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WORLD MARITIME UNIVERSITY
Shanghai, China

**THE ANALYSIS OF CORE COMPETENCE FOR
CHINESE OIL SHIPPING COMPANY**

By

Mo Binneng
China

A research paper submitted to the World Maritime University in partial Fulfillment of the requirements for the
award of the degree of

MASTER OF SCIENCE

THE FINAL DISSERTATION

2006

DECLARATION

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

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

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At the very beginning, I am very grateful having this opportunity to express my sincere thanks to WMU and SMU, who have given me the chance to write here.

On the base of my undergraduate thesis *The Competition Analysis of Chinese Domestic Oil Shipping Fleet*, and almost six months' effort, this dissertation has finally come to the end. During this whole period of time, I have been profoundly impressed by my supervisor, Associate Professor Hu, Meifen, who has poured great effort, attention, patience, and passion.

I also want to express my gratitude to my friends for their support and encouragement all these days, especially to Judy and Kenneth, for being there when I need them. Without them, I couldn't have finished it.

Thank you all.

ABSTRACT

Title of Research paper: **The Analysis of Core Competence for Chinese Oil Shipping Company**

Degree: **MSc**

During the past decade, China's crude oil import has risen sharply, which demands the immediately matching shipping capacity of the domestic oil shipping companies. Therefore, how to steer the Chinese oil shipping enterprises towards a promising development is a very big problem facing the Chinese entrepreneurs.

This paper has tried to provide some practical suggestion to improve Chinese oil shipping companies' core competence based on the analysis of Chinese Shipping Tanker Company, which is typical representative for this industry.

After having studied the measuring methods of the core competence and the index system building principles, the author constructs a complete set of index for evaluating the core competence of oil shipping companies, during which, the innovative combination of AHP and SWOT is used. SWOT analysis can define the strengths, weaknesses, opportunities and threats. And the AHP method can briefly determine the index weight. The author discusses the weight-determined steps of the AHP. At last, the author introduces the model for determining the evaluation results by employing IFE (Internal Factors Evaluation) and EFE (External Factors Evaluation) matrix.

Basing on the priority of the SO, WO, ST and WT strategies, the primary task of China Shipping Tanker Company is to develop the competitiveness of fleet by increasing the operation performance as well as enhancing the fleet carrying capacity.

The conclusion drawn from China Shipping Tanker Company can also be used for reference and applied in other oil shipping companies in China under the environment that fostering core competence has become the aim of oil shipping companies in the fiercely competitive market.

For the reasons that the author has no actual working experience, and the lack of most up-dated data, this paper must has a lot to improve, but the purpose of author is to explore a new approach to measure the core competence with what he has learned in the past one year.

Keywords: Core Competence, Oil Shipping Industry, IFE, EFE,
China Shipping Tanker Company

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LIST OF ABBREVIATIONS

AHP	Analytic Hierarchy Process,
IFE	Internal Factors Evaluation
EFE:	External Factors Evaluation
SO	Strength & Opportunity
WO	Weakness& Opportunity
ST	Strength & Threat
WT	Weakness & Threat
C.S.T.C	China Shipping Tanker Company

Chapter 1 – Introduction

1.1. Research Background

Since 1993, with the step that China became a crude oil net-import country from an export one, the overall economy of China has been keeping 8% increasing rate and the annual average increasing rate of crude oil consumption is 6.66%. For instance, the crude oil annual consumption and import quantum of China have exceeded those of Japan and became the second crude oil consumption and import country following America in 2003. Besides, the import quantum of crude oil kept the increasing impetus in 2004 and obtained 1.228 hundred million ton, as well as the marine import covered 90% of the total import quantum. However, what is embarrassing is that 90% of the marine import quantum is transported by the foreign oil tanker companies or chartered the foreign oil tanks or vessels. Most of vessels of oil tanker companies in China have the features of old; single hulled, small tonnage, poor performance, and low efficiency, which limit the business operation scope in some respects. As is known to all, oil is regarded as the “lifeline” of the economic increase; in other words, it plays a vital role in economy. However, the oil shipping has become the bottleneck of the crude oil import chain, which should encourage the Chinese tanker companies to develop themselves at top speed.

After China joining WTO, with the increasing concern of adopting market principles, the reinforcement of market adjusting function, and the less control from the China central government have significantly encouraged the entry of foreign investment into the market of China. Due to the strong power of economy and advanced management experience, foreign oil shipping enterprises have been penetrating the oil market of China, which formed a great impact to those Chinese companies. In November 2002,

the State Department brought up the national crude oil strategic reserves system, which gave Chinese oil shipping industry a new development challenge. However, our entrepreneurs should take into consideration these important problems, including whether the Chinese oil shipping companies could find a standpoint in the fierce market competition, how to get development in the disadvantageous situation and how to find the solution to conquer those foreign competitors.

Actually, the above questions are about improving the core competence, in other words, how to become small but better, big but powerful. Since the oil shipping industry of China is at the beginning period of the reform and development, it cannot be mentioned in the same breath with those foreign great oil transportation corporations in many aspects. However, we should find out our advantages, actual differences with the foreign companies, as well as the key points for our development; besides we should improve and promote our core competence to fulfill the effective conformity between the systems of industries and take advantage of the overall performance.

1.2. Research Approach & Purpose

Though many Chinese scholars have done a lot of profound and significant researches in marine technology, financial investment, distribution of ships and other related fields, the studies of the whole competence of China oil shipping industries are seldom referred. Even there were some studies in the operation of some tanker companies, they still stranded at a superficial level. Therefore, the research in the core competence of oil shipping industry in China is still the virgin land, with the significance of theory and practice. The purposes of the thesis is try to evaluate the core competence from a brand new view and offer some suggestions to improve the core competence of Chinese tanker corporations on the base of case studies with the hope of helping the development of oil transportation industries of China.

The study in the core competence of Chinese oil shipping enterprises is a new and complicated topic, for the research in oil shipping corporations is rare and the related information is difficult to find. The author brought up the concept of core competence of oil shipping companies on the base of reading lots of literature in accordance with the shipping management theory and core competence theory. After analyzing the characteristics of oil shipping industry, the author constructed the integrated index system for core competence and quantified the importance of each factor (index) to the competence of oil transportation companies by the way of AHP. And then, the author established the model for SWOT analysis with IFE and EFE matrix. At last, on basis of the index evaluation questionnaires given by oil shipping experts, the author tried to explore the strengths, weakness, opportunities and threats of China Shipping Tanker Company and offer the effective suggestion for promoting the core competence of this company.

The purpose of this research is not only to provide an innovative approach to evaluate the core competence of oil shipping Industry, but also and more importantly, by what the author had learned in his gradate study period, to give some suggestion into Chinese oil shipping companies.

1.3. The Characteristics and Skeleton of Thesis

There are three characteristics of the thesis: 1. It is on the ground of theory and large quantity of data; 2. The author established a set of overall index system for the evaluation of core competence of Chinese oil shipping industry; 3. It conducted the evaluation of core competence by the methods of analytic hierarchy process and SWOT analysis method, especially the innovative combination of IFE and EFE matrix usage to determine the priorities.

Next is the concrete plan for contents of the thesis:

Chapter 1 The Introduction of Thesis: The author introduces the background of research, the characteristics of the thesis, and the approach and purpose of this research paper.

Chapter 2 The Competitive Environment Facing Up Oil Shipping Industry: As one of the most essential modes for marine transportation, oil shipping industry has its own specialties. This chapter focused on the supply and demand of current oil market and characteristics of this industry, which offered the theory base for realistically decomposing the factors constituting the core competence.

Chapter 3 The Evaluation of Core Competence in Oil Shipping Enterprises: On the ground of chapter 2, and after the author briefly introduced the concept, characteristics of core competence, he established the establishment of index system for evaluation of core competence of oil shipping companies and made clear explanations for each item.

Chapter 4 Strategy to Improve Chinese Oil Shipping Companies' core competence: Taking the example of China Shipping Tanker Company, the author gave the detailed SWOT analysis by using of the index offered in chapter 4 and concluded the final strategy to improve the core competence of China Shipping Tanker Company.

Chapter 5 Conclusion: On the ground of the above demonstration, the author not only made a summary for the contents and results of the research, but also gave the advice for the development of Chinese oil shipping enterprises and pointed out the aspects for improvement of the paper.

CHAPTER 2

The Competitive Environment Facing Up Chinese Oil Shipping Industry

2.1. Status Quo for International Oil Shipping Market

2.1.1 The Demand of International Oil Shipping Market

1) General Quantity of International Oil Trade

As the activator of the growth of global economy, crude oil can be regarded as the weatherglass of international economy situation. From the table 2-1, the change of crude oil shipping quantity is nearly the same as the growth trend of economy. Moreover, as the trend of economy these years, the international oil shipping trade has the trend to increase with years as shown in the Chart 2-1 below

Table 2-1 Global oil shipping trade quantity and international economy growth rate
(unit: million ton)

Year	Crude oil	Product oil	Total	International economy growth rate%
1999	1,571	502	2,048	3.6
2000	1,648	497	2,068	4.7
2001	1,646	524	2,172	2.3
2002	1,589	530	2,176	3
2003	1,670	573	2,162	3.2
2004*	1,742	633	2,303	4.1

Source: Clarkson autumn 2004, * is the forecast shipping quantity in 2004

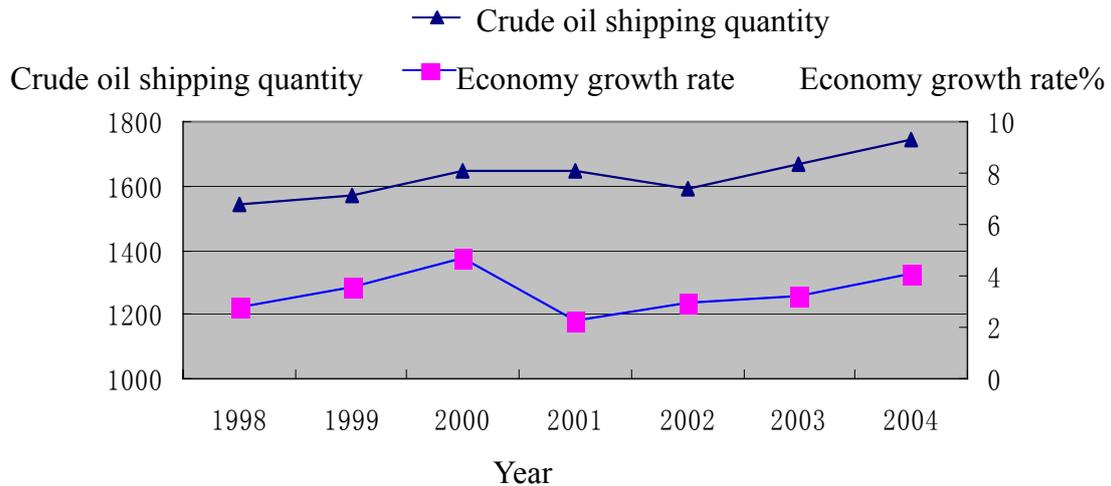


Chart 2-1 Global economy and crude oil shipping quantity trend

Source: Clarkson autumn 2004

2) The Main Oil Export Region of the World

According to the data published in 2004 from Resource Intelligence Office of The Department of Energy, the top five oil reserves countries are Saudi Arabia, Iraq, Kuwait, the United Arab Emirates and Iran, which are all located in the East Asia. The respective quantity percentage is 25%, 10.9%, 9.48%, 9.35% and 8.69%. The biggest export regions are East Asia, North America, The former Soviet Union, West Africa and middle South America. Besides, East Asia covers half; and North America, The former Soviet Union, West Africa respective covers about 1/10; middle South America is about 6% as well. The export quantity of each region is above 100 million ton.

