast Asia and from Southeast Asia to China. From 2012 to 2016, the container transport will remain an average of 6% year-on-year growth which is unsurprised to the scholars and insiders. The future demands of the liner services will sustain a very good momentum of increase for the future couple of years which is good news for all the shipping lines operated on the trading routes.

The surging demand of container transport is both good and bad for the small and-medium sized shipping lines. The good side is that they could expand their business, purchase or charter in more and larger container ships but the cost to expand fleet will be higher. Besides, market boom will turn the market from buyers' market to suppliers' market which will benefit all the shipping lines and industry. Larger ships will be deployed in this area and more modern ports will be built in the Southeast Asia. The bad side is that it is definitely that the market competitions will be fiercer and cruder than ever before. The small and-medium sized one will doing business under the stress and squeeze from the larger ones. More new-comings will flood into the regional market. Faced with the new force and old force, the future of small and-medium sized shipping line is a question. Nevertheless, there is no need for them to be passive about their future. As long as the market is in the boom, there is opportunity for them. After accumulating good reputation and business foundations, they could show their full capacity and grow up rapidly which is never could happen in the market downturn.

Chapter 5 Development strategy for small and-medium sized shipping lines

In the chapter 5, the paper will discuss the development strategy for the small and-medium sized shipping lines with details.

5.1 SWOT analysis of small and-medium sized shipping lines

5.1.1 Introduction of SWOT

SWOT is the acronym of four words: strength, weakness, opportunity and threat. It analyses the strengths, weakness, opportunities the company is facing and the threats that exits. Strengths and weakness focuses on the power and the comparison with its competitors, while opportunities and threats focus on the possible impacts of the changing outside environment on the company. Some changes on the outside environment may impose completely different opportunities and threats on the companies with different resources and power, but they are closely related with each other at the same time. Any company has its own strengths and weakness and also opportunities and threats so that small and-medium sized companies should take the full advantages of their strengths, avoid the weakness, seize the opportunities and overcome the threats. In doing so, even small and-medium sized companied could survive and develop well in the cruel market. Figure 10 is the illustration of SWOT analysis. A company knows about itself by knowing its inside and outside environments and then it can make certain decisions.

Figure 10- The Organization of SWOT

5.1.2 SWOT analysis

Strengths:

1. Services

   Small and-medium sized shipping lines could provide their customers with friendly service and helps. In doing so, they gain the trust and long-term cooperation. In designing the liner schedule and ports of call, they are more flexible than the larger ones. Once the market environment changes, they change in the services and ports of call.

2. In the stage of rapid growth

   In terms of the life cycle of the industry, small and-medium sized shipping lines are in the initial stage of growth. Once proper development strategies are established, they could sustain a rapid growth. Compared with small ones, large shipping lines are much more developed and may be in the bottleneck of growth.

3. Simple and efficient organization

   The organization of small and-medium sized shipping lines is simple so that it is more efficient. Once correct decisions are made, it could be quickly implemented by the specific people. It is fast and efficient. Simple organization also helps to cut the

overhead and management cost of the shipping lines.

4. Low operation cost and entering barriers

   Small and-medium sized shipping lines have lower labor costs, fixed costs and operation costs, which makes them easier to enter new markets. Compared with them, the large ones have complete mechanism of management so that operation cost is much higher.

Weaknesses:

1. Few high quality employees and the brain drain

   Small and-medium sized shipping lines are not that attractive to the talents with higher education, rich working experience and management expertise. Senior talents and professionals tend to join in the large shipping lines with higher salary and better welfare. Moreover, the turnover rate of the employees in small and-medium sized shipping lines is higher.

2. Less competitive than larger ones

   It is obvious that small and-medium sized ones are less competitive than the larger ones. The small shipping lines are being squeezed by the larger ones. They are always in the passive positions because they lack core competency so they are vulnerable to the ‘attacks’ by the large shipping lines and the market.

3. Narrow financing channels and hard to get strong funding from banks

   Most of small and-medium sized shipping lines do not have very good cash flow and strong capital funding. The financing problems stand out among others. Bank is tough to the debit applicants from all kinds of small companies, not to mention a large sum of money over a million dollars.

