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# Analysis of the feasibility of building virtual corporations in the shipping industry

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**WORLD MARITIME UNIVERSITY**

Shanghai, China

**ANALYSIS OF THE FEASIBILITY OF  
BUILDING VIRTUAL CORPORATIONS IN THE  
SHIPPING INDUSTRY**

By

**DI SHENGXIAO**

China

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

**MASTER OF SCIENCE**

**INTERNATIONAL TRANSPORT AND LOGISTICS**

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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## **ABSTRACT**

Title of Research paper: **Analysis of the Feasibility of Building Virtual Corporations in the Shipping Industry**

Degree: **MSc**

Compared with other company organization theories, the virtual corporation is a new one. It has been widely used in manufactory industry. The virtual corporation is built based on the core competence of the partners. The virtual corporation has the flexibility and agility to react to the market.

The market in the shipping industry is always changing. If the virtual shipping corporation can be built, it is very helpful to the shipping company in such a competitive environment. The thesis will discuss about the feasibility of building virtual shipping corporations in shipping industry. The study is mainly from three aspects: operation, economy and legal aspects.

**KEYWORDS:** Virtual corporation, Virtual shipping corporation, Feasibility analysis

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## **LIST OF ABBREVIATIONS**

AHP	Analytic Hierarchy Process
BCG	Boston Consulting Group
CAD	Computer Aided Design
COSCO	China Ocean Shipping (Group) Company
COSFRE	COSCO International Freight Company
NVOCC	Non-Vessel Operating Common Carrier
M&A	Merger & Acquisition

## **Chapter 1 Introduction**

### **1.1 Background**

Recently, the world economy is transferring from industry economy to information economy. Nowadays, the information is passing globally with high speed, because of the highly developed information technology. For the quick changes in market and international environment, the organization of company is facing the challenges. The aim of company organization is to adapt to the economical or social environment. The virtual corporation is a theory of company organization. The organization creation and information technology are very important for a succeed company. Well, in such a changeable situation, it seems impossible for every shipping company to become big one, for the big shipping companies are always handful. The big shipping companies and the small ones are co-existing in the market. In China, there is a word that: little ships can swerve quickly. What business strategy can these small shipping companies take? This article is mainly to study about the small shipping companies cooperate between themselves and get a better performance.

### **1.2 Theories Development of the Virtual Corporation**

#### **1.2.1 Overseas Researches of the Virtual Corporation**

The concept of the virtual corporation appeared in 1992, in *Virtual Corporation*, which was published by W.H. Davidow & M.S Malone. Another concept of virtual organization appeared in 1995, in *Agile competitors and Virtual Organization*, which was published by K. Preiss etc. The virtual corporation concept was built in the manufacturing industry. These articles talked about possibility of the cooperation between manufacturers and this cooperation was built on the companies' core competence.

In 1998, Strader etc. set the life cycle model of virtual organization in the manufacturing industry. There are four stages of the life cycle model: identification, formation, operation and termination. The identification phase is the beginning of the organization, finding opportunity. The formation phase includes the identification and selection and formation of partners. The operation phase includes the design manufacturing, distribution etc. The termination is the end of the virtual organization.

In 2005, S. Dowlatshahi showed that a better business performance can be got in an agile manufacturing environment if we combine the virtual corporation and information technology together. The virtual corporation has some relationship with the information technology. The scholars do not think only about the virtual corporation. The Technology of information is also taken into consideration.

The EU-funded MARVIN project, Maritime Virtual Enterprise Network, was developed in 2001. Software tools were used to support virtual enterprises in the ship repair and maintenance industry. "The software was developed to operate a web-based virtual enterprise, specifically in the area of scheduled and unscheduled repair." said by E.M. Weitzenboeck. This is a real case that the virtual corporation

was built in the ship repair industry. Well, up to now, there is no virtual shipping corporation in China. It gives me the idea that the virtual corporation may widely be used in the shipping industry.

### **1.2.2 Domestic Researches of the Virtual Corporation**

In C.G. Li's thesis (2000), we can see the summary of the definition of the virtual enterprise. Three different definitions of the virtual corporation were compared. In this thesis, six cases were studied, three abroad cases (Nike sports corporation etc.) and three domestic cases (Southwest Electronics Products Virtual Detection Center etc.). This is the earliest articles talked about the virtual corporation in China. Then in 2001, Z.L. Nie suggested that we can build the virtual corporation in China.

Then, there were some articles compared the virtual corporation with other company organization. In 2003, C.F. He displayed the different organizations between virtual corporations and traditional companies. The comparative study conducted in two aspects: management tactics and organization form which is composed of organization structure, functioning mechanism and cooperation mechanism. In 2004, D. Li etc. wrote the article *Empirical Study on Validity of virtual Enterprise and Alliance of firms*. They used factor analysis method and the statistics to study nine financial data of 18 firms in 4 industries, which are computer, electronic, motor and clothes. They drew following conclusions: the operation ability of virtual enterprise is superior to that of alliance.

In recent years, there are some articles studied about the virtual corporation application in other industries instead of manufacturing industry. H. Du (2004) discussed the application of virtual enterprise in domestic construction industry. L.

Hu (2004) built a virtual organization, with the traditional newspaper as a leader, in newspaper industry. He concluded that such a newspaper supply chain has flexibility. In logistics industry, W. Li (2005) used AHP (Analytic Hierarchy Process) to study how to choose a partner. In 2005, G.Z. Zhang studies the application of the virtual manufacturing to the shipyard. In 2005, W.L. Xue studied the virtual corporation and port integration.

After we combine these comments, we can get the definition of the virtual corporation as follow: The virtual corporation has the whole functions of companies or organizations, which is built based on the different core competences of companies in order to catch the changeable market opportunities. But in the entity of a company, there are not the whole departments or organizations to execute these functions. The company in the virtual corporation remains one or some key competences. Other functions are realized through the cooperation with the partners, such as suppliers, competitors, customers, etc. We can find that the virtual corporation extends the company's boundary.

In my opinion, if we consider the virtual corporation as a virtual company, then the real companies, which registered legally, can be looked as the virtual departments. In this way, we can more clearly know about the name of the virtual corporation. Furthermore, the virtual corporation uses the information and communication technology as the main technology methods. Through the support of the network information technology and the quick information exchange, the virtual corporation is a dynamic united organization. The Internet is an information technology globally used. In the Internet economy, the companies take advantage of the network technology to reduce the cost of trade. In such a situation, the virtual corporation has much room to live.

### **1.3 The Aim and Thought of the Research**

Recently, there are some articles about the virtual corporation application in other industries, e.g. logistics, except manufacturing industry. It is a trend that the company is virtualized in the information times. In the shipping industry, the shipping companies also face a lot of uncertainty in such a changeable market. There are some articles talked about building the virtual shipping corporation in the shipping industry. Well, these articles talked very theoretically about it and less of the discussion on the operation level. This thesis wants to give some operational advices.

In this thesis, the qualitative analysis will be mainly used. The feasibility of building virtual shipping corporations will be discussed through three aspects: the operation level, the economic level and the legal level. In the operation level, the game theory and information sharing will be discussed. In the economic level, the information asymmetry and benefit distribution will be discussed.