Due to the decrease tendency of oil quantity in North Sea region and sharply increase of that in Russia, it will take the place of North Sea in the supply of oil. At the same time, Russia expands its export areas to North America and Far East to help developing those economies. In 2004, the benefits of this part covers 28% of GDP in Russia, which is more depend on the export of oil and oil gas.

3) The Main Oil Consumption Countries of the World

Recently, the total oil consumption is about 4 billion ton, which is mainly located in North America, the Asia-Pacific region and Europe. From table 2-2, we can conclude that America, European Union and Japan cover 63.3% of world oil consumption. The most consumption countries are America, China, Japan, Germany, Russia, and Korea, which cover half of the total quantity and the consumption of each one is above 100 million ton (above 4%)

Table 2-2 Crude oil import shipping quantity of main countries and regions
(Thousand bucket/day)

Country or region	America	EU	Japan	Total
Oil import quantity	8092	9053	4990	34957

Source: Clarkson autumn 2004

The oil consumption was 245.7 million ton of China in 2002, which became the second biggest oil consumption country following America. Moreover, in 2003, the crude oil import quantity was 91.12 million ton and the consumption 250 million ton, which was the second biggest crude oil import nation. In 2004, the import quantity continuously raised to 122.83 million ton. From the above data, we can safely conclude that the oil import quantity will get more increase with the development of Chinese economy and the establishment of Resource Strategy Reserves System.

2.1.2 Analysis on International Oil Shipping Market Situation

1) Tanker Supply and Demand Situation

The quantity of oil tanker is wholly decided by the requirement of oil shipping. However, as this industry is capital-intensive one with small flexibility of supply and demand, oil-shipping companies cannot reject tankers because of decrease in requirement, or gain the increase of tonnage in a short time for the sharply increase of

market demand.

Table 2-3 The tanker fleet construction situation (Million ton, time limit: 1/1/2005)

Tanker Type	20+	12 ~ 20	7.5 ~ 12	5 ~ 7.5	1~5	Crude oil tanker	Product oil tanker	Chemicals/oil tanker	Pure chemicals vessel
Tonnage	136.98	47.52	55.51	8.51	1.75	250.28	48.02	22.63	9.93

Source: L.S.E February 2005

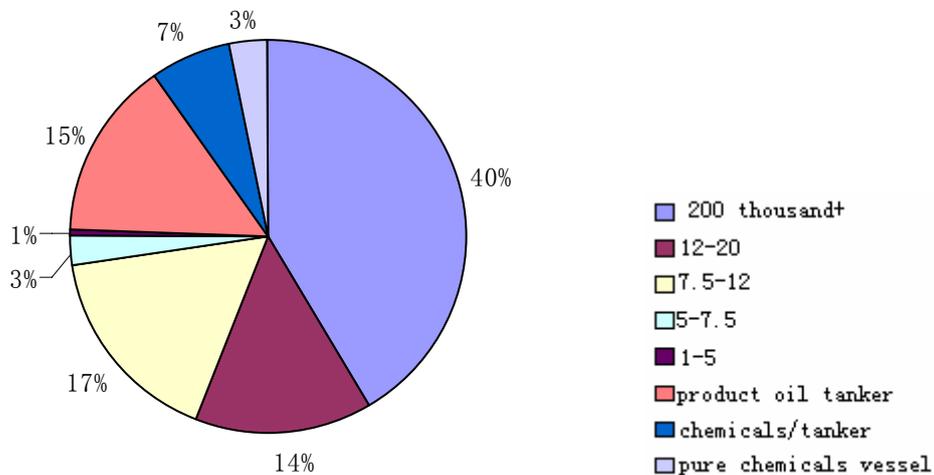


Chart 2-2 International oil tanker tonnage construction

Chart2-2 reflects the actual requirement of oil shipping. Since the crude oil trade is mainly ocean shipping of long distance, large fleet tonnage covers most of it. VLCC takes up 40% of oil tanker tonnage, 17%Aframax, 14% Suezmax. Panamax and convenient vessels, which are usually in charge of short distance transportation, cover less than5%.

2) Tanker building ordered situation

Table 2-4 international oil tanker order forms situation (million deadweight ton)

End of year	200 thousand +	12 ~ 20	8~12	6~ 8	1~ 6	Total	Specified vessel	Covers current fleet%
1998	24.5	7.3	8	2.1	6.4	48.3	3.8	17
1999	24.1	6.7	3.8	1.4	4.9	40.9	2.8	14.2
2000	27.2	10.1	7.2	0.9	6.8	52.2	5	17.7
2001	26.9	10.6	12.8	2.8	7.1	60.2	6.5	20.8
2002	18.4	8.2	13.9	4.5	8.7	53.7	6.2	18.2
2003	22.5	12.5	16.5	8.4	13	72.9	2.6	23.9
2004 *	24.36	11.39	14.66	2.28	0.0	52.69		21.3

Source: Clarkson autumn 2004, *fromL.S.E, February 2005

The table 2-4 indicates that tanker owners accelerated the step to order new tanker building, mainly VLCC, Suezmax ship and Aframax. Because since “Prestige” tanker sank in November 2002, on behalf of international organizations and countries, EU constituted more strict policy, which got more rigorous requirement to protect ocean environment. In order to protect the original market share, many tanker owners took measures to build new vessels.

3) Oil tanker dismantling situation of the world

Table2-5 Oil tanker dismantling situation of the world recently (Million deadweight ton)

Year	20+	12~20	8~12	6~8	1~6	Total vessel fleet	Specified vessel	Dismantling percentage%
2000	7.1	2.5	1.6	0.3	2.4	13.9	0.1	4.7
2001	8.6	3.8	1.4	0.4	1.1	15.3		5.3
2002	10.9	1.6	1.5	0.4	2.6	17.0	0.2	5.8
2003	10.0	2.2	3.3	1.1	2.7	19.3	0.2	6.3
2004	4.0	2.9	3.6	1.3	2.6	14.4	0.3	4.5
2005	3.6	1.5	3.6	2.1	4.3	15.1	0.2	4.5

Source: Clarkson autumn 2004

From table 2-5, the speed to dismantle oil tanker fleet kept stable. Though the rejection plan of the single-hull vessel had already become effective, there was no phenomenon of quick rejection. Since 2002, the oil shipping market was prosperous and owners tried their best to prolong the life of vessels. Compared with table 2-4, the order quantity is much more than that of dismantling, which indicates that the gross tonnage showed the tendency of increase.

4) Age of vessel distribution of oil tanker fleet

Table 2-6 Average age distribution above 10 thousand ton (up to 9/2004)

Type	1~6	6~8	8~12	12~20	20+	Total average
tanker	13.9	12.4	10.2	9.3	8.6	12.2
Double-hull	6.4	5.72	5.72	5.08	4.13	5.04
Doped tanker	11.8	9.9	10.1	4.1		11.6

Source: Clarkson autumn 2004

From the above table, we could safely conclude that the average age of vessels gradually decrease with the increase of tonnage. It is because large sized tankers

engaging in long lines are strictly restricted by the international regulations and laws. However, small ones dealing with coastwise transportation (regional or national shipping) are only required by the local regulations, therefore ship owners generally take advantage of the life span of tankers. Besides, in order to compete with other enterprises, ship owners of large tankers have to guarantee the quality and capability of vessels, which need renew in a probable time.

5) The change of rate in oil shipping market

Oil shipping rate is an important index of indicating the situation of supply and demand in oil shipping market, which could reflect the overall state of international economy development. Both chart 2-1 and table 2-7 indicate that global oil shipping market was seriously stricken in 2001 by 9.11. From 1988, no matter in time-charter market or spot market, the rate got pinnacle in 2000-2001, but dropped to the valley in 2001. With the recovering of global economy in 2002, the oil-shipping rate increased to a new height in 2004.

Table 2-7 the changing tendency of oil shipping rate in recent years

Year	Time charter rate (Us dollar/day)				Voyage charter index WS			
	Product oil tanker1	Aframax	Suezmax	VLCC 2	White oil 3	Aframax 4	Suezmax 5	VLCC 6
1998	11,205	15,971	23,346	34,555	185	96	85	59
1999	9,933	13,148	18,174	26,586	194	95	75	47
2000	12,719	20,163	28,614	37,940	280	188	160	93
2001	15,777	23,381	31,370	38,792	274	153	111	62
2002	11,418	15,900	17,826	24,441	180	119	81	45
2003	13,364	19,106	24,815	31,685	270	184	136	84
2004*	14,714	21,953	29,628	42,384	322	194	165	101

Source: Clarkson autumn 2004

Instruction: 1——30,000ton product oil tanker

2——280,000ton VLCC

- 3——30,000ton white oil, Caribbean to American-bay line
- 4——Med to American-bay line
- 5——West Africa to America
- 6——Middle east to America
- *——data in 9/2004

2.2 The Analysis in Characteristics of Oil Shipping Industry

As the main transportation mode in international transaction, shipping industry shoulders the responsibility of more than 90% transportation, which has the incomparable advantages: low cost, large quantity, long distance, low dissipation of energy and relatively little pollution. As the biggest share of goods in shipping trade, oil is unbalanced in its reserves, thus a lot of countries have to import oil from oil production nations. In 2004, China's oil import got to 100million ton, following America and Japan. Oil shipping has other characteristics together with its specialties. Next is the conclusion of ten main characteristics of international oil shipping basing on the a great deal literatures.