Opportunities：

1. Government support

On the one hand, the policies of the CAFTA, which actively promote the trade between China and Southeast Asia, show the governmental supports. On the other hand, China will continue to strengthen its shipping power. So the industry related to shipping will be developed rapidly, for example shipping finance, derivatives market of fuel, shipping insurance and shipbuilding industry. The municipal governments of China have also been actively helping small and medium-sized shipping lines to solve the problems of financing, which is good news to Chinese small and-medium sized shipping lines.

2. The growing trade volume between China and Southeast Asia

   In the future, the trade volume between China and Southeast Asia will continue to increase as well as the shipping trade between Southeast Asia and China. Even during 2003 to 2008 when the global economy is in the pre-recession period, the annual growth rate of the trade volume between China and ASEAN is about 26%. In 2010, the total volume of container trade grew by 16.4% between Southeast Asia and northeast Asia. The trade volume reached 9.2 million TEU.

3. Refocuses to the trunk routes by large shipping lines

   Although the whole shipping market is still in the downturn, and has not recovered from the financial crisis, the shipping market presents itself as the periodical changes in the long term. The shipping market will not always in the bottom of the cycle. The large shipping lines will pay more attention to the trunk routes when the market booms again. The large shipping will add the most shipping capacity into the trunk routes with highest profit rates. At that time, the group of small and-medium sized shipping lines will play a critical role in the regional liner market, including China-Southeast Asia lines and feeder service within the Southeast Asia areas, so the small and -medium sized ones can get more opportunities to get stronger.

Threats：

1. The uncertainty and unpredictability

The uncertainty and unpredictability is a feature of the shipping market. Shipping is a derivative of the international trade. If the inter-country trade volume increases continuously, the demand for the liner shipping will grow and the growth promotes the development of the shipping lines. All the uncertainty increases the difficulty in making decision and development strategies.

2. The larger-sized container ship may lead to the over-supply of container capacity on the China-Southeast Asia routes

   The trend of lager-sized container ships pushes the large shipping lines to cascade the less large ships from the trunk routes to the China-Southeast Asia market and other regional routes. If large shipping lines continue to acting like this or deploy more container ships in this route, the imbalance of supply and demand will be more and more prominent.

3. Profits fall and price battle goes on

   The increasing cost is the main reason for the decline in profits. The average price of the oil in 2010 was around 35% higher than that of 2007. The international fuel price is still rising, which brings a huge stress of fuel cost of shipping lines. The rising of steel price also increased the cost of using containers. At the same time, port charges and other surcharges is getting higher. The other reason for the decline in profits is the slump of freight rate. The shipping routes of China-Southeast Asia are relatively short than other routes so that the average freight rate is lower than $300 per TEU (20 feet GP container). The small and-medium sized shipping lines use the price battles to get the shipment and the battle will not cease in a short time. If the price battles work, the shipping market will boom and the freight rate will rise. Then the small and-medium sized shipping lines can further develop. If the price battles fail, the small and-medium sized shipping lines may lose a lot of money and go bankruptcy.

SWOT analysis unveils the strengths, weakness, potential development opportunities and potential threats of small and-medium sized shipping lines as Figure 11 shown.

They could improve their weakness. The outside environment is never unchanging. The key for the shipping lines is to transfer the threats into opportunities and make it hard to be imitated. Small and-medium sized shipping lines have more weakness than strengths, honestly. But they can succeed if proper development strategies are made.