## **Chapter 2 The Shipping Industry and the Virtual Corporation**

### **2.1 The Shipping Industry**

The shipping industry developed very quickly after the World War II. For every country was busying to develop and recover its economy after the war. The increasing economy drives the trade within a country and between countries. The international trade become more and more frequent. During that time, the shipping transport becomes the main mode between countries and countries through the sea. The international trade forces the development of shipping industry.

#### **2.1.1 Modes of Transportation**

There are 5 transportation modes in the world. They are railway transportation, road transportation, air transportation, pipeline transportation and sea transportation. Transportation means that the goods are transported from one place to another place by using the transporting tools and spending some time.

The five different modes have different characteristics. The sea transport has a competitive cost and can transport anything virtually. The transit time in the sea transport is usually long. If we use the container, the transit time can be shorter and risk of damage can be lower. Meanwhile, the container can provide the door to door

service. This is why there are so many containers used nowadays. NVOCCs (Non-Vessel Operating Common Carrier) or agents can offer competitive consolidated rates. Many shippers like to use NVOCCs or agents to transport goods. The value of cargo transported by sea is not as high as cargo transported by air, because of different speeds. Compared with other transportation modes, sea transport has the advantage of large capacity.

The air transport has short transit time and can reduce the cost of capital tied up. The air plane can go to any point in the world. The capacity of space is very limited if we choose the air transport. The freight of air transport is high. So, many high valued cargo or urgent cargo use the air transport. The road transport is quicker than sea transport and slower than air transport. It is more flexible. When we need some road transport, we can rent some trucks easily. The road transport also has restricted space and some restrictions, such as some places and roads can not go through at certain time.

### **2.1.2 The Situation of the Shipping Industry**

Shipping means transporting things from one port to another port by a ship or several ships and using the watercourse and seacourse. Based on the market, the shipping market can be divided into liner market and spot market. These two markets are totally different. The liner has certain calling ports, certain route, certain time and certain schedule. The spot market is just opposite. Everything is uncertain. All the details are needed to be contracted by the charterer and charteree. In a word, the spot market is like taxi while the liner market is like bus. One is convenient, the other is regular.

The shipping industry has high risks, for its barriers of entrance and exit. The

shipping market is very difficult to get in and get out. The price of buying a new ship is very high. If one wants to buy a new ship, he will mostly find it is a big problem to get so much money. Some people choose to loan the money from banks, and they will have a heavy burden to give back the money. Some people rent the ship from the bank for a long-term contract, e.g. 20 years. Meanwhile, a new ship needs some time to build, usually 1 or 2 years. This means that when we see the market is very good, it is difficult to get new ships immediately. However, it is difficult to forecast the market in 2 years later when we get the ship actually. When the time the market is not so good, the ships can not disappear at once. Ships also need time to be demolished, for the ship breakers have limited capacity. Furthermore, the shipping market is always changing. Many people want to find out the regulation of the cycle between the up and down of the market. But, up to now, no one has found it. When we go back to the history, we will find every cycle is different.

The product of the shipping industry can not be stored and it is invisible. These may be the most different thing compared to the manufactory industry. For, in the manufactory industry, the goods can be stored. The products are stored when the market is bad, and sold when the market is good. So, the supply and demand situation can be adjusted. However, in the shipping industry, the empty space of ship can not be stored. When a ship leaves from a port, the extra capacity is useless and nothing. Sometimes, a customer will pay the dead freight to the carrier, if he books some shipping space and finally does not use them. So, in the shipping industry, there is not the concept of storage. The customer can not see and touch the service of transporting goods from one place to another place.

The demand of shipping is a derived demand. The sea transportation is derived from the trade, especially international trade. People need products and these products may

be in other places instead of the consuming market. So, the customer wants to transport the goods from the producing place to the consuming place. If there is only the transportation without goods, no one wants it.

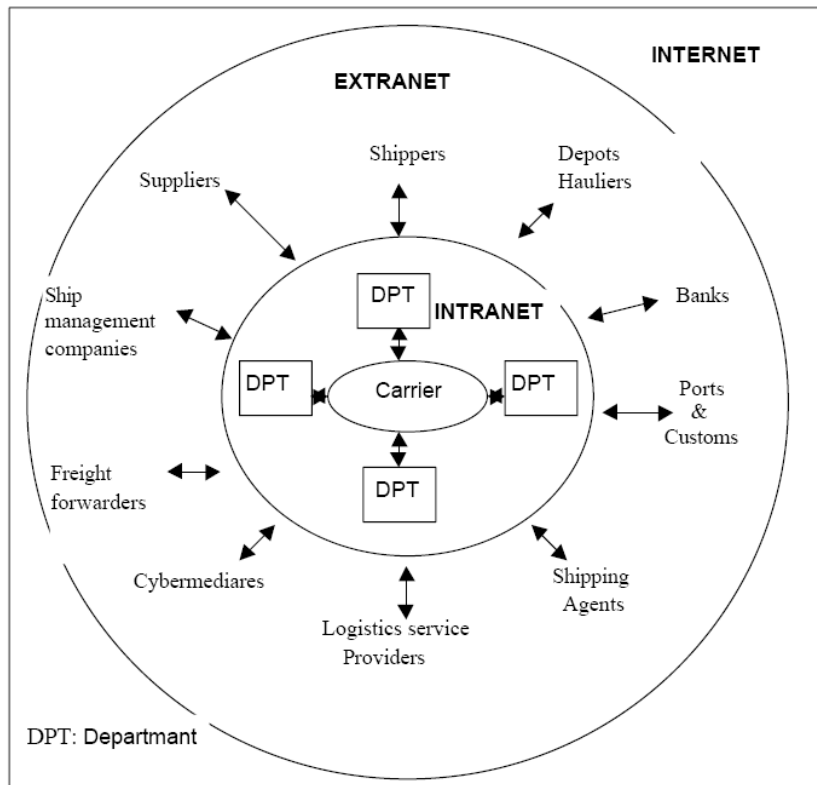


Figure 2.1 - The relationships of shipping companies and shipping communities

Source: Yuruyen, U. M. (2001). Maritime transport and e-business “E-commerce applications in liner shipping”. *Dokuz Eylül University*.

In Figure 2.1, we can see relationships between shipping companies and shipping communities. Among so many parties, the communication and information exchange is huge, even the word “cybermediaries” is showed in the figure. Many shipping companies may think about to go an information-based way. Many large shipping companies have their own websites. If we want to search some information, we have to go to different websites and spend a lot of time. About small shipping companies,

there may not have so much information in their websites. Can we find a better way to solve these problems?

### **2.1.3 The Organization**

There have three main organization modes in shipping industry, the shipping company with a single vessel/a fleet, the shipping group and the strategic shipping alliance.

A single vessel company means that a company has only one vessel. This kind of organization mode is commonly seen in the spot market. Such a small company has some advantages in the view of economy. Most shipping companies have limited responsibility, which is based on the assets of the company. The amount of compensating money is set based on the size of the ships owned by the company. Because of the single vessel company has not another vessel, there is not sister ship to bear the compensation of damage together. A single vessel company can limit the compensation to just this vessel itself. A company with a fleet usually is a big company. For example, COSCO [China Ocean Shipping (Group) Company] has a fleet of bulk carriers. It has a large capacity of operation compared to the single vessel company. The company with a fleet can provide liner shipping operation etc.