1) Oil shipping industry is capital-intensive

Shipping industry is a kind of high one-time investment, long return period, and high operation cost one. Oil tanker is much more costly than general cargo or bulk carriers. In 2004, the price of 300,000ton VLCC got to 115 million dollars, 160,000ton Suezmax 72million, and 170,000ton bulk 65 million. Since the return period is usually 10 or 20 years, the operation risk is relatively high.

2) Due to the one-way transportation, unbalanced direction is obvious

Oil shipping generally is impossible to have return shipping. From export nation to import one, no matter crude oil or product oil, it is mostly directly used to fulfill the national requirement of import nation. After discharging, the empty tanker has to return to the export port. Therefore, the unbalanced direction of oil shipping is obvious. Because of one-way transportation, the load capability utilization ratio is quite low, and operation capability of enterprise is decreased consequently. In recent years, some shipping companies built several multi-use vessels like OBO, chemical/oil and cargo double use vessel, black/white oil carriers so as to increase load capability utilization ratio.

3) Oil shipping lines are few and centralized

Compared with other marine cargoes, oil is mostly transported directly from export nation to import country or trans-shipped. Since the main oil export countries are in Middle East, North Africa, Russia, Baltic Sea, Black Sea and Middle America while the import countries are located in west Europe, America and Far East. Consequently, the main lines are from some few export areas to a relatively specific region, like Middle East—Far East, Europe, America, Med—West Europe, Middle America—North America and West Africa—America, Europe.

4) Big risk to Environment and is strictly restricted by international regulations

After World War two, global economy gained rapidly development by the motivation of industrialization. However, the living environment of human was deteriorated by such promotion. After gaining big historic lost, people become to realize the importance of environment protection and establish some international regulations and laws to restrict human beings.

Oil shipping is one of transport mode that can cause marine environment pollution. According to the kurtosis, there are 55 oil pollution affairs caused by vessels above

10,000ton since 1960s. The most serious one is “Torrey canyons”. On18th, March, 1967, Libya oil tanker “Torrey canyons”, which had 120,000ton crude oil run on the rocks in English Channel and its hull broke, moreover, nearly 60,000ton leak into the sea. Therefore, there were nearly 300 kilometers shores, including England South Coast, France north seaboard and Holland West seashore seriously polluted.

In order to decrease such accidents, IMO and UN tried their best to set up several conventions or agreements in the standardization of shipping vessels, which included some imperative regulations. Following are some significant ones:

- International Convention for the safety of life at sea, 1960 and 1974
- Convention on the international regulations for preventing collisions at sea
- International convention for safety containers.
- International convention for the prevention of pollution from ships, 1973, as modified by the protocol of 1978 relating thereto
- International convention relating to intervention on the high seas in cases of oil pollution casualties.
- Convention on the prevention of marine pollution by dumping of wasters and other matter,1972
- International convention on oil pollution preparedness, response and Co-operation
- Protocol on preparedness, response and Co-operation to pollution incidents by Hazardous and Noxious substances,2000
- International convention on civil liability for oil pollution damage, 1969
- International convention on the establishment of an international fund for compensation for oil pollution damage
- International convention on civil liability for bunker oil pollution damage

Many countries also established some laws to prevent pollution in accordance with each situation. Besides, the world-shipping field will have more restriction to the requirement of vessels because of the development of shipping industry. After

“Prestige” affair happened, EU took the lead of other international organizations brought up more severe stipulation about new rejection plan of single hull oil tanker, which put forward new challenge for the oil shipping companies.

5) National key protection industry

As the essential strategic resource all over the world, oil is the “Life line” of national economic increase. Due to the unbalance of oil reserves and economy development of the world, the consumption of economic giants is much more than the national oil production. The competitions between countries are not only the contest of oil supply markets, but also the smoothness of oil transportation chain. According to the experience of Japan, oil-shipping industry will not be manipulated by other countries provided that the national shipping capability could maintain 50% of import requirement. Therefore, all the countries make effort to take some protective measures to support national enterprises development and hold some quota of oil shipping, such as transportation quota, low-interest loan, big battalions’ investment and law.

In accordance with America Jones Act, only the vessels with American sailors and American flag have the ability of running inland water transportation lines. As a result, the native vessels are in charge of oil shipping from Alaska to other places of America to protect national trade transportation. In Japan, the annual crude oil import quantity is above 250 million ton and native owners can carry 200 million ton of the whole shipping capability, which is 80% of import shipping requirement.

Another situation is that national oil companies invest the shipping fleets. For example, Iran National Tanker Company (INTC), ranking NO.9 in tonnage of the world is the subsidiary company of Iran National Oil Company, which in charge of exports shipping and transportation in Middle East.

BP Group in Britain is busy with studying with building a large tanker fleet, which

could help it becoming the biggest tanker owner in world oil companies. In June 2004, ranking No.20 of the world, BP dominated 43 fleets (including owner or bare charter) and the gross tonnage is 3.55 million deadweight ton. After the ordered vessels entering the market, it can get into top 10 in the world.

6) The spot market of oil shipping is fluctuating

Similar with other kind shipping markets, oil shipping market is also divided into time charter (spot market), time-charter and bare charter. The overall development tendency of oil shipping market reflects the situation of international economy situation. In prosperous periods, the political situation is stable and oil demand increases, thus the market becomes prosperous. On the other hand, economic stagnancy will result the supply exceeds demand and the price index decreases.

However, in the same voyage but different time or visa versa, oil-shipping market has big fluctuation. Chart 2-3 indicates the price-changing trend of a classic world oil shipping line and the fluctuation is obvious.

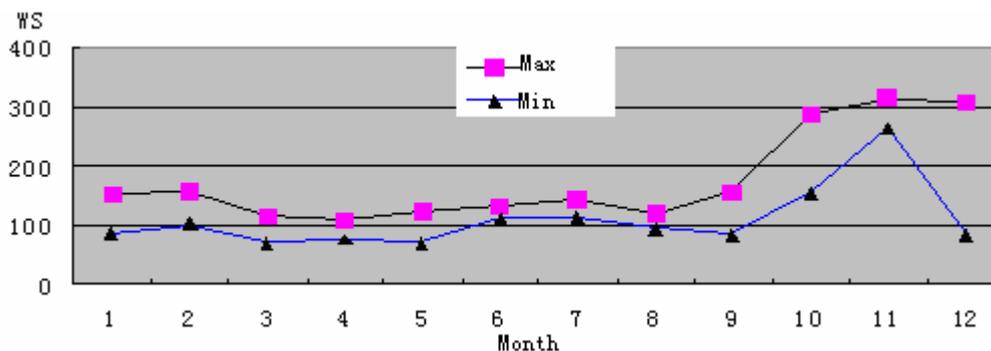


Chart2-3 Middle East –Japan price index changing tendency (2004)

Source: China Shipping Trade Net

7) The type of tanker is closely with scope of operation

There are six types of oil tankers: handy-size carrier, Panamax carrier, Aframax carrier, Suezmax carrier, VLCC and ULCC. Their respective trade regions are illustrated in

table 2-8.

Table 2-8 Comparison of some kinds of tankers

Type	Tonnage	Main trade regions	Biggest owner	Main union
Handy	Below 55,000 ton	Local internal/coastwise shipping		LR1,LR2,MR
Panamax	50,000-80,000 ton	Black oil shipping in Latin America、Caribbean /America; White oil shipping in Persian/Asia	Stelmar	Star Pool,Torm Pool
Aframax	80,000-120,000 Ton	Caribbean, South America/North America;Black Sea, Mediterranean areas	Teekay	AIP
Suezmax	120,000-200,000 Ton	Mediterranean areas, black sea, west Africa, Middle East, North Sea, Russia/Europe, American Bay	Frontline	Frontline and OMI
VLCC	200,000-320,000 Ton	Middle East, West Africa/Far East, Europe, America	O.S.G	TI
ULCC	Above 320,000 Ton	Middle East/ America	Hellespont	TI

With a view to decrease the transportation cost and improve the business benefits of vessels, tankers with large tonnage are in charge of long distance shipping while those of small tonnage could deal with short distance. Though the tonnage of vessel is not the absolute standard in deciding the trade areas, it also plays an important role. Take the data of L.S.E in Feb 2005 for example, the export areas of oil carrying by Panamax tankers are located in Caribbean (24%), North Africa (22%) and other areas all below 15%. Aframax size carriers: 41% from Caribbean, 14% from North Sea and other areas all below 10%; Suezmax vessels: 20% from Middle East, 19% from West Africa, 17% from North Africa and other areas all below 15%; VLCC: 83% from Middle East, 14% from west Africa and other areas are below 1%.

8) The owners of oil tankers are spread

Since oil industry gained rapid development in 20th century, oil companies had been investing to build large tankers to fulfill their oil shipping demand. In 1980s to 1990s, private owners got great improvement and controlled 80% quota of international oil tanker market while the rest 20% are dominated by national oil companies or national tanker owners:

In May 2005, the international oil tanker owners union included almost 245 tanker owner members (total 155 million ton). In these members, the number of tankers owned by nearly half of them is below 5 and only 55 companies have more than 10, which indicated that the owners have the characteristic of diversification, so the annex rush will not have devastating influence to the market structure.

According to the Statistics of L.S.E, there were 3 companies above 10 million ton, 8 enterprises exceeding 5 million ton and 17 between 2 million to 5 million ton in top 25 tanker owners by Aug 2003. Besides, there were only 11 corporations owning 10 carriers, 15 having 5 to 9 carriers, and 54 owners having not more than 5 vessels (31 of them only have 1 or 2 VLCC) in 80 VLCC owners.