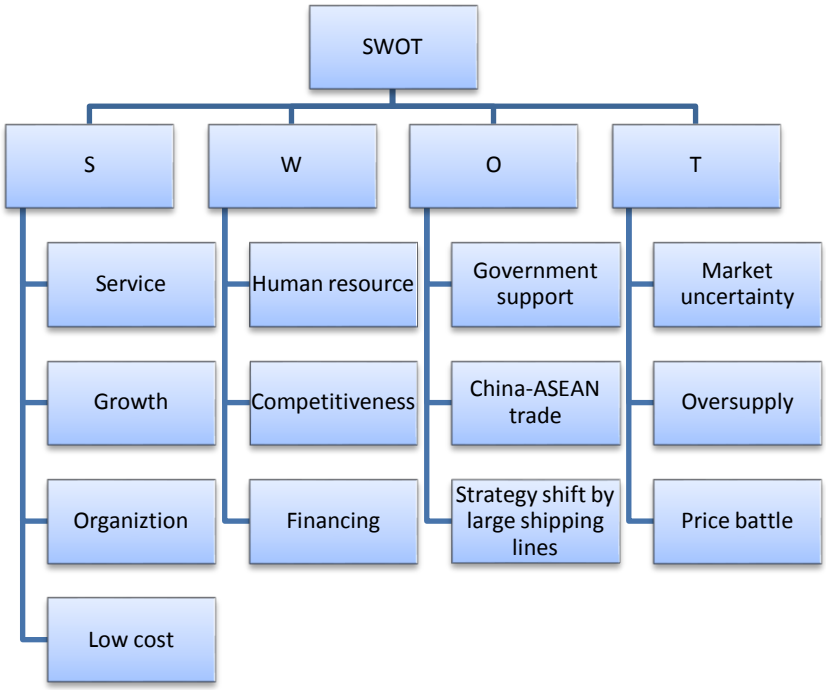

Figure 11-SWOT analysis
Source: Analysis mentioned above

5.2 Basic thinking of development strategies

Under the crude liner market conditions, it is never an easy thing for small and-medium sized shipping lines to survive and seek a sustainable development at the same time, but it is possible. Many small and-medium sized shipping lines still operate actively on the China-Southeast Asia routes and struggle to get stronger.

The development issues of small and-medium sized shipping lines should be unfolded focusing on both the ‘hard power’ and ‘soft power’. On the one side, development of small and-medium sized shipping lines need the supports from government, preferential policies such as subsidy for ship-building, loan interest and tax exemption and a fair and open shipping market mechanism. On the other side, they should obtain

more creative operation strategies based on what they are good at and what is easier for them to succeed. Compared with large shipping lines, they have not advantages in the ‘hard power’. According to the SWOT analysis, we know what the strengths of small and-medium sized shipping lines lie in and also the weakness and threats. The weakness includes human resources problems, lack of competitiveness and financing problem.

In terms of the human resources, small and-medium sized shipping lines should open their doors to the talents and those with rich working experience. Many of the talents do not want to go to the small and-medium shipping line because the salary and welfare. In this regard, these shipping lines should improve the salary and welfare to these specialists which might totally change the fate of the shipping lines. At the same time, they should also invest more time and money on the employees who already work for them because they are the potential talents. It is hard to produce talents but it is very worthwhile to doing so. Many small and-medium sized shipping lines complain that they could not reach to the qualified employees and I think they should ask themselves if they are good employers. Every shipping line, small or large has to set up a sound human resource management mechanism because people are the wealth of a shipping line. Without the management mechanism and reasonable punishing and incentive measure, even if good employees will leave the company sooner or later.

In terms of lacking competitiveness, it is the common problems and inevitable problems of small and-medium sized shipping lines. Services and business scale are the major problems lie in which details and solutions will be given in the next section. Besides these two problems, these are some other part they could do to improve their competitiveness. For example, cut the cost. Although the operation cost and fixed cost is much lower for small and-medium sized shipping lines than that of larger ones, it is still necessary to cut the overhead and other cost to keep the cash flows smoothly. For another example, optimize the fleet. Although the capacity and ships controlled by

small and-medium ones are very limited, the fleet optimization is key to the operation of the shipping lines. Assignment of the ships and the timing to deploy new capacity and demolish old capacity should be well considered.

In terms of the financing problems, small and-medium sized shipping line could widen the financing channels such as small and-medium sized commercial banks and private financing mechanism. In China, quite a lot of commercial financial is realized by private financing and many non-government organizations initial such kind of financing channel.

Small and-medium sized shipping lines have no power to control the market. They cannot influence oversupply of the market capacity or initial freight rate rising. What they can do is to get stronger by self-development. The development strategies proposed in this paper include three parts: large-scale development, service-oriented development and business innovation development.

5.2.1 Large-scale development

The small and-medium sized shipping lines can realize the large scale development by two means which is alliance and fleet expansion.

Alliance in the shipping industry has a long history. By continuously M&A, reorganization and internal changes of members, there major alliances are followed as New World Alliance, Grand Alliance, CKYH Alliance and some major interdependent operators including Maersk, CMA-CGM and MSC. The initiative of shipping alliance is to better assign the resources and gain market shares by economies of scale and concerted actions. When a single shipping line is not strong enough to compete with the larger ones, they will form alliances.