A shipping group means that there are several shipping companies which are belonging to the same group. This organization mode can be seen widely, e.g. COSCO. There are many different kinds of the sub-companies. The sub-companies may be divided according to the function, such as air transport and sea transport. The sub-companies may be divided according to the geography, such as Chinese company and Singapore company. But all these sub-companies should obey the

command from the headquarters of the group.

Strategic shipping alliance means that two or more companies make a strategic contract. In shipping industry, we can see that there are several large liner alliances, such as Grand Alliance and The New World Alliance etc. The companies, belonging to the same shipping alliance, can rent the space among them or use the same shipping route. This can reduce the cost of shipping companies. For example, the A company's route is from port M to port N to port Z. While B company's route is from port N to port Z to port X. If they are in the same alliance, both the A company and B company can transport the goods from port M to port X. A company rents the route from port Z to port X while B company rents the route from port M to port N.

## **2.2 Virtual Corporations**

In the late of 20<sup>th</sup> century, the virtual technology and information technology are growing fast. Under the help of technology, the communication and information searching are becoming easier than before. Because of the changing environment, the organization theory is also renewed. The latest theory is virtual corporations. The virtual corporations have some precondition, which are virtual technology and information technology. The virtual technology means the computer system and software, such as CAD (Computer Aided Design), to help the work more convenient. This is mainly used in the manufacturing industry. The information technology is the widely used Internet etc.

### **2.2.1 The Origin of the Virtual Corporation**

When the virtual corporation appearance, there are some reasons behind it, mainly of

them are changeable market and advanced technology. Nowadays, people do not satisfy to get the basic needed goods. They want to buy something which is personalized. In marketing, we can hear that we should use the pull strategy instead of push strategy. A push strategy is to use the company's sales force to create consumer demand for a product. A pull strategy is to spend a lot on advertising and consumer promotion to build up consumer demand for a product. It satisfies the customer's psychological want and need.

After studying the information collected, the company will find what this group of people want. Then the product is produced before these consumers change their ideas. This requires the company to have quick response and reaction to the market. A large company may waste some time to transfer the information to the different parts, for the information transferring class by class. The supervisors convey the information and instruction to the subordinates, and then the subordinates convey the effect of action to the supervisors. Maybe, it needs several times from up to down and from down to up. It will cost a lot of time in the information transferring. So, it may be easier for a small company for there have fewer classes within the company.

### **2.2.2 The Virtual Corporation**

Partners work together in a virtual corporation with a horizontal relationship between each other. The information among the partners can be transferred much quickly and updated timely for the information technology and Internet used. The companies can know many things about their partners through the information exchange. They are more likely to cooperate when they want to get a specific market and find the proper partners with different skills, resources or core competences. Companies work together to share information and have quick response to the changing market. Thus,

better service or product can be provided, and more costumers can be attracted.

The virtualization can be divided into formal virtualization and contract virtualization. (Y.L. Ye, 2005) Formal virtualization means that the enterprise provides some products in Internet. Contract virtual means the enterprise itself has not all kinds of departments which a company needed, such as research, manufactory, selling. Instead of this, the company cooperate with other companies through contracts, virtual technology and information technology.

Most virtual corporations have certain directions. (Y.L. Ye, 2005) For example, it is a virtual operation if we look at the co-work on the direction from Nike company to the partner (factory). The Nike company transfers its producing department or manufacturing department to another company. All the products are made in the factories, not in Nike company itself. Meanwhile, it is a traditional cooperation if we look at on the direction from the factory to Nike company. The factory has a new partner and produces more products. There is a little organization change in the factory. In this situation, we only can say that Nike company realized its virtual production.

In many articles, we can see that Nike company is a virtual corporation. Does a virtual corporation can be used to represent for a single company? I don't think so. This virtual corporation includes the Nike company, its manufacturing factory, etc. We identify that the Nike company is the leader in this virtual corporation. When we call a Dell company is a virtual corporation, Dell company is also a leader in its virtual corporation. How a company can be a leader in the virtual corporation? A company with thoughts. The leader company like the director of a film, finding the proper actors and actress to join the film.



The relationships between partners of virtual corporation are based on the contract. The contract can be made based on a long term or based on a short term. The life of the virtual corporation can be long and also can be short, so there are different periods of contracts. The virtual corporation is beginning when there is the market opportunity and ending when the opportunity disappears. The virtual corporation has very quick response to the market. The company has agility and flexibility. Carmrinha-Matos summarizes some key words about the virtual corporations as follows (T.Y. Kim, 2006, p.3):

- Cooperation and complementarities
- Networked or distributed organization
- Infrastructure supporting interoperation

The cooperation within the virtual corporation is based on the different core competences of the partners. This is a complementary cooperation, through making fully use of the current conditions and abilities. The virtual corporation has some differences compared with merger & acquisition, group and alliance:

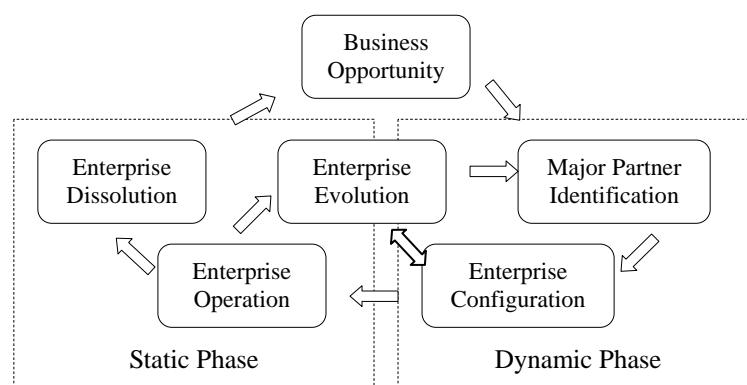


Figure 2.2 - The periods of the virtual corporation

Source: Kim, T.Y. etc. (2006). A modeling framework for agile and interoperable virtual enterprises. *Computers in Industry*.

The periods of the virtual corporation can be divided into dynamic phase and static phase, illustrated in Figure 2.2. The business opportunity is the beginning of the virtual corporation. The dynamic phase includes major partner identification, enterprise configuration and enterprise evolution. The static phase includes enterprise evolution, enterprise operation and enterprise dissolution.

The comparison between virtual corporation and merger & acquisition (M&A): The virtual corporation is based on contracts while the entity of the company in M&A is changed. The M&A usually deals with only one company, with a long plan or strategy and a lot of money occupied of the buyer company. Meanwhile, this will involve some legal formality about the two companies become one company. There is no such legal formality for the virtual corporation.

The comparison between virtual corporation and group: The companies in a group have the same goal, such as long strategy, marketing. The headquarter makes the goal of the whole group, and the sub-companies just follow it. The virtual corporation is built based on the contract and market. Companies can enter into and go away from the virtual corporation freedom.