9) The annex of tanker owners promote the development of oil shipping companies

In accordance with the data published by L.S.E, comparing with 2002, the top 5 tanker owners covered 18% of the market in 2003 from 14% last year and the top 10 companies covered 27% from 25%; however, the top 20 and 25 corporations did not have any change. In 1999, the top 10 companies just had 19%, which indicated that merger had become the trend recently. Following is the merger situation of main owners these years:

Frontline developed rapidly and became the biggest tanker owner in the world by the way of merger. It purchased London overseas vessel company in 1997 and ICB shipping company in 1998; moreover, Gold coast, Mosvold and Osprey were be also

purchased in 2000 and 2001. Now the fleets got to above 17 million tonnages.

Malaysia International Shipping Company (MISC) purchased America Eagle Ltd. (AEL) from Neptune Orient Line (NOL) with 520 million USD credit certificate and cash.

World-Wide Shipping Company cost 1.4 billion USD to purchase Bergesen, the owner Norway oil tankers and liquid gas vessels and became the biggest ship owner of the world.

It cost General Shipping Company 5250 million USD to incorporate Greek company Metrostar, which made this company's rank of tanker, especially Aframax increase.

Teekay spent 8000 million USD in buying shuttle tanker owner Navion from Norway national oil company Statoil, which could help to compete with the biggest competitor Frontline.

10) Oil shipping is the consignor-dominating industry

Though some large oil shipping company got great promotion in the market by merger, the power of them is pale by comparison with that of oil companies.

Make comparison between table 2-9 and 2-10, we could safely conclude that though Teekay is the company with the highest market value, its funds are less than 1.7 billion USD, which is less than 1% of biggest oil company. The funds of a medium-sized national charter company like Canada Petroleum are more than the total of all the oil tanker owners, excluding the large bulk group AP Moller.

Table2-9 the market funds of oil shipping magnates on 10/7/2004(million USD)

Company	List place	Fund	Other company*	List place	Fund
Teekay	America	1,675	AP Moller	Denmark	22,488
Bergesen	Norway	1,389	NYK	Japan	4,232
Frontline	America	1,035	MISC	Malaysia	3,818
OSG	America	769	MOL	Japan	3,160
OMI	America	480	K Line	Japan	1,297
Genmar	America	360	SCI	India	387
Stelmar	America	287	TEN	America	250

Source:L.S.E August 2004, * listed shipping company owning large quantity of tankers

Table 2-10 the market funds of listed oil company (million USD)

Name	List place	Fund
ExxonMobil	America	244,900
Shell	Holland	158,500
BP	Britain	153,200
TotalFinaElf	France	103,800
ChevTex	America	75,800
Repsol	Spain	19,300
Petrocanada	Canada	10,000

Source:L.S.E August 2004

2.3 Conclusions of the Analysis

1) Firstly, oil shipping industry and oil production are in great unbalance in some

degree. No matter how oil tanker owners develop the size and market power will not have big change unless establishing a large oil tanker owner group having big enough market quota. However, it is not realistic in a short time.

2) Additionally, oil shipping Industry is playing a vital role in the national security, economic development, social stability, etc, therefore, how to improvement the capability of oil shipping Industry is a ever-pursuing question for many countries.

3) Last and most importantly, compared with the foreign competitors, although bearing some advantages, the Chinese domestic oil Shipping companies are falling behind significantly in most aspects, hence, how to enhance the domestic oil shipping companies' core competence is a crucial question lying ahead.

CHAPTER 3
The Evaluation of Core Competence in Oil Shipping Enterprises

3.1. The Introduction of Core Competence in Oil Shipping Industry

3.1.1 The Concept and Characteristics of Core Competence

As regards to the different expressions of core competence, it generally means the capability of adjusting to the changeable market environment, applying the creative ideas, developing core produce or operation methods adapting the requirement of market, integrating the resource and technology to provide customers with advantageous product or service and gaining more business returns. The core competence is dynamic, which needs to keep creation and development. The construction chart is:

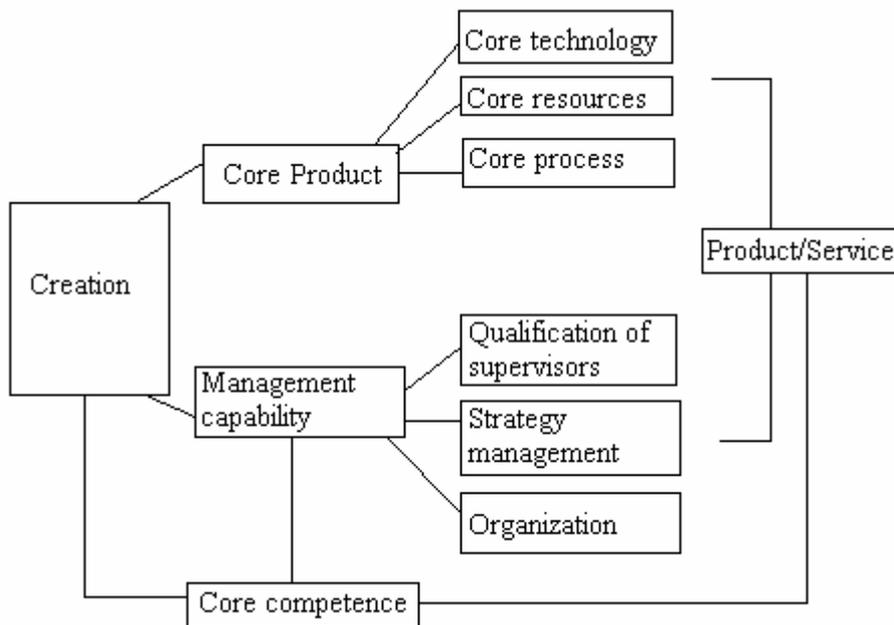


Chart3-1 construction of core competence

There are some instructions of the concept of core competence which need to be paid attention:

- 1) Core Competence is constructed with core capability and support capability. The core capability plays the central part of core competence while the support capability has the function of help and support.
- 2) The combination of core capability and support capability depends on many kinds of factors of the industry and competitive environment. For example, the core capability of trade is generally logistics service quality, finance management capability and marketing capability while its support capability includes image planning, corporation culture etc. besides, the core capability of industry involves the product research and development capability, marketing capability, after service quality and brand management while its support capability includes production management, corporation culture and human resource management.
- 3) The core capability and support capability will change; even get reciprocal transformation with the movement of the internal and external environment of enterprise. For instance, the capability of human resource development and management, as basic capability formally, will become the core capability.
- 4) The core capability and support capability supplement each other.

Besides, there are eight characteristics of core competence:

- 1) Individuality

The Individuality of core competence, which is the most essential characteristics, is difficulty to possess, displace or imitate. Any of enterprises can establish their core competence by simple imitation, but should depend on the continuously studies, cultivation in the market competition.

- 2) Value

Obviously, the core competence is helpful for increasing the efficiency of companies,

which can aid the corporation to do better than his competitors in the aspect of creating value and decreasing the cost. For example, the core competence of McDonald's, including segregation and family harmony, is bigger than his competitors like Hamburger King.

3) Disability of imitation or substitution

Through the continuously studies by each department of company, such integrated knowledge and technology is formed in long-term operation activities, which has the special characteristics. Though single capability is easy to copy or imitate, the core competence is much more difficult to copy or imitate, for the integration mechanism and related conditions are hard to simulate.

4) Expandability

Core competence plays a significant role in offering the enterprise potential access to different markets for customers' benefits realized by the final product, which is like a kind of "Technologic Source" to expand to the final product and meet the customers' requirement. Canon successfully got into more than 20 fields like copycat, laser printer, camera, scanner and electrograph by the advantage of the core capability of optical glass, imaging technology and microprocessor control. Therefore, as the development and integration of industry technology, the core competence can create many magic products to make a lot of new markets.

5) Endurance

From the macroscopically aspect, the core competence has the specialty of endurance, which mainly means the persistence degree offering profits as the strategic resource, not means the physical endurance. Compared with 10 years ago, the endurance of most of funds decreased a lot because of the constant decrease of lifecycle of product

and technology. Such decrease mainly influenced the material assets, however, the intangible assets of enterprise, including core competence, brand, teamwork are not affected by such decrease.

6) Innovation

From the microscopically aspect, the core competence should have innovation. What was the content of core competence 10 years ago is just normal capability nowadays. For instance, the high quality was absolutely the core competence of Japanese automobile companies, which cost the enterprises in the western world tens of years to catch up. However, in 1990s, good quality of automobiles is the precondition of all the companies, not core competence any more. Such fact is also adapted in other fields. In a long time, the high qualities, efficiently coming into the market of product and satisfaction from the customers were core capability of companies, but they are becoming the normal and daily capability. Thus, each corporation should keep pace with market and consumption tendency, make development and innovation and avoid “core competence rigidity” to keep the advantageous competition.

7) Accumulation

The core competence is not based on one or two significant inventions or purchasing in the related production elements market, but the result of constant accumulation of enterprise. For example, a new name formed in the accumulation does not need any specific studying process and its creativity and deploitation could be used directly.

8) Dependence of history

The core competence is the interaction of different departments and individuals, which is usually unique in the development history of enterprise and closely related with the psychology and mood of different individuals. It named as “management

heritage”, which has strong historical dependence.

3.1.2 The Concept and Characteristics of Core Competence in Oil Shipping Industry

Nowadays, the basic requirement of service industry is offering satisfied service for customers. The popular saying “The customer is the god” is identified by all the society. Not only the production industry, but also the service industry pursues the satisfaction of customers to realize the value.

On the other hand, there are a lot of differences between service industry and production companies. Due to the core technology or the related market occupied, one enterprise may have more advantageous competition than others. However, service is not the same. There are nearly no obvious technological differences of service. The success of this industry is laid on the acknowledgement of the requirement of customers and digging their potential requirements. Therefore, the competitive advantage is easy to imitate or copy.

There are some similarities between oil shipping industry and service industry. The goal of oil shipping companies is to fulfill the requirement of charterer (Crude Oil Company or tanker Management Company, etc) and to offer the satisfied crude oil transportation service for the benefits of the company. The cost of vessels, operation fee and vehicle management technology are nearly the same between oil shipping companies, however, the operation decision, market localization and strategy management are different from each other. For the same type vessel, the building fee is various in different periods and accordingly the cost is various, which influences the payoff situation. Even in the same time, the payoff level changes with the different operation environment and location. Therefore, the management capability is more important than technology level of vessels for oil shipping industry.

