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# The research on new logistics integration

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# Research On Integrated Logistics In Mining Company

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## DECLARATION

I certify that all the material in this research paper that is not my own work has been identified, and that no 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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**Supervised by**

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# ABSTRACT

Title of research paper: **Research on integrated logistics in mining company**

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Because of the economic crisis in 2008, both mining market and shipping market are fallen into decline. In this situation, no matter mining companies or shipping companies are want to find a measure to help them get out of the trouble and get more profits. However, in this decline, some companies still keep a rapid increasing. Shenhua Group is one of these companies, and the core strategy of the Shenhua is the integrated logistics strategy.

This dissertation will research on integrated logistics strategy. Through theoretical analysis and case analysis to discuss what competitive advantage can be brought by integrated logistics strategy. And I will use a prediction model to verify this strategy can bring competitive advantage to mining company.

However, while using this strategy, several problems must be noticed. So, in the end, I will discuss these problems.



**Key Words:** Logistics, integrated logistics, Shenhua Group

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# Chapter One: Introduce

## 1.1 Research background

Logistics comes from the late 19th century. It is generally considered to have originated in the military's need. In a war, army needs to supply weapons, ammunition, and rations from a base to the forward position. This materials' movement can be seen a kind of logistics.

In the Oxford Advanced English Dictionary, logistics defined as "organization of supplies and services."

And, in the Webster's English Dictionary, logistics defined as "the science of the organization, transport and supply of military forces; the planning and organization of any complex activity."

In modern commercial, logistics is generally defined as the management of the flow of resources between the point of origin and the point of destination in order to meet some requirements, for example, of customers or corporations. The resources managed in logistics can include physical items, such as food, materials, equipment, liquids