The comparison between virtual corporation and alliance: The virtual corporation uses virtual technology and information technology as the main communication method. There is a lot of information sharing between the partners in the virtual corporation. The company joins the alliance mainly to get the economy of scale or reduce the cost, especially in shipping alliance. There may have some cooperation during the alliance, but not like the cooperation in the virtual corporation, which is totally based in the information exchange.

## **Chapter 3 Building the Virtual Shipping Corporation**

The virtual corporation has been successfully applied and realized in manufactory industry. Recently, some other industries, like logistics, began to use such an organization structure. Logistics is belonging to the service industry, and the shipping industry is also belonging to the service industry. So, there is the possibility that the virtual shipping corporation can be built in the shipping industry.

### **3.1 The Core Competence of the Shipping Corporation**

#### **3.1.1 The Core Competence**

The partners of a virtual corporation are working together with a good performance for they can concentrate on their core competences. The core competence means the ability which the company is good at or has advantages compared with other companies. There are different parts or departments in a company, of which only some can be done very well by a certain company. So, we must find the core competence of the company.

The concept of core competence was developed by Prahalad and Hamel in 1990. The core competence can be related to the technology and the value created etc. "A core competence is a combination of complementary skills and knowledge bases

embedded in a group or team that results in the ability to execute one or more critical processes to a world-class standard.” said by Coyne etc. This definition concentrated that a core competence consists of knowledge and skills, which is belonging to the intangible aspects. The core competence can also be the tangible assets, for example the ships in shipping. If there is no ship, there is no shipping. The core competence is the star or cash cow, if we use the BCG (Boston Consulting Group) Matrix to research the abilities of companies, showed in Figure 3.1. The vertical line shows the market future and the horizontal line shows the ability rank.

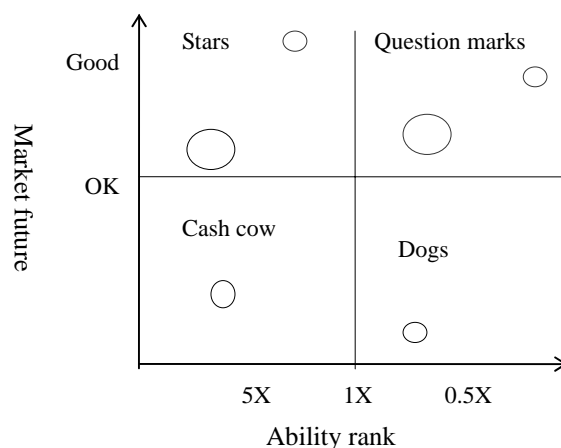


Figure 3.1 - The BCG Matrix of core competence

Source: Various sources.

This is the example of the BCG Matrix model. We suppose there are 10 companies to be chosen, company A, B, C, D, H, I, J, K, L, R. We put them in different cells in the BCG matrix according to their different situation, in Table 3.1. Then we give different indexes to them, showed in Table 3.2. This index is one of the parameters when we choose a partner. We can also have other indexes such as AHP, market share, company scale, goodwill, working experience etc. Combined all these parameters, we will get the total rank of the companies.

Table 3.1 - The positions of 10 companies in BCG Matrix

The ability needed	The expected growth of market			
	Very quick	Quick	Slow	Very slow
Very needed	B	D	R	K
Needed	A	C	I	
Less needed	H	J	L	
Don't needed				

Source: Various sources.

Table 3.2 - The indexes of 10 companies

	Very quick	Quick	Slow	Very slow
Very needed	1.7	1.5	1.2	0.5
Needed	1.5	1.4	1.3	0.3
Less needed	1.3	1.1	0.7	0.2
Don't needed	1	0.6	0.4	0.1

Source: Various sources.

### 3.1.2 Characteristics of Core Competence

The core competence is the things which the company can do best. It will help the company to suit a variety of markets. It can help the company to make value in a number of markets, not only a single market. For example, there is a supermarket and a small grocer. The supermarket can provide a lot of things, while the grocer can only provide some things. The grocer has no core competence? Yes. The grocer can change the kinds of the goods flexibly. This is its core competence. In summer, ice cream and bear can be sold, and in winter, gloves can be sold. As a small company, it cannot provide a large scale of products at one time, but it can change the products according to the market.

The core competences are rare or difficult to imitate. This characteristic concerns

about what we can outsource. For example, the Intel company and Microsoft company thank to the IBM to outsource the computer system and the chip making to them. When IBM realized what a big mistake it made, IBM can only be a follower in these two fields. It is important to consider that what the core competence the company has.

### **3.1.3 The Core Competence of the Shipping Corporation**

Nowadays, we can see many articles talk about that: shipping corporations should go an information-based way, e.g. *Information-based shipping corporation*. L. Zhen also suggests building a virtual shipping corporation. We can see that these two opinions have some relationship. The information-based, internet-based company is also one of the characteristics of virtual corporation.

The shipping company can be divided into direct value activities and indirect value activities based on the value according to W. Cao's opinion. The direct value activities consist of the marketing, research and development, material purchase, producing, sales, quality control and cost control. The indirect value activities consist of basic management, human resource management and customer management. I would like to add one more division, the tangible assets. In the shipping industry, ships and containers are very important. So, we can see there are many container leasing companies. Besides, we can also see leasing business of ships between ship owners and renters in the spot market every day.

The shipping company should also consider the safety and speed of the service. The safety of transportation needs a strong security system to support. Besides this, the quality control system is also needed. This deals with a software design. Some

companies are very good at design the information system. If we have a very good information system, the condition of goods can be sent to the related partners as soon as possible. We know there is no perfect thing in the world. The things like cargo damage, cargo delay, etc are sure to happen more or less. The emphasizes is how to control such things to an acceptable range, in stead of reduce to zero.

After the core competence is found, the company will have the idea of cooperation. The company will know how and where to cooperate, in which level and what kind of partner is needed.

## **3.2 Building the Virtual Shipping Corporation**

### **3.2.1 Analysis of Game Theory and Information Sharing**

Game theory is a theory to research the competition and cooperation. In elusions.com, the definition is: game theory (the abstract study of games or the mathematics of competition and cooperation) analyzes situations in terms of gains and losses of opposing players. It is a system for predicting the action of people in certain situation. The theory is applied widely in economics, operations research, military, political science and organization theory.

The cooperative game theory is based on the wooden barrel theory. The wooden barrel theory means that the volume of water inside the barrel is depending on the shortest wooden bar. Some companies are good at technology research, but lack of producing ability. Some companies are good at producing, but lack of marketing ability. Some companies have large network, but lack of famous brand. The developments of these companies are restrained by their shortages. If they work together, the shortages are

remedied. For example, the NVOCC and the carrier, one has the market of consumer and the other has the transportation tools.

In the virtual shipping corporation the information sharing is very important to all the partners. We can exchange information by EDI, Internet etc. In the game theory, there is a situation called prisoners' dilemma. For example, there are partner A and partner B. They are supposed to have different kinds of information. They have two choices, share the information and don't share the information. In Table 3.3, the first figure in the bracket shows the partner A's benefit and the second figure shows the partner B's benefit. If the partners share the information, both of them can get 6. But if one partner shares information and the other partner doesn't share information, only the partner, who doesn't share information, will get 8. So, the best choice is sharing the information, for these two companies can get the benefit 12 (=6+6) totally.