For the capital-intensive oil shipping industry, the reason why one company is

powerful or rapidly developing than the other is the combined action of many aspects, like national demand of oil transportation, the support from the government and the operators' forecast for the oil shipping market. Thus, the author pointed out the definition of core competence of oil shipping industry: in current and future market competition, the capability of effectively taking advantage of internal and external resources, catching favorable market opportunity, fulfilling the integration of corporation function, offering the customers satisfied service and realizing the company's self-value, which reflects in four aspects including vessel fleet strength, operation performance, management capability and adaptation of society and environment.

3.2 The Measuring Methods of Core Competence and Index System Building Principles

3.2.1 The Measuring Methods of Core Competence

There are four measuring methods of core competence and the differences are in table 3-1. Each method has its own advantages and weak points. For example, qualitative analysis can systemically evaluate things, but it lacks of necessary limit; while quantitative analysis is able to measure the target accurately, however, it is short of all-sidedness and systematicness. It is significant to choose the suitable measuring method for the correctness and objectivity of result. The thesis takes the combination of half-qualitative and quantitative methods to evaluate.

Table 3-1 the comparison of four measuring methods in core competence

	Qualitative description	Half-quantitative description	Quantitative method	Combination of half quantitative and qualitative
Graduation& Systematicness	Relatively weak	Increase with the complication of index	Relatively weak	Increase with the complication of index system, better than quantitative and qualitative
All-sidedness	Relatively weak	Exclude quantitative index	Relatively weak	Lying on the index system, better than other 3 methods
Subdivision	Relatively weak	Relatively good	Relatively weak	Relatively good
Data accession	Relatively good	Index system is the key point, but generally not as good as quantitative method	Relatively good	Index system is the key point, but generally not as good as quantitative method
Effective	Effective in some range and degree	Index system is the key point with strong subjectivity	One-sidedness	Index system is the key point, and better than quantitative and qualitative methods
Referenceness	Clear for communication	Index system plan can be simple or complicated for indicating details of core competence	Clear and better quantitative	Combination the advantages of half quantitative and qualitative methods

3.2.2 The Principle of Index System of Core Competence

As the basic reference of target evaluation, index system could have correct measurement of core competence of different enterprises by using uniform standard and method. Besides, only the results with comparability can effectively support wise decision. Therefore, one should stand on the following principles in planning index system:

1) Systematicness

The evaluation of core competence cannot just be based on one factor influencing; However, it should lie on overall analysis with systematic plan and measurement.

2) Feasibility principle

For the sake of increasing the feasibility, the definition of index and the reliability of data should be taken into account for avoiding misunderstanding and different meanings; moreover, it is necessary to consider the suitable index numbers to escape overlap index.

3) Comparability principle

The core competence index should apply in most corporations. The economy contents, special scale, time limit, calculation caliber and calculation methods shall have comparability for both the horizontal and vertical comparison.

4) Graduation principle

Before planning index system, it is crucial to summarize every important factor influencing core competence and conduct profound analysis to set up the measuring system with some graduation for scientific judgment.

3.3 Index System of Core Competence in Oil Shipping Companies

3.3.1 The Building of Index System

There are many kinds of measuring index system. *Wealth* made evaluation to the most popular companies in 8 aspects: innovation capability, service quality of product,

management quality, long-term investment evaluation, sense of responsibility of community and environment, capability of attracting and withholding talents, capital integration capability and international operation capability. Besides there are 7 elements from China Enterprise union: economy profits, finance situation, management capability, scientific innovation, human resource, international operation, social responsibility and achievement.

According to the concept of core competence in oil shipping company and the basic features of oil shipping industry analyzed, the author brought up the construction as below in Chart 3-2:

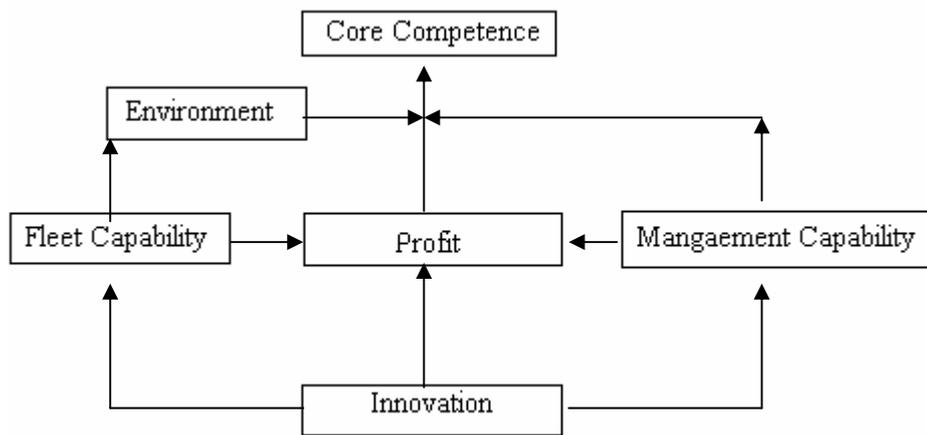


Chart 3-2 the construction of core competence in oil shipping company

Based on the above clew of building core competence, the author conducts evaluation of competence of oil shipping company in four aspects, including fleet capability, management capability, operation performance and society and environment adaptation capability.

3.3.2 Analysis of the Index

3.3.2.1 Capacity of Fleet

1) Fleet scale

- a) Overall tonnage is an index indicating the total shipping capacity of a fleet under the administration of a shipping company; it can be subdivided into stationary and dynamic ones. It can be symbolized as below:

D_{quota} means quoted deadweight of a vessel, and $\sum_{i=1}^n D_{i_{\text{quota}}}$ means total deadweight of a fleet with n =number of vessels

Vessel tonnage day means the quoted deadweight multiply the operation hours of this vessel. It has three forms as below:

Vessel register tonnage day: $D_{\text{quota}} \times T_{\text{registered}}$

Vessel operation tonnage day: $D_{\text{quota}} \times T_{\text{operation}}$

Vessel sailing tonnage day: $D_{\text{quota}} \times T_{\text{sailing}}$

- b) Self-owned fleet percentage: it is an index used to indicate the percentage of self-owned tankers in its total tonnage. Nowadays, a great amount of companies not only manage their self-owned tankers, but also run chartering business by bareboat chartering or time chartering. It can be formulized by

$$\text{Self-owned fleet percentage} = \frac{\sum D_{\text{self-owned}}}{\sum D_{\text{overall}}} \times 100\%$$

- c) Average tonnage: is used to indicate the average tonnage of a fleet. It can be formulized by

$$\text{Average tonnage} = \frac{\sum_{i=1}^n D_i}{n}$$

- d) Average fleet age is an index used to indicate the modernization situation of a fleet. Generally speaking, the smaller the average fleet age, the higher the

modernized to be. It can be formulized by

$$\text{Average fleet age} = \frac{\sum_{i=1}^n Y_i \times D_{i\text{quota}}}{\sum_{i=1}^n D_{i\text{quota}}}$$

Y_i = vessel age

2) Fleet structure: it is used to indicate the composing structure of the company's fleet, which is consisting three aspects:

a) Fleet structure: can be used to reflect the fleet business range and zone. The types of tankers are as follows: ULCC, VLCC, Suezmax, Aframax, handy-max.

b) Market share of chief fleet: can indicate the level of a company's chief fleet in overall market proportion. It can be formulized by

$$\text{Chief fleet market share} = \frac{\sum D_{\text{chief fleet}}}{\sum D_{\text{total market}}} \times 100\%$$

c) Chief fleet market average age: can reflect the chief fleet's technical competence in market.

3) Vessel utility efficiency:

a) Operation rate: it means the proportion of operation time of Vessels in their registered time. it can perfectly reflect the effective operation time of vessels in a given period of time.

This index can be symbolized by $\mathcal{E}_{\text{operation}}$, for a single vessel, the Operation rate is the ratio between its operation time and registration time in a given period of time, and for a fleet, it's the ratio between its total operation time and registration time in a given period of time. the formula is:

For single vessel: $\mathcal{E}_{\text{operation}} = \frac{T_{\text{operation}}}{T_{\text{registered}}}$

For multiple vessels: $\mathcal{E}_{\text{operation}} = \frac{\sum_{i=1}^m D_{\text{quota}} T_{\text{operation}}}{\sum_{i=1}^m D_{\text{quota}} T_{\text{registered}}}$

This ratio reflects the utility degree of a vessel's registration time. The better the maintenance condition is, the shorter the repair time is, then the higher the operation rate is. On the condition that all other indexes keep still, the higher the operation rate is, the great volume of transportation it can carry in a given period of time.

b) Sailing rate: It is a ratio to measure the percentage of sailing time of a vessel in the total operation time, which might include sailing time and anchoring time.

This rate is symbolized by $\mathcal{E}_{\text{sailing}}$, the ratio is

Single: $\mathcal{E}_{\text{sailing}} = \frac{T_{\text{sailing}}}{T_{\text{operation}}}$

Multiple: $\mathcal{E}_{\text{sailing}} = \frac{\sum_{i=1}^m D_{\text{quota}} T_{\text{sailing}}}{\sum_{i=1}^m D_{\text{quota}} T_{\text{operation}}}$

For the reason that fleet can only create fortune by transport cargoes, so it is vital for a fleet to improve its sailing time rate, the higher the sailing time is, the shorter time of anchoring and berthing, the greater amount of transportation volume for a fleet.

c) Deadweight utility rate:

It used to indicate the degree of deadweight utility in the overall transportation process. Generally speaking, for the reasons of cargo deficiency and cargo mislead, the vessel deadweight might not be used fully.

3.3.2.2 Operation Performance

This index indicates the outcome from the operation of Oil Company and its recognition degree by market and customers. It can be subdivided into four categories, respectively are capacity, income, profit, and market recognition.