The alliances among small and-medium sized shipping lines do not intend to compete

directly with the large shipping lines, but to increase the capacity controlled. The market completion is fiercer than ever, this could be the opportunity for small and-medium sized ones to better survive. Small and-medium sized shipping lines could form alliance by means of joint-operations, cooperation and collectivization. The liner market is the one with prominent economies of scale. A single small shipping line cannot reap the benefit of economies of scale because of limits on capital, company scale and technique. Through setting up fine organization system and regulations, small and-medium sized shipping line could realize the joint and collective operations. The alliance helps to make the best of the strengths of each shipping line, the capacity, fleets, business network which forms a more competitive business unit. It also helps to enlarge and diversify the shipping business and lower the business risks without extra assets purchasing and capital investment. Furthermore, if members of the alliance include the one operating Intra-Southeast Asia routes and the one operating East Asia costal services, they will help a lot to add the services number and coverage of services and dig the needs of customers.

On the China-Southeast Asia routes, few of alliances or joint-operations exist among small and-medium sized shipping lines. What small and-medium sized ones really need is more deep-going ones than the large alliances. Also, it should be well noticed that the team spirit of the alliance is more important than anything in the alliance. Members should avoid the inside competitions and non-cooperation which will destroy the alliances. That each member can play a role realizes 1+1>2.

Fleet expansion is another way to enlarge the business scale. Alliance is to strengthen the competitiveness by the concerted actions of the member, while fleet expansion is more personal.

In theory, larger container ships help to realize the economies of scale in the liner shipping because the unit container transport cost is lower. Fleet expansion could be very risky for both the large and small shipping lines. But, the capital cost to expand

fleet is much lower in the market downturn than in the market boom. That is the power of market to balance the supply and demand of ships. Decreasing demands lead to cheaper market price.

There are two ways to expand the fleet: charter in and purchase one. Most of the Asian shipping lines, including mall and-medium sized ones rely on the charter market to obtain the container capacity instead of purchasing ships. In doing so, shipping lines can enjoy lower risks and more flexible business operations. Ship chartering is definitely a more cost-saving and low-risk way of expand the fleet. Chartering on a long-term contract basis or bareboat basis is good options in the market downturn and shipping lines can control the ships at the largest extent. But, shipping lines should carefully calculate the total cost to charter in a ship based on the market situation. Sometimes, chartering in a ship is more economical than purchasing one, but sometimes it is not. It remains to be balanced by small and-medium sized shipping lines on the basis of the calculation of the total cost. Every dollar of small and-medium ones matters. From the financing point of view, owning a ship is more economical than otherwise. But capacity controlled by shipping lines could not always match the changing demands. Small and-medium sized shipping lines are recommended to sell part of the fleet and charter in same number of or more ships in the charter market using the sales revenue. Especially for some small shipping lines that operate ships below 1000TEU, ship chartering is more helpful to them.

For ambitious small and-medium sized ones, they may consider purchasing ships if the larger ones are wanted. In the long run, large container ships are very much needed and market downturn is a good time to purchase some. Short-term charter may not be as economical as it looks like in the long run. If shipping lines decide to purchase larger ships then they used to operate, then daily cost savings is stable. With the ships get larger, the daily cost savings by chartering get less and less. Small and-medium sized shipping lines should compare the total cost of purchasing a ship or chartering a ship so as to make the decision and purchase some at the proper time.

5.2.2 Services-focused development

Whether services are good or not is the core to win a competition for small and-medium sized shipping lines. As the paper mentioned above, relying on the price battle to obtain the shipment is not enough anymore. For small and-medium sized shipping lines, service improvement and closer shipper-shipping line cooperation is the weapon to defense them and win a position in the market. Faces with the challenges from the larger ones, small and-medium ones should think about how to closely cooperate with their customers, which means they should know what they needs and what they want. Small and-medium ones could survive and survive well by satisfying those needs and wants. The services include both customer services and shipping services.