Table 3.3 - The prisoners' dilemma of information sharing

Partner A \ Partner B	Share the information	Don't share the information
	Share the information	(6, 6)
Don't share the information	(8, -2)	(0, 0)

Source: Du, Y.P. (2005). The game theory analysis of the information sharing in the supply chain, *Journal of Information*, 1, p.75.

This prisoners' dilemma is a static situation. In the real situation, this may be a dynamic situation. When the partner A and B share the information, there is a potential benefit. So, in Figure 3.2, we set the benefit (10, 10), when both partners share the information. The partners don't make the choices at the same time. The partner A is supposed to make the choice firstly. If the partner A share the information, the partner B can get the benefit anyway, sharing or no sharing. But, the



partner A can predict the action of the partner B. The partner A will not share the information, if it predicts the partner B doesn't want to share the information.

In once or limited times of cooperation, the partner make its choice by predicting other partners responses. In this situation, we can get the best benefit for both partners by increase the deceive cost. The experience of cooperation can be used as information. The frequent cooperation can spread the information as widely as possible. When company C faces betrayal by company D, company C will spread the information to its partners that company D cannot be chosen as a partner. Then company D will have a worse situation, the more times it betrays.

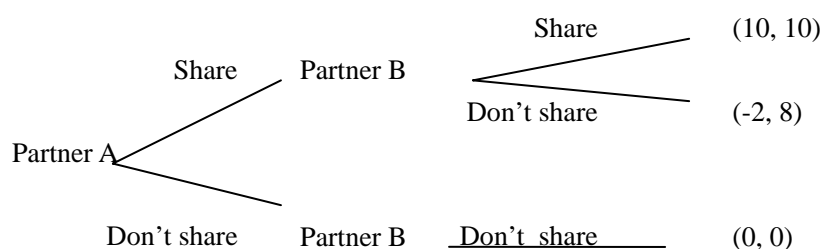


Figure 3.2 - Dynamic situation of information sharing

Source: Various sources.

In other situation, the cooperation between partners is supposed to be repeated again and again. So, it can be thought as repeated cooperation and repeated game theory. So, when a company makes a choice, it considers about the influence of the choice at this time as well as in the future. He not only considers about the profit he can get this time, but also considers about the profit he can get next time (through building the goodwill etc.). If the company betrayed this time, no one would like to cooperate with it again. For the information spread is very quickly. So the company chooses the best one in such a situation that it can cooperate with other partners as long as

possible.

A shipping company always provides a part of its information to its partners. In a company, some information is too secret to share with other people. The company must have some control of its information. The information sharing is divided to different levels. The partners in the different level of operation can get the information of different level. This is the information level used in the information sharing. The different partners can get the needed information and meanwhile the secret information can be protected. This can be realized by directional information. This means the information system set certain information going through a certain way, to a certain company or person.

This is just an example for sharing and controlling the information: The rule is based on several parameters, such as partner (P), operation right (OR), information group (IG), and effective period (EP). These parameters are related.

$$F: P*OR*IG*EP \rightarrow (0, 1)$$

The (P, OR, IG, EP) was mapped to (0, 1). If the (P<sub>1</sub>, OR<sub>1</sub>, IG<sub>1</sub>, EP<sub>1</sub>) is mapped to “1”, the partner P<sub>1</sub> has the operation right OR<sub>1</sub> at the information group IG<sub>1</sub> at the effective period EP<sub>1</sub>. If this is mapped to “0”, the partner P<sub>1</sub> has no right of operation. The parameter of effective period is used to restrict time period. Sometimes, the partners do not cooperate continuously, for example the second time cooperation is 1 year later than the first time cooperation. In this situation, we can use the parameter of effective period to close a certain operation right. In the same way, we can use it to open a certain operation right.

When a partner uses the system to get some information, the field of information is set according to the value in the parameters. For example, an agent wants to get some

shipping route information, the information system will feedback available information. These parameters can be modified when the partner's ability change, for example a forwarder becomes a carrier. New parameters can be set if we have some special partners requiring for special information. This mode of information share can provide the needed information as well as protect the information.

### **3.2.2 The Virtual Shipping Corporation**

The virtual shipping corporation means that the new relationship between shipping companies based on the information network to open the market through co-working. The development of the information technology will change the shipping company's organization structure. Besides, the network becomes the basic system with the exchange of the knowledge and information.

Robert Metcalfe, the founder of Ethernet cables states that, "The real value creation of a network is equal to the square root of the total numbers of connected computers". (U.M. Yuruyen, 2001) The total value of networks today gives opportunities to shipping companies and their value chains, especially through the virtual corporation

### **3.2.3 The Operation of the Virtual Shipping Corporation**

The virtual shipping corporation can be divided into two different kinds: virtual department and virtual function. The virtual department involves virtual producing, virtual development, virtual management and virtual sales. The virtual function involves virtual sales and Internet using.

Virtual producing is the first form of virtual operation. The producing means that the

transportation by ships in the sea. The virtual producing means that a shipping company get the business and let other companies to do the sea transport. This company is very similar with the NVOCC. The shipping company concentrate on the other operation, such as quality control.

Virtual research and development means several shipping companies can work together to research and find a new shipping route. They can get a new market and co-operate to develop it. These shipping companies can exchange the information between themselves and then they will find a most suitable shipping route. All the partners can provide their ships to sail on the route together. Thus, each shipping company can spend less money and save time to find and use a new shipping route, compared with the work by a single shipping company itself.

Virtual management means to virtualize some departments in a shipping company, mainly human resource department. A special human resource company is chosen to do employment and management. Many foreign invested companies use the human resource management centre to do the employment. Some domestic companies begin to use an employment company, for example COSFRE (COSCO International Freight Company). We can also see many seafarer provider organizations in many countries.

Virtual sales mean that the shipping company can sale in the Internet or use the independent sales companies, which have independent persons, instead of sales department in shipping company. The shipping company need not to pay so many energies to the department management and market research. The shipping company can concentrate more on its core competence. Nowadays, we can see that there are many companies have their agents. More and more shipping companies have the

knowledge that the agent can be the virtual sales department of their companies, just like the virtual corporations.

The virtual shipping company virtualize some of its function in the Internet, which is very familiar to us. Many shipping companies use the website in the Internet. The shipping company can also send its information in an information centre website. This centre/website is a place to exchange information, just like an information market. Small shipping companies may prefer the information market than the large shipping companies, for most of them wouldn't like to build an information system themselves, for huge cost.

For example, there is a company which is good at design and build the information system. They think their core competence is that they can provide an information platform, on which the forwarders, customers, warehouse, shipping companies, etc to exchange the information. When a forwarder enters into the information platform, it can get the information manually or automatically. It can get the sailing schedule in one information platform, instead of going to many different shipping companies' websites. Because of the information exchange is on the Internet and the information spread's speed is very quick, companies and its partners can get the newest information at the same time. For there is no information delay, what we get is the updated information and real information. It is very helpful for a company to make the decision. The company who provides the information platform and the cooperated partners are called as the virtual corporation. If there are another three companies cooperate with this company together, then another virtual corporation is called. A company can join into several virtual corporations at one time.