1) Capacity index

- a) Cargo volume: It means the total volume of cargo between two geographic spots in a given period of time. The formula is

$$\text{Single: } \sum_{j=1}^n Q_j ; \text{ multiple: } \sum_{i=1}^m \sum_{j=1}^n Q_{ij}, \text{ unit: tonnage.}$$

- b) Cargo turnover volume: it means the multiply result of cargo volume and transportation distance,

$$\text{Single: } \sum_{j=1}^n Q_j l_j ; \text{ multiple: } \sum_{i=1}^m \sum_{j=1}^n Q_{ij} l_{ij}, \text{ unit: tonnage*mile.}$$

2) Revenue index

- a) Total revenue: it means the total amount of income from charter or cargo owner by providing transportation or chartering service, which is a significant index of an enterprise's performance.

- b) Average tonnage revenue: it means the profitability of every tonnage of a vessel

- c) Revenue increasing ratio it means the increasing degree of an enterprise and indicates the fluctuation of a company. The formula is

$$\text{RIR} = \frac{\text{current time unit reveune} - \text{last time unit revenue}}{\text{current time unit revenue}} \times 100\%$$

3) Financial performance ratios

a) Sales Profit

It is a main index to measure the profitability of a firm, which is the unit profit from unit revenue. The formula is

$$\text{sales - to - profit} = \frac{\text{sales profit}}{\text{sales revenue}} \times 100\%$$

b) Total capital return ratio

It indicates the comprehensive utility of capital for a firm. The higher the ratio is, the better use of total capital for a firm, thus, the higher the profitability is.

The formula is

$$\text{Total capital return ratio} = \frac{\text{net profit}}{\text{total capital}} \times 100\%$$

c) Net capital return ratio

It indicates the net earning for shareholders'. The formula is:

$$\text{Net capital return ratio} = \frac{\text{net profit}}{\text{total net capital}} \times 100\%$$

d) Debt-to-total assets ratio

It measures the relative extent to which the firm is using borrowed money. The smaller the ratio is, the stronger the capability of firm to pay debt is. The formula is:

$$\text{Debt-to-total asset ratio} = \frac{\text{total debt}}{\text{total asset}} \times 100\%$$

e) Current ratio

It measures the ability to meet current debts with most liquid current assets. Generally speaking, the higher this ratio is, the stronger ability of the firm to meet short-time debts is.

$$\text{Current ratio} = \frac{\text{current asseet}}{\text{current liabilities}} \times 100\%$$

Table 3-2 The standard index of finance ratios

Ratios	Standard
Profit-to-revenue ratio	0.20
total capital return ratio	1.00
net capital return ratio	1.10
Debt-to-total asset ratio	0.50
Current ratio	2:1

Source from: Financial management

4) Market recognition degree

It means the positive assessment from clients after being provided promised oil transportation service. This index can be subdivided into three branches:

a) Enterprise brand

The enterprise brand is crucial for customers when choosing services, which is also a reflection of recognition from customers

b) Customer satisfaction

This index means the satisfaction of clients concerning transportation quality, attitude, service forms etc.

c) Enterprise credit

The assessment from clients of whether can serve on time, with promised quality after being provided with oil transportation by oil transportation companies. It is an important factor for customers to take into consideration when choosing the service providers.

3.3.2.3 Enterprise Management Capability

1) Management ability

a) Managers' qualification

The qualities of decision-makers of enterprise are greatly influential of enterprise's developing direction, degree, efficiency, and mode.

b) Limits of authority

Generally speaking, decision limits for the state-owned company's decision maker is far less than that of those private enterprises. This index reflects decision efficiency and effect.

c) Enterprise culture adaptation

This index reflects degrees of influence of a enterprise's culture adaptability into its future strategic goal.

2) Service innovation

It means: under distinctive transportation circumstance, in order to provide better and

more suitable service for the clients as well as fulfill firm's goal and responsibility, the transportation company adopt more effective service approach

a) Firm's alliance degree

It is the ratio of tonnage participating in the alliance with total fleet tonnage. The formula is

$$\text{Alliance degree} = \frac{\sum D_{\text{allianced}}}{\sum D_{\text{total}}} \times 100\%$$

b) Long-term contract percentage

In order to ensure current market risk, the oil shipping companies would prefer to sign long-term contract with petroleum firms who also wish to obtain sustainable transportation service. The formula is:

$$\text{Long-term contract proportion ratio} = \frac{\sum Q_{\text{long-term}}}{\sum Q} \times 100\%$$

c) Personal service

Based on international or domestic market characteristics, the oil shipping companies provide service with regional and national feathers, thus can better meet clients' demands.

3) Technology innovation

a) Fleet double hull percentage

It means the proportion of double hull vessel tonnage in the total fleet tonnage. The formula is:

$$\text{Double hull ratio} = \frac{\sum D_{\text{double-hull}}}{\sum D_{\text{total}}} \times 100\%$$

b) New vessel ratio

It means the proportion of vessels under the age of 5 years in the total fleet tonnage, which reflecting the degree of a enterprise devoting into new vessel building and technology innovation. The formula is:

$$\text{New vessel ratio} = \frac{\sum D_{\text{five-year}}}{\sum D_{\text{total}}} \times 100\%$$

c) Degree of research and development

It means the comprehensive assessment of a company into research, development, innovation, creation.

4) Raised-fund management

a) Financing channel

Financing channel is a commercial conduction for a company when it's in the need of capital exceed self-owned amount by appropriate financial markets such as bond, security, stock, etc. This index reflects the company's ability to raise capital with various approaches, such as raising investment, issuing stocks and bonds, loaning from banks, etc.

b) Support from government

In order to encourage state-owned enterprises to grow in health and quickly, the central government would adopt many protective measures and policies which are

beneficial for domestic companies. Especially, it would give certain support on the channels of raising needed funds and capitals.

3.3.2.4 Society and Environment Adaptability

Adapting into society and environment is the fundamental needs for the existence and development for any commercial company. Being a branch market of petroleum market, Oil transportation market is with great responsibility to the well-being of society and environment. Once the oil-leaking happened, it would be a dramatic disaster with destructive effect. That's the reason why oil companies have to strengthen its society and environment adaptability with the purpose to improve its competence.

1) Market-oriented flexibility

It means the response of the enterprise to oil transportation market by the influence of enterprise structure, culture, and information flowed.

2) International law and regulation adaptation

It means the conformality degree of the enterprise to current and upcoming international regulation, laws.

3) National-demand adaptation

It means ability of enterprise to meet demands of national petroleum transportation.

4) Sustainable development

It means the ability of the enterprise to adapt into current and future petroleum transportation demand.

CHAPTER 4

Strategy to Improve China Oil Shipping Company's Core Competence

4.1. The Introduction of Applied Methods: AHP and SWOT

As mentioned in 3.2.1, the index system has based on combination of half-qualitative and quantitative methods to evaluate the core competence. In the combination, the quantitative method is referring AHP, and the qualitative method is referring SWOT analysis.

The Analytical Hierarchy process (AHP) is used to determine the priority or weight for each element in internal and external factors. The tool is used to break down a complex problem into its element, identifies the relationship among elements, measures the interaction of each element, and also determines each priority to simplify the decision problem making.

In order to assess the strategy for Chinese Oil shipping Industry, SWOT analysis is also applied. SWOT Analysis (also known as TOWS analysis) is a powerful technique for understanding the Strengths and Weaknesses, and for looking at the Opportunities and Threats we face.

What makes SWOT particularly powerful is that, with a little thought, it can help the company uncovers opportunities that it is well placed to take advantage of. And by understanding the weaknesses of the business, we can manage and eliminate threats that would otherwise catch our unawares.

Strengths and weaknesses are internal to the organization. Opportunities and threats relate to external factors. For this reason the SWOT Analysis is sometimes called Internal-External Analysis and the SWOT Matrix is sometimes called an IE Matrix Analysis Tool.

Therefore, in such situation, the SWOT analysis was combined by Internal-External (I-E) Matrix. The I-E Matrix is divided into Internal Factors Evaluation (IFE) Matrix and External Factors Evaluation (EFE) Matrix. The first step to get quantitative measurement of the internal and external factors was identification of SWOT elements. To find out the relative importance among the elements, paired comparison procedure where the elements were compared each other with scoring from 1 to 9 was used. These were used as weights for the key success factors of company, since the key success factors are the elements that strongly influence the company. In order to simplify pairing comparison, a paired comparison matrix has been developed. The matrix contents elements of SWOT both in its rows and columns that were compared their importance to each other. Using quantitative procedures as a part of the Analytical Hierarchy Process, then the elements have their priorities, represented by such numbers. Those numbers were used as a weight in the I-E Matrix. Both the IFE and EFE Matrices were developed in five steps as follows:

1. Make a list of critical success factors as identified in an external / internal - audit process. List opportunities/strengths first and then threats/weaknesses.
2. Assign a weight ranges from 0.0 (not important) to 1.0 (important) for each factor. The weight is resulted from quantitative analysis of AHP.
3. Assign a 1 to 4 rating for each factor. For the EFE Matrix, these rating indicate how effectively the industry's current strategic respond to the factors, where 4 = the respond is superior, 3 = the respond is above average, 2 = the respond is average and 1 = the respond is poor. The rating 1 to 4 is determined by comparing the current strategy and policy in catching up an opportunity or avoiding a threat. For the IFE

Matrix, these ratings indicate whether represents major weaknesses (rating 1), minor weaknesses (rating 2), minor strengths (rating 3), or major strengths (rating 4). The rating 1 to 4 is determined by comparing the fact with the ideal expectation or ideal performance. However, this effort is subjective assessment.

4. Multiply each factor's weight by its rating to determine the total weighted score for each variable.

5. Sum the weighted score for each variable to determine the total weighted score for the industry.

Regardless of how many factors were included in the IFE Matrix, the total weighted score ranges from low/weak of 1.0 to a high/strong of 4.0, with the average score is being 2.5.

4.2. The Building of Evaluation Model for China Shipping Tanker Company

With more fierce competition with the foreign oil shipping companies, the domestic ones should find their own core competence in this field. China Shipping Tanker Company, being the most distinctive domestic enterprise in this booming field, is taken as an example to illustrate the feasibility of the core competence evaluation system mentioned above.