The first step to strengthen the services is to aim at a target market segment. Small and-medium sized shipping lines have to carefully choose the business specification and target market based on the changing environment, the resources they hold and the competitiveness. It means that they need to find a target market which they have bigger chance to survive and where there are limited market players. The larger the market, the diversified the needs of shippers are. There are always the needs uncovered or unsatisfied. That is the target of the small and-medium sized ones. A shipping line often judge whether the market segment is sound for it based on the following four aspects. First of all, easiness to enter the potential market segment and the parties focus on the segment. Secondly, how familiar you are to the market segment. Thirdly, how you know your competitors in the segment. Finally, how is the demand and needs of the potential customers. Based on the analysis to the potential market segment and the anti-risk capacity of the shipping line itself, small and-medium sized shipping lines could get ready to enter the market segment. Small and-medium sized shipping lines should make a survey of the market and choose a market segment based on what they are good at, and then focus on the market and do whatever you can to be one of the best. For example, trade volume of Viet Nam and

Malaysia keeps rapid increase in recent 2 years so that these two markets have further development potential. Small and-medium sized shipping lines could open more liner services targeted to these two countries.

Then, small and-medium sized shipping lines should set up their own services standards. Small and-medium sized ones could set up their independent standards to further improve services level as the larger ones do. The standards set up by large ones are the benchmark in the shipping market, and the small ones need to closely follow or even do better. The standards are useful for customers to judge the services provided and turn intangible services into strong perception that let customers feel 'I received very good services'. Punctuality and reliability of the ships, box dunk rate, transit time, customer feedbacks, cargo damage rate, pre-stowage and others should be included into the standards and give details about how it works and how the shipping lines improve it. Small and-medium sized shipping lines need the standards to inspect themselves and continuously improve the shipping services and customer services. Of course, standards are not enough and the people who implement the standards are also important. The customer service coordinators need to provide more friendly and considerate services to the customers with quick responses to all the problems and trouble of the customers. And the management level must employ some with rich working experience in the field. They must master and control the freight rates and make the decisions in the upper level turn to reality in the operation level timely and fast. The standards will be continuously updated based on the feedbacks and new demands of the customers.

Moreover, the logistics services and services in the discharging port are also what customers need. In this case, small and-medium sized shipping lines need to diversify their business so that they could control more links in the logistics chain. They could realize that through opening freight forwarding business, overseas market development, land-transportation services and so on. Proper diversification in the business could support the major business which is the liner transport. But they should

also notice that the liner transport is the only focus in the whole business.

Last but not least, CRM is the key to the whole good services. Few small and-medium sized shipping line are doing the customer relation management because they think it does not produce the revenue directly but you need to input people and money. That is really short-sighted view. CRM is one of the most important parts of the modern business management. Small and-medium sized shipping lines should really do that. The liner transportation is actually a kind of service. The customers need to be analyzed, categorized, valued and well maintained. The customers who have direct business with small and-medium sized shipping line are the most important group which needs to be well known. Shipping lines should try their best to provide all-directional services. CRM is also helpful to guide and develop the habits of customers. The loyalty of the customers in liner shipping is low because customers have many choices. Small and-medium sized shipping lines should maintain long-term and stable commercial relationship with their customers. The choices of the customers should be honored and regarded as the right of them. But small and-medium sized shipping line should never miss the opportunity to guide the customers that quality of service and reliable after-sale services are the most significant factors to choose a shipping line.

Small and-medium sized shipping line could get stronger by the service-focused development strategy. More and more customers nowadays are willing to pay more money to get better shipping services. Small and-medium sized ones could provide good services and keep freight rate lower than large ones to get the best cost-performance.

5.2.3 Business innovation

An innovative enterprise always turns an idea into a product, service or a new process based on the changing environment and self-conditions, which means it can turn a

thought into productivity. Small and-medium sized shipping lines should be innovative in its management and business so that they could fight against the larger ones. When thinking about the innovation, small and-medium sized shipping lines should not follow blindly the operations and actions of larger ones, because they could never win the larger ones if they follow the rules made by the larger ones. On the contrary, they should focus on a well-chosen market segment and provide high-quality services to the targeted customers.

First step to innovate the business for small and-medium sized shipping lines is to focus on the market segment. They should focus limited resources to the business instead of opening different business but cannot do well in any of them. These shipping lines need to make the full use of the resource to build its core competency. Besides, small and-medium sized shipping lines should improve the dense of the liner service schedule and improve the customer loyalty. In the current world market, the percentage of raw material transport is decreasing while the demand for flexible and fast transport is increasing. Liner services often transport high-technic, high value-added and light products. Small and-medium sized shipping lines could follow the market trend and provide safe, fast, flexible, frequent, high-reliable and information-supported liner services to catch the customers' demands. By provide services with high quality, new customers are discovered and old customers are well maintained. For customers, they need the flexible liner services to cut the inventory cost, shorten the cast flow and make JIT possible. For small and-medium sized shipping lines, they could satisfy the needs and wants of customers.