In such a situation, the functions of departments in the company are not changed. The

departments still exist in the company. A department may have several persons, less people. For example, booking the space. People usually need fill the table/paper to book space of a ship. The shipping company may need many people to look at these papers and make the statistics. Nowadays, some shipping company provide the booking in Internet. The computer system can calculate the statistics automatically. Less people are needed in the booking department. Meanwhile, the customer may find that they can book in any time theoretically, for the Internet service is 24 hours. Well, in the fact, the different companies have different situations.

In this operation of a virtual shipping corporation, one thing is very important that is the partners should trust each other. If there is not trust, the shipping company will not be willing to provide the information to its partners. If there is not efficient information exchange, there will have difficulties to cooperate.

## **Chapter 4 Economic Analysis of the Virtual Shipping Corporation**

Information is very important to do a business. If we can get useful information, we can do well. Well, among people or companies, the information is not equally distributed. Some people or companies have more information, some have less.

### **4.1 Analysis of Information Asymmetry**

The information asymmetry means that different people have different information about the same thing, in quality or quantity. In [inverstorwords.com](http://inverstorwords.com), the definition of information asymmetry is: condition in which at least some relevant information is known to some but not all parties involved. Information asymmetry causes markets to become inefficient, since all the market participants do not have access to the information they need for their decision making processes. As for the consumer and seller, the seller usually has the more information than the consumer.

#### **4.1.1 Analysis of Information Asymmetry between Shipping Corporations and Partners**

In shipping industry, services are the product of the transportation. The information about this service includes price and contents etc. This information has various degrees of information asymmetry between companies and companies, companies

and customers, customers and customers.

The information asymmetry is caused by the distribution and specialization of the social work. The information of a company is different in the different positions of operation, industries and geographic places. There is a limitation for a company to get the information it needed. The causes of this are mainly two situations, objective situation and subjective situation. Different companies have different conditions, and these influence what information they can get. This kind of information asymmetry is called objective information asymmetry. There is also another kind of information asymmetry which is called subjective information asymmetry. This means that some companies do not want to provide the information, and other companies can not get the relative information they wanted. Usually, the company can get some benefit just for itself if it chooses to hide some information.

If we want to get some information about other companies, we usually use the companies' financial reports. The information is easily to be got. However, we can not rely on only the financial reports. In America, many companies like to publicize their financial reports. Well, in China, only the companies, which come into the stock market, have to publicize their financial reports. If we suppose all the financial reports are true and based on the facts, there is still some omits in the reports themselves. An information demand research (H. Wen etc., 2005, p.38) showed that 68% people thought that the information about intangible assets is very important, but only 8% of the companies' financial report talked about this. According to Bassi's research, in the annual financial report of about 40 big companies, there is no quantity information about the value of human resource. Although the companies always emphasize how important human resource they have had. Only several countries, such as America, require that the research and development fees should be separately displayed in the



financial report. Other information about brand and investment in information technology usually don't be showed.

In shipping industry, the revenue is great while the cost is great too. A company with ships and a company without ships, their financial reports have some differences. The information about a shipping company is very variety. We can get the information about financial reports, brand influence, records of ship accidents, seafarers' condition and working experiences.

Internet and other information technology are changing the speed and method of information spread. In the virtual shipping corporation, partners can get the information and exchange information more easily and they have many methods to testify whether the information is appropriate. In the virtual shipping corporation, partners work together for the first time and then they will have a lot of opportunities to work together again. If there is a NVOCC, it gets a business from Shanghai to Malaysia. It finds the carrier A to do this transportation. Later, it may get a business from Shanghai to Antwerp. The carrier A still has the chance to do the transportation. The carrier A may have the third time and fourth time etc. The frequency of the cooperation between partners is comparatively high in the virtual shipping corporation than in other organization structures. For the high frequency of cooperating between partners, the company will be likely to exchange the information and provide the right information.

#### **4.1.2 Analysis of Information Asymmetry of Products**

Besides the information asymmetry between the companies and companies, there is information asymmetry between the companies and consumers. This information

asymmetry may influence the consumer's decision to buy the product.

In the shipping market, the seller is usually knows more about its product than the customer. The seller communicates with the carrier more than the customer, or sometimes the seller has ship capacity and is the carrier itself. Many shippers and consignees may know their products, but usually are not familiar with the shipping business. This is the foundation of the living of the NVOCC. The shipping company provides the high freight rate to the small customer, and provides low freight rate to the large customer. The small customer can not get the low freight rate and also do not know the bottom line. Well, the NVOCC has the communication with the actual carrier frequently, so it has much information. Compared with customers, the NVOCC knows more about the carrier. Meanwhile, the NVOCC knows more about the customer, compared with the carrier.

In the Internet and web environment, the information about carriers can be got more easily. Because of the low cost of spread information, the carriers are preferred to provide the information to customers. However, the use of Internet is imbalance in the world. 90% of the global Internet business are beginning, through and ending in America. 81% of the websites are written in English. Among the points of the top 100 websites, there are 94 in America. In the 13 rootreservors managing the global domain names, there are 10 in America. (W. He, 2005, p.193) These mean that not all people can use the Internet. Internet is a good thing, but only it can not eliminate the information asymmetry. So, the shipping company should provide their information through various ways, papers, magazines etc.

In some product field, the brand is the emphasis of the advertisement, such as Nike and Adidas. Instead of stressing the material used, they prefer to transfer the spirit and

fashion to the consumer. In some product field, the function is the emphases of the advertisement, such as toothpaste. In 1981, Patton pointed that a lot of information about product can help consumer to make a better purchase choice. In 2003, the demonstration of Olson showed that the more information about the product the customers can get, the higher brand evaluations the customers will give. (Z.Y. He, 2005, p.103)

There are so many different products in the market, the brand strategies are different. In some product field, the mainstream brand has a strong top position, such as Coca Cola and Pepsi Cola in the soft drink, Maersk in the liner market and UPS, Fedex in the air transport. In some product field, the market occupation of a brand is low although the company makes every effort, such as clothes and vegetables.

The Table 4.1 showed the coherence between the degree of information asymmetry and brand partialness (the price factor is omitted in this research). The higher information asymmetry there has, the higher brand partialness there has. This phenomenon is mainly because that the high cost of researching information. The brand is a main method to transfer the information about quality and credit etc. If the customer can't get the information by themselves, they will rely on the brand. Furthermore, the research also showed that with the information asymmetry degree increasing, the coherence between the partiality and purchase is increasing.

This research indicates that the information asymmetry widely appears and influences directly to the customer's choice and partialness of brand. When the information asymmetry is very high, the consumer prefers to the product of name brand. For the brand is the promise of the quality and function of the products at certain extent.

Table 4.1 - The relationship between the brand and purchase

Information Asymmetry	Low		Medial		High	
Product	Business suit	Sportswear	Mobile	Walkman	Shampoo	toothpaste
Degree of brand partialness	12.5%	20.5%	38.3%	23%	66.7%	71.7%
Average	16.5%		30.7%		69.2%	
Coherence of partialness and purchase	47.2%	55.9%	67.8%	71.9%	76.3%	79.2%
Average	51.6%		69.9%		77.8%	

Source: He, Z.Y. etc. (2005). Information asymmetry influences the brand strategy. *Economy Science*, 2, 102-108.