The table below obtained from the official website of China Shipping Tanker company in 2005 presents the needed basic data for the innovative combination of AHP and SWOT analysis. In this table, the needed data are strictly classified by the index structure mentioned above, which are fleet capability, operation performance, management capability, social and environment adaptation. (up to 1st, Jan.2005)

Table 4-1 The basic data for evaluation index in China shipping tanker company

	Name		C.S.T.C
Fleet capability	Fleet scale	Overall tonnage(million ton)	3,138
		Self-owned fleet percentage	100%
		Average tonnage	29,730
		Average age	13.2
	Fleet Structure	Fleet structure	49.7%
		Market share of chief fleet	2.42%
Age of chief fleet		17	
Operation performance	Revenue index	Total revenue(million \$)	782
		Increasing ratio	25.30%
	Profit index	Sales profit	29.20%
		Total capital return ratio	21.10%
		Net capital return ratio	22.20%per
		Debt-to-total assets ratio	26.00%
		Current ratio	3.6
	Market recognition	Brand	6.8
		Customers' satisfaction	7.0
		Enterprise credit	7.8
Management capability	Management	Managers' qualification	8.0
		Limit of authority	7.3
		Enterprise culture adaptation	7.4
	Service innovation	Alliance degree	0.0%
		Long-term contract percentage	0.0%
		Personal service	7.5
	Scientific innovation	Double-hull percentage	30.0%
		New vessels	30.0%
		R&D	6.8
	Financing	Financing channel	7.0
Support from government		7.8	
Social& environment adaptation	Market oriented flexibility	7.6	
	Regulation and law adaptation	7.1	
	National demand adaptation	6.8	
	Sustainable development	7.8	

Source: <http://www.cnshipping.com/>

Based on the given data, a series of questionnaires were given to some experts in the oil shipping company in order to figure out the weight, rating, and weighted score in Table 4-2 and 4-3.

Table 4-2 Internal Factor Evaluation (IFE) matrix for China Shipping Tanker Company

Key Internal Factors	Weight	Rating	Weighted score
Strength			
Self-owned fleets' percentage	0.040	3	0.120
Revenue increasing ratio	0.057	4	0.228
Total capital return ratio	0.055	4	0.220
Debt-to-total assets ratio	0.062	4	0.248
Current ratio	0.061	3	0.183
Brand	0.053	4	0.212
Managers' qualification	0.045	4	0.180
Enterprise culture adaptation	0.047	2	0.094
Personal service	0.050	3	0.100
Weakness			
Overall tonnage	0.050	3	0.150
Average tonnage	0.054	3	0.162
Average fleet age	0.043	2	0.086
Fleet structure	0.052	3	0.156
Market share of chief fleets	0.055	3	0.165
Age of chief fleets	0.042	2	0.084
Revenue	0.045	3	0.135
Sales profit Ratio	0.046	3	0.138
Net capital return ratio	0.051	3	0.153
Authority limit	0.012	2	0.024
Alliance degree	0.021	2	0.042
Long-term contract percentage	0.013	2	0.026
Double-hull percentage	0.025	2	0.050
New vessel percentage	0.011	2	0.022
R&D	0.010	2	0.020
Total	1.000		2.998

Table 4-3 External Factor Evaluation (EFE) matrix for China Shipping Tanker Company

Key Internal Factors	Weight	Rating	Weighted score
Opportunity			
Customers' satisfaction	0.096	3	0.288
Enterprise credit	0.147	4	0.588
Support from government	0.155	3	0.465
Market oriented flexibility	0.100	4	0.400
Sustainable development	0.099	3	0.297
Threats			
Financing channel	0.156	3	0.468
International law& regulation adaptation	0.149	3	0.447
Adaptation to National demand	0.098	3	0.294
Total	1.000		3.247

Key Opportunities of the corporation come from the government support and the reliable credit of enterprise. Moreover, loyal customers, good adaptation to changeable market as well as the sustainable development of national economy are the opportunities for the company. In the meantime, less financing channel, more and more strict international maritime law and regulations as well as the weak adaptation to national demand are the key weaknesses that must be anticipated by China Shipping.

The IFE score for the company is 2.998, while the EFE score is 3.247. The IFE score indicates that the China Shipping Tanker Company is categorized in average, neither too weak nor too strong internally. On the other hand, in responding to external factors, the firm has been responding in an outstanding way to existing opportunities and threats in its industry.

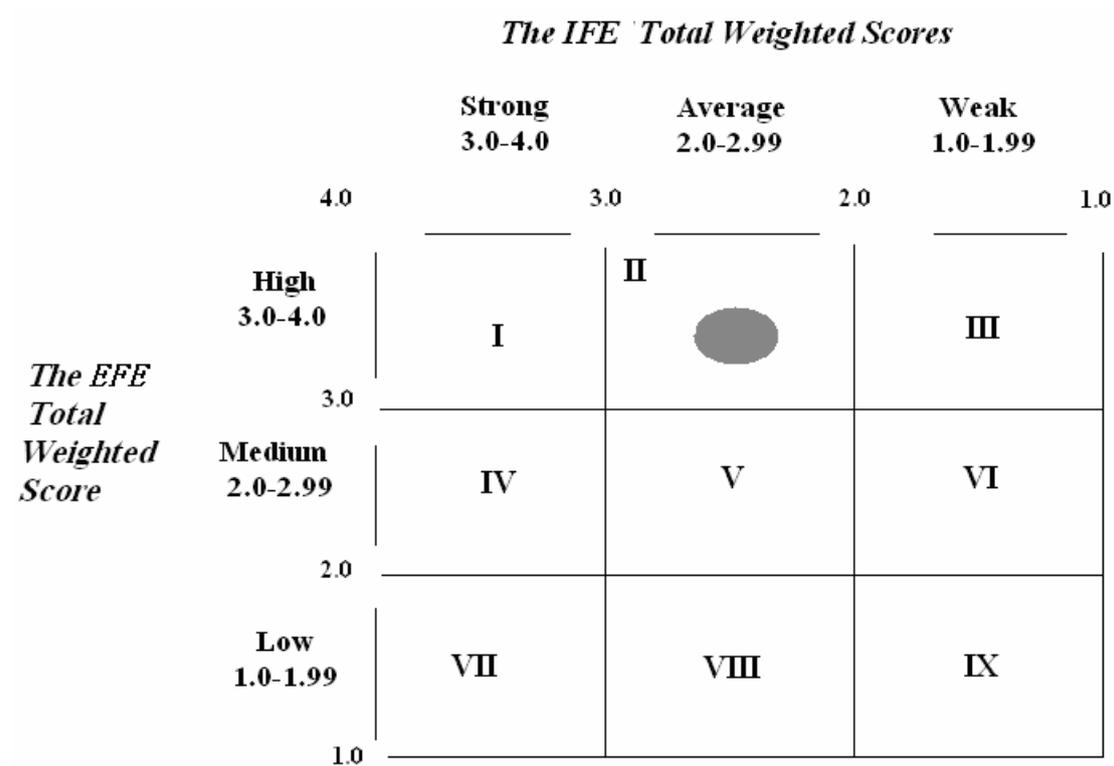


Chart4-1 China Shipping Tanker Company position

The position of China Shipping Tanker Company is in cell II. It means that, based on the IE matrix, the competitiveness of China Shipping Tanker Company is relatively good. However, the success of the firm in international competition is determined by the ability of manager in formulating and implementing the business strategy.

4.3. Strategic and Business Implication for China Shipping Tanker Company

Based on the SWOT analysis, strategy priority suggested for the company is presented in Table 4-4, while the elements of strategy are described down below.

Table 4-4 SWOT analysis on China Shipping Tanker Company

Internal	Strengths(S)	Weaknesses(W)
	<ol style="list-style-type: none"> 1. Self-owned fleets' percentage(0.120) 2. Revenue increasing ratio(0.228) 3. Total capital return ratio(0.220) 4. Debt-to-total assets ratio(0.248) 5. Current ratio(0.183) 6. Brand(0.212) 7. Managers' qualification(0.180) 8. Enterprise culture adaptation(0.094) 9. Personal service(0.100) 	<ol style="list-style-type: none"> 1. Overall tonnage(0.150) 2. Average tonnage(0.162) 3. Average fleet age(0.086) 4. Fleet structure(0.156) 5. Market share of chief fleets(0.165) 6. Age of chief fleets(0.084) 7. Revenue(0.135) 8. Sales profit ratio(0.138) 9. Net capital return ratio(0.153) 10. Authority limit(0.024) 11. Alliance degree(0.042) 12. Long-term contract percentage(0.026) 13. Double-hull percentage(0.050) 14. New vessel percentage(0.022) 15. R&D(0.020)
External		
Opportunities(O)	SO Strategies	WO Strategies
<ol style="list-style-type: none"> 1. Customers' satisfaction(0.288) 2. Enterprise credit(0.588) 3. Support from government(0.465) 4. Market-oriented flexibility(0.400) 5. Sustainable development(0.297) 	<ol style="list-style-type: none"> 1. Maintain the Chinese market through competitive advantages (S1, S6, S7, S9, O1, O2, O3, O4, O5) =2.65 2. Expand the existing shipping service into new foreign market(S1,S2,S6,S7,S9,O1,O2, O3,O4, O5) 	<ol style="list-style-type: none"> 1. Develop the competitiveness of fleet and to increase the operation performance (W1, W2, W3, W4, W7, W8, W9, W13, W14, W15, O1, O2, O3,O4, O5) 2. Develop the overall scale of the fleet (W1, W4, W5, W6, W7, W9, W12 W14, W15, O1, O2, O3, O4, O5)
Threats(T)	ST Strategies	WT Strategies
<ol style="list-style-type: none"> 1. Financing channel(0.468) 2. International law and regulation adaptation(0.447) 3. Adaptation to national demand(0.294) 	<ol style="list-style-type: none"> 1. Improve the proper financing channel for gaining economics of scale (S2, S3, S4, S5, S6, T1, T3) 	<ol style="list-style-type: none"> 1. Enhance the cooperation with foreign partners for achieving mutual benefits both in domestic and international market (S10, S11, T1, T2, T3) 2. Apply advanced technology (S13, S14, S15, T1, T3)

According to the SWOT analysis in Table 4-4, we can conclude the strategy priority

for China Shipping Tanker Company as presented in Table 4-5 below,

Table 4-5 Strategy priority for China Shipping Tanker Company

STRATEGY	SCORE	PRIORITY
Develop the competitiveness of fleet and to increase the operation performance (W1, W2, W3, W4, W7, W8, W9, W13, W14, W15, O1, O2, O3, O4, O5)	3.110	1
Develop the overall scale of the fleet (W1, W4, W5, W6, W7, W9, W12 W14, W15, O1, O2, O3, O4, O5)	2.949	2
Expand the existing shipping service into new foreign market(S1,S2,S6,S7,S9,O1,O2,O3,O4, O5)	2.878	3
Maintain the Chinese market through competitive advantages (S1, S6, S7, S9, O1, O2, O3, O4, O5)	2.650	4
Improve the proper financing channel for gaining economics of scale (S2, S3, S4, S5, S6, T1, T3)	1.853	5
Enhance the cooperation with foreign partners for achieving mutual benefits both in domestic and international market (S10, S11, T1, T2, T3)	1.275	6
Apply advanced technology (S13, S14, S15, T1, T3)	0.854	7

To sum up, after innovatively combining AHP and SWOT analysis, the most essential step for China Shipping Tanker Company now is to develop the competitiveness of fleet and to increase the operation performance, especially the overall scale of fleet. On the base of the priority, those companies should expand the foreign services through comparative advantage and enhance the cooperation with foreign partners for achieving mutual benefits both in domestic and international market. Additionally, they should positively implement advanced IT technology into the operation as well as improve the financial channel of gaining capital. Since the oil shipping industry of China is at the beginning period of the reform and development, it cannot be mentioned in the same breath with those foreign great oil transportation corporations in many aspects. However, we should find out our advantages, actual differences with the foreign companies, as well as the key points for our development.