Besides, small and-medium ones could even enter the specialized market segment to provide service to special cargo like fruit, vegetable or fish. Cargo like fish, frozen products and agricultural and sideline products are often transported between China and Southeast Asia. It is very suitable to deploy small container ships to provide this kind of services because the demand for the special cargo is smaller than filling a large ship but bigger than tens of reefer space in a large ship. It might be hard in the

start of the business because there might be enough container cargo so that they could increase the reefer slots step by step.

What's more, small and-medium sized shipping lines can take the advantages of the small sized container ships. They could think about if it is possible to provide the feeder services, no matter in China or in Southeast Asia by using the small ships. In many ports in Southeast Asia, they could not berth the ships bigger than 1000 TEU. For the reason that some port in Ho Chi Minh City, Surabaya and Bangkok cannot berth the ships larger than 2000 TEU, small ships are needed to transfer the containers to the final destination. Small and-medium sized shipping lines can provide direct service from China to sub-ports in Southeast Asia which is much faster than transferring the cargo.

It is never an easy task for small and-medium sized shipping lines to make innovation, but it is an urgent task for them. They need the business innovation to differentiate themselves from the larger ones.

5.3 Summary

In this chapter, SWOT analysis is given to the small and-medium sized shipping lines and then development strategies are proposed. The development strategies are divided into three parts: large-scale development, service-focused development and business innovation development. Large-scale development helps to improve the hard power of the shipping lines, service-focused development helps to improve the soft power and innovation helps to differentiate the services from the normal ones. These are very important to the long-term business and shipping lines should never give favorites.

Chapter 6 Conclusion

The competition within China and Southeast Asia liner market is getting fiercer and fiercer and the survival and development of small and-medium sized shipping lines is getting harder. They have no choice but to do thing for their business and future. The paper reveals the status quo and future forecasted of them and the trend of the whole market.

6.1 Main findings

Few of the studies focus on small and-medium sized shipping lines in the academic fields, especially under the circumstances of great challenges posed to them. The balance of the market is broken down because of the larger-sized container ships deployed on the China-Southeast Asia routes and proactive strategies taken by the large shipping lines. The global shipping lines and large regional lines are the major players on the China-Southeast Asia routes. The market share of the total small and-medium sized ones is only 10%. The threats from the large ones push them to make changes or exit the markets.

The small and medium sized shipping lines have a small business scale and transport network coverage. The biggest problems of them are tight cash-flow, poor anti-risk capacity and wrong market targeting. They have no idea how to market the shipping liens and build their reputation and brand image is also fatal to their failure.

Among all the challenges, the most serious one is the imbalance of the supply and

demand in the market. Although, according to the demand forecast in the paper, the demands of the container transport will continually to grow in the following 5 years or more, the capacity deployed will be increase dramatically at the same time. The fierce market competition is more or less the results from the imbalance.

But small and-medium sized shipping lines still have chances to survive and that is the very reason why the study is needed. Based on the market forecast and the analysis of the subject, large scale development strategy and services-oriented strategy are proposed. Small and-medium ones have to get physically stronger to compete with the larger ones and services are the core to the competitions. Through proper market targeting and service improvement, they could survive and get stronger in the long-run.

6.2 Limitation of Research

Firstly, the group of small and-medium sized shipping lines is smaller than the large shipping lines and the members within is very different from each other so that we could not summarize every detail of them. Secondly, it is hard to get full information and data of small and-medium sized shipping lines so that the information might be less sufficient than it is expected to. It might affect the accuracy of describing the whole group. Thirdly, the data used in the demands forecast is limited because by meaning Southeast Asia countries, the paper actually only cover the six, but the most important countries in the area. It results to the forecast might be little underestimated, although it is always very hard to forecast the demand, no matter what kind of subjects. Finally, the development strategies proposed in the Chapter 5 mainly focus the services and fleet expansion. Besides, there are much more small and-medium sized shipping lines should improve, but the paper just show the two most important aspects.

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