The service provided in shipping industry is an intangible product. In the intangible product market, the provider is very difficult to display the information about its products to consumer. The customer also has difficulty to get the information, for they can not see, touch and feel before they buy the service. The measure of the service value becomes a problem.

In shipping industry, the brand partialness is very high. For example, many people like to buy Maersk's products. Maersk's brand strategy is higher price with better service. The shipping company can actively provide the information to the consumers with various methods. For example, in an advertisement, we can show how punctual we are. In the China-Japan route, the ship *New Jianzhen* is very famous for her punctuality. The China-Japan international ferry company can do what they promised. The management of ship is very strict, e.g. ship control, operation control and quality control. Many things can be done quickly, such as custom affairs. All these things are done according to certain rules, very systemically. Thus, the international multimodal transportation can be realized between the sea

transport and air transport. In such a competitive environment, a lot of customers are attracted by the ship *New Jianzhen*, and there a lot of loyal customers.

Brand building is a very useful method to reduce the information asymmetry. The brand with the added information, such as advertisement of quality and services, shows to the consumer at a high frequency. The consumer can know the company's brand and even choose it while they get the information they needed. The shipping companies can advertise in many ways. They can publish the service information and schedule information on the special newspapers and magazines. A special website can also be built to provide a platform of information exchange. The shipping company can introduce its characteristic service, communication method, the work flow and some operable advices. In the information website, there can have some knowledge about freight calculation, chargeable weight calculation, abbreviation of freight surcharge and some instruction about custom clearance. There can have a BBS (Bulletin Board System). In here, the customer can ask questions and get useful replies. The government can provide an information platform to publish shipping information, such as the information about shipping agents, ports and Customs affairs.

#### **4.2 Analysis of Transaction Cost**

The transaction cost means that the expense spent on finding the appropriate partners, making the contract, trading and related punishment. The transaction cost is built upon three principal attributes of transactions: asset specificity, frequency, and uncertainty. Some assets are difficult to be transferred to other utilization after the investment happened. According to Williamson's view, the higher asset specificity, the higher transaction cost. The shipping company is hard to sell the ships or other assets to other people for other use when the market bad. The price is very low after the

bargain, if the assets are sold.

The information-based company can result in reducing transaction cost. K. Ma etc. displayed the relationship between organization model and transaction cost, *The study of enterprise organization based on transaction cost and the principal-agent theory* (2005). L. Zheng said about the transaction cost had close relationship with the virtual shipping corporation. When the market opportunity appears, the virtual shipping corporation needn't add too many new resources. It can take fully advantage of the current resources of the companies to provide the needed product or service with low investment and high efficiency. Because of this, the response of market is very quickly. So, the virtual corporation can save the opportunity cost of the company.

In the shipping industry, the ships are assets with high asset specificity. If we do not need the ship to do transport, the ship can do nothing else. Some company just sell the ship to the demolition market. So, the transaction cost in shipping industry is usually very high, especially in liner market. The liner companies usually have a fleet. It is a very difficult thing to get into the liner market and also to get out from the liner market. But if it is an NVOCC, the transaction cost may be less compared to the liner companies. The NVOCC is a virtual carrier, for it has not a single ship. The NVOCC is in the middle position, one side is the carrier to do the sea transport, and the other side is the customers. Comparatively, the NVOCC has a large flexibility.

## **Chapter 5 Related Factors of the Virtual Shipping Corporation**

The organization of a virtual shipping corporation is a horizontal structure. This structure is very good for transferring information. Even though, there is still a risk of management if we can not find a good partner, for example the uncertain environment, the different background of partners and the opportunism. When we use the internet, there may be some security questions. The virtual shipping corporation itself has some legal characteristics.

### **5.1 Management Risk**

#### **5.1.1 Trust Mechanism**

Sable viewed that: trust is that the cooperative partners believe that no one will take the advantage of the other partners' weakness to get profit. If we want to have a cooperative virtual shipping corporation, the trust is necessary. Trust means that a company can do what it has promised. The trust between partners can help them to have a better communication and comprehension. The trust between partners is factored by the goodwill of company, organization background (similar culture or different culture) and communication.

The trusts between the partners of virtual corporation have four degrees, showed in

Figure 5.1: deterrence-based trust, knowledge-based trust, identification-based trust and swift trust. The trust form (degree) is increasing between the virtual corporation partners. In deterrence-based trust, the partners do what they promised, for them afraid to be punished. In knowledge-based trust, the partners know about each other and can communicate and predict the other's actions. In identification-based trust, the partners cooperate as a family. In swift trust, the partners can build the trust between each other in a short time to catch hold of the market opportunity. The trusting partner will have little action of opportunism.

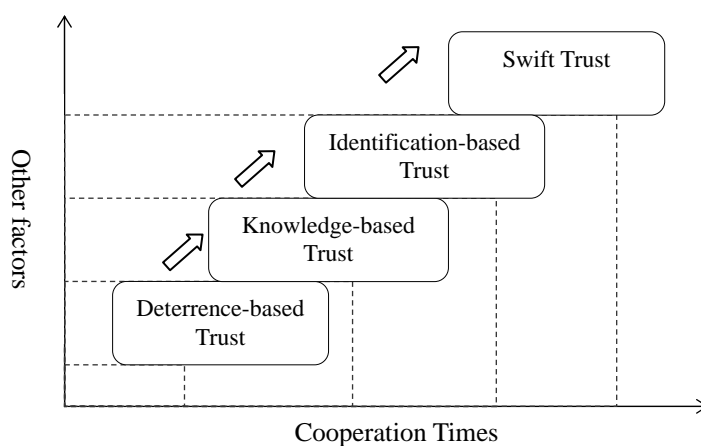


Figure 5.1 - The four degrees of trust

Source: Xu H.L. (2005). *Restriction and incentive of stakeholders in virtual enterprise*. Unpublished master's thesis, Harbin Engineering University, China.

The trust can be got through two methods: cooperation experience and information. The cooperation experience means that the partners trust each other when they have the good cooperation. This kind of trust is developed by the times of cooperation. The degrees of trust are increased step by step. Sometimes, the shipping company needs to find a new partner, with which has not cooperation experience. The trust is built on the information, which display the new partner has goodwill. This trust is usually beginning from the first or second degree of trust.



The information can be got through the public media information, company itself collection, the special research company's report, official information.

The official information is about the operation qualification, legal duty performing situation etc. The information can be got through the official information data base and related government departments, maritime department, court, customs, business department and tax department.

The special research company is the third party shipping credit evaluation company. It can wholly investigate the shipping company. The special research company can also get the information about the service quality, contract performing situation, through sending the questionnaire papers to the customers of the shipping company.

The shipping company usually has its own data base about other shipping companies which about the service quality, company's goodwill, credit and co-work experience. We can use the 5C standard to measure the partner, which are character, capacity, capital, collateral and condition. We can also use the AHP method to select a partner. The AHP divides the problem to different levels. The factors of different levels are given relative rates. Then we can get the rank of programs. For example, we can use the factors as the space and volume of ships, route operation situation and network.