Chapter 5

Conclusion

As the life line of economic development in each nation, oil plays a significant role in international society. Therefore, oil shipping becomes the focus of those countries which rely on the oil import. Chinese oil tankers did not receive the reasonable emphasis in the early time and it has been in the disadvantageous position in the fierce competition. Fortunately, the opportunity that Chinese oil shipping industry is activated in the market economy and the stable economic development as well as the abundant growth of oil shipping demands provide the space for this industry rapid promotion. When the theory of core competence caught eyes of Chinese scholars, they conduct quite a lot profound analysis in many fields. However, the adaptation of this theory into oil shipping Industry is rarely seen. The author intends to be the explorer to offer the personal opinions in the development of Chinese oil shipping.

In accordance with the above research, the author has got the following three conclusions:

- 1) The core competence of oil shipping enterprise is the result of many factors. In the thesis, there are four respects: fleet capability, operation performance, management capability and society and environment adaptability.

- 2) In the way of setting up scientific AHP as well as the SWOT model, especially the IFE and EFE matrix, the author has calculated the results of comprehensive evaluation to gain the strength of firms. Besides, on basis of the data given by experts, the author has found the strengths, weakness,

opportunities and threats of China Shipping Tanker Company and provide the SO, WO, ST as well as WT strategies.

- 3) The author does the deep analysis towards competence relying on the index system and obtains the effective methods to promote the competence. By quantitative calculation, the priority for China Shipping Tanker Company is the fleet capability. Besides, the weaknesses are in tonnage, average tonnage, market share of chief fleet, average age and the age of chief fleet, which are also the most urgent affairs for solve.
- 4) The model used to measure the core competence of China Shipping Tanker Company can also be reference and applied by other Chinese oil shipping companies.

The most outstanding characteristic of the thesis is the new and complete measurement index system building for core competence, especially the combining usage of Internal Factor Evaluation matrix and External Factor Evaluation, which is helpful for conducting scientific evaluation towards competence between oil shipping enterprises.

The research of core competence in oil shipping Industry is a complicated and systematic one with lots of related factors. Due to the limits of time, space and data source as well as lack of experience, the author has not finished all the tasks, for instance, the identity of time of data, reasonable proving of evaluation results. Therefore, this topic still has much space for discussion and improvement.

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The China Shipping Tanker Company web sites further information and statistics on index required in 2005.

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The oil News wet site mainly provides a great amount of tables, charts, figures relevant to the World Oil Shipping industry.

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Appendix

Literature Review

As a specific industry, shipping is paid much and spread attention with the development of international trade and globalization of economy. Moreover, shipping management is on the step of promotion. Through the thorough and profound studies in shipping and its related fields, both national and foreign scholars brought up their respective opinions from different aspects. The following is the conclusion of the research achievements of these respectable scholars:

1. The Related Studies of Shipping Management Theory

(1) Foreign Scholars

Peter Lorange took the strategy into consideration of shipping corporations and brings up four development strategies based on various situations: Pioneer/Experiment, Rapid Expansion, Dominate/Defend, Restructure in his book *Strategic Rethinking in Shipping Companies* and made a discussion focusing on the competence and management of enterprise from the strategic aspect. In another book *Strategic Management in Shipping* the author reviewed the shipping companies strategic management and development tendency currently; moreover, he emphasized the corporation strategy, globalization, management, variety, and competitive advantages in the view of development.

Gin-Shuh Liang made measurable studies in the operation performance of shipping industries by employing the AHP-FUZZY and gave suggestions to the methods of improving the operation in *Application of a fuzzy multi-criteria decision-making model for shipping company performance evaluation*

Through the case studies of 63 shipping corporations located in Norway, Jan Inge Jenssen and Trond Randy successfully wrote *Factors that promote innovation in shipping companies*

(2) Domestic Scholars

Oil Shipping Management written by Wu Changzhong and Li Zhiping was the earlier works in oil shipping management. It gave a comprehensive demonstration towards the oil shipping management from the oil transportation practice at sea, which includes the oil shipping market, port (load& unload), vessel, product organize, quality management and related domestic and international regulations. Though some parts of this book are not suitable for modern management, it is still useful for reference for our oil transportation management and operation.

Professors Zhao Gang and Lin Guolong pointed out in *International Shipping Management* that there were four aspects constituting the competence of shipping companies: delivery cost, quality of freight, financing capability, protection of shipping policy; besides, the shipping competence is actually a kind of comprehensive capability organic combined by the internal and external factors of shipping companies. At the same time, they brought forward the operation strategic target of shipping corporations: raise development funds, introduce advanced technology, expand the international market, expedite the renovation, increase the employment and improve the management, aiming at the special situation of our country as well as the international atmosphere of new century. What is more, they also put forward several operation strategies, including diversified operation strategy, combined operation strategy, intensive operation strategy and multinational operation strategy.

International shipping economy written by Xu Jianhua and Qu Linchi analyzed the characteristics of organization management of modern shipping enterprises and studied the competence from the organizational aspect.

Chen Jiayuan and Tong Chengquan wrote *International Shipping Market*, which illustrated the basic principle of shipping market and systemically demonstrated the specialties of oil shipping market and oil tanker freight index, as well as analyzed the oil shipping market by the use of systemic motivate theory.

Professor Jin Wuxing's article *The Development of International Shipping Industry and Countermeasure Study*^[9] first analyzed the influence to the international shipping market given by the environment from the changes of global economy. And then brought up that domestic shipping industry had to face the sharply changeable international situation after China's joining WTO; moreover, the completion between companies would become more fiercely with the development of free trade. At last, it offered the shipping strategy and suitable countermeasure that could give quick response in the new international situation.

The above researchers the author mentioned are just part of scholars focusing on the development strategy, information technology, shipping enterprise, logistics and other correlative facets.

2. The Studies in Oil Shipping of Our Domestic Scholars Recently

In Lv Shimin's thesis *The Development of Tanker Fleet in China* he analyzed the supply and demand of international oil shipping market and forecasted the future market. Besides, he put forward the development plan of Dalian Shipping Company by the methods of simple calculation, in accordance of the crude oil transportation demand of our country.

From the current situation of COSCO Tanker Company, as well as the market competition faced by COSCO in the new global atmosphere, Wu Jinping studied the development plan for COSCO tanker fleet, brought up the strategy of the fleet and successfully wrote *COSCO Tanker Fleet Development Study*

In Guan Fang's paper *The Research in Crude Oil Shipping Market and Development Strategy of Northern Oil Port in China*, she analyzed the crude oil shipping market situation and development tendency; and then measurable forecasted towards import and export of the Chinese crude oil and oil production in 2000-2001 by the methods of studying the recent data; besides she also offered the plan for the construction and development of oil port in China from the strategic scope.

Hou Lianchang conducted the demonstration of the oil tanker type from the aspects of its building and operation cost by analyzing the situation and development tendency of tanker market in his article *Crude Oil/ Oil Product Tanker Type*

Based on the shipping market analysis, Liu Xiaohang calculated the operation cost of VLCC and proved the economical feasibility of COSCO developing VLCC and brought forward his suggestion for the improvement of COSCO tanker fleet in the thesis *The Investment and the Economical Analysis of Very Large Oil Tanker*

In *The Development and Tendency of International Oil Shipping Market Recently*, Gu Jiajun concluded the development trend of international crude oil shipping supply, demand, quantity of tankers and freight and gave his own opinions of the promotion of Chinese oil tanker fleet.

The thesis *The Study in Competence of The International Oil Tanker Companies*^[16] written by Li Ling not only analyzed the problems, including fleet size, age of vessel and benefits on the basis of the studies in international shipping market, but also built up a set of index system to put forward some opinions in improving the competence of our oil shipping enterprises.

Otherwise, each of oil shipping companies has been exploring the operation strategies of effectively improving the competence. For instance, China Shipping Oil Tanker

Company invited the experts group of Dalian Maritime University to work together with their own specialists to stipulate for *The Strategic Plan for China Shipping Oil Tanker Company*, which consulted the operation performance of world famous oil shipping companies and established the principle of “counter standard” to find out the differences and offer suggestions and methods. However, the standards appointed by this plan were just the advantages of foreign companies; besides, there was a lack of integrated consideration of each index, in other words, there was no clear measurement of weighting.

The above studies brought forward plans and advice to the development of Chinese oil tanker fleet from the view of market or cost, which took the fleet size as the main standard in estimating the capability of companies. Generally speaking, big and powerful is inseparable. It is feasible to consider the demand of market and low cost as the crucial factors for the development of fleet. However, in the situation of more competition under the market economy, large quantity is not the magic weapon to conquer the competitors any more, but instead of taking customers as center, offering safe, high quality, quick but low cost service to fulfill the customers’ requirement. Therefore, though the above researches are very important for the theory, they are not qualified for the practice demand of new time.