The partners may be in different countries. The cultures in the different companies are different with each other. With the more operation together and frequent communication, partners will know and understand about each other more and more. Every partner has the chances to work together again, so most of them will not destroy the future opportunity of business. This can help the partners to have a better co-work and better trust.

### **5.1.2 Benefit Distribution**

The success of the virtual corporation also needs the equal and reasonable benefit distribution. The benefit distribution means that the participants of the virtual shipping corporation get the benefit separately from the total revenue of the virtual corporation. There have several rules about the benefit distribution (H.L. Xu, 2005, p.44):

- Reciprocity--means that the benefit of partners should be promised; otherwise the cooperating activity will be influenced.
- Optimization of the organization benefit--by considering the various factors, design an optimal benefit distribution structure.
- The asymmetry between the risk and benefit--means that the more risk a company takes, the more benefit it will get.

We can use the contract to set some rules about the distribution of benefit. The benefit can be set to a certain figure. At the contract, the company gets the promise that it can get the certain money. The money can be paid once or in several times. For example, a shipping company rents several ships at a fixed rate. The total rent is a certain figure. The advantage of this kind of benefit is that the company (ships owner) has less or zero risk. Whether the market is good or not, he can get profit anyway. Meanwhile, the shipping company who rents ships takes all the risk and all the remaining benefit.

The benefit can be set a certain percentage of the total benefit of the virtual shipping company. For example, we can have a local company as our partner, if we are not familiar with the foreign market. We are not sure how good it will do, so a percent benefit is a good choice. The company who agrees to use this mode of benefit distribution means that it agrees to take some risk of the virtual shipping company. For the amount of money get is uncertain. When the companies work together as a

virtual shipping company, there is a risk of the market if they don't catch the opportunity successfully. So, there has the situation that no benefit but cost. In such a situation, the company will not get benefit. The advantage of this kind of benefit distribution is that whole risk of the virtual shipping company is distributed to several partners.

If we combine these two modes, this is the third benefit distribution, mix. There are two kinds of mix: one kind is separate, the other kind is complex. The kind of separate means that a company gives the benefit to some partners by a certain figure and to other partners by a certain percentage of total benefit. The kind of complex means that a partner has both fixed and percent benefit. This can be seen usually in sales company. The agent provides the volume of goods to the shipping company every month. The shipping company pays the agent a minimum fee. The agent can get the minimum fee whether the volume of goods are large or small. If the agent can provide a very large volume of goods, the shipping will give the agent some extra money according to a percentage of the extra volume of goods. Sometimes, we also called it extra bonus.

The third kind of benefit distribution is the best one. Some of the partners may do not like risk. Some of the partners may like risk, for high risk with high profit. The different kinds of benefit distribution are chosen according to the different characteristics of the partners.

## **5.2 Technology Problems**

The advanced information technology helps the virtual shipping corporation to get the market. Meanwhile, the technology itself has a risk of security. During the

information transferring from one partner to another partner, the information may be changed and exposed by the third party, such as hackers. Although the two partners trust each other, they can not predict the third party's damage.

We can see many examples about the Internet. Many people have credit cards. In the middle of 2005, there happened a serious credit cards' information system has been invaded in American. Hackers invaded the Card Systems and influenced 40 million customers' information. The VISA card, Master card, American Express card and Discover card are all influenced.

The computer does a lot of work today and it usually memorizes many things. The details information about the shippers and consignees are usually stored in the computers or data bases. The large shipper or consignees usually have the conference freight rate with the carrier. The price of transportation is much lower for the large customers than that of small ones. The information exchange among partners is mainly through emails and Internet, although there are many other information exchange methods, such as telephone, fax. The cost of using Internet is comparative less. Some information is very important to a company. If the information is got by other shipping companies, the customers may be taken away by other companies or the company is in a disadvantage condition in competition.

So the security technology is very important for all companies. Many shipping companies use the anti-virus systems, such as Panda, Rising. We just hope that this problem of information security can be improved in the future.

### **5.3 Legal Characteristics**

The partners have multi-cooperation in virtual shipping corporations. A partner can enter the one virtual shipping corporation or several corporations at the same time. The reason is that the virtual shipping corporation is virtual. The virtual shipping corporation need not to register as company. It is virtual existing and provides an environment for the cooperation between companies.

As we know, in the virtual corporation, there is usually a leader company. This company needs to know more about the law and shipping knowledge, etc. It is very helpful and necessary to choose cooperated partners. The leader usually is the mind of the virtual shipping corporation and has the initiative choice of who will be the body. For example, a market research and consultant company find a shipping opportunity or market in the north of China. It may cooperate with the professors of SMU to do some detail research of this special market. Then, it chooses the shipping route, carrier, etc. In this virtual shipping corporation, the market research and consultant company is a leader, who designs the whole business.

The partners in a virtual shipping corporation make contracts among them. The contracts are legal and protected by laws. So, the contract law has close relationship with the companies. The contract must be made very clearly and particularly. It is very important for all partners to distinguish the responsibility and protect the property of knowledge. If there is some dissension in the future, we can only get the legal protection according to the contract rules.

The electronic information is developed quickly in recent years. There appear a lot of contracts based on electronic information. For example, the emails can be used as proof that the company has the responsibility of what it has written. I want to mention that, in China, not all electronic information can be used to make a contract.

## **6 Conclusions**

In the changeable shipping market, the shipping company's structure also needs changing. The participants of the virtual shipping corporation use the information technology to reduce the information transit time and realize the information exchange timely. The virtual shipping corporation can help the company, especially the small shipping companies, to concentrate on the core competence and save a lot of energy. It also can help the shipping company to have a quick response to the shipping market through the cooperation and information exchange among the partners.

This thesis uses the qualitative analysis to study the feasibility of building virtual shipping corporations in the shipping industry. The shipping companies have different core competences. The different core competences help them to cooperate in the virtual shipping corporation.

In the virtual shipping corporation, the information transfers efficiently. The information technology and Internet is the base of the virtual shipping corporation's operation. This helps the partners in the virtual shipping corporation can have a good communication and information exchanging. The game theory discusses the possibility of the information sharing in the virtual shipping corporation. Information is shared according to the different level of cooperation. The exchange of information has some certain direction. So, the information can be both shared and

protected.

The information sharing can reduce the transaction cost and information asymmetry between partners and between customers and companies. The shipping company can publish the information about schedule and service regularly through many kinds of media. This is very helpful to relieve the information asymmetry in the shipping industry. Well, the information asymmetry can not be eliminated thoroughly. For example, the freight rates are different to the different customers, within a large range. The risk of the virtual shipping company can be divided to the partners through the contracts and benefit distribution. The benefit of a partner relates to the total benefit of the virtual shipping corporation.

The company law has not the concept of the virtual shipping corporation. The partners in the virtual shipping corporation use the contracts to distinguish the responsibility. The contracts are protected by the law. So, in my opinion, the virtual shipping corporation, which is based on the contracts, is legal.

Although there may have some problems such as technology and Internet security, as a whole, this operation mode of the virtual shipping corporation is feasible in operation level, economic level and legal level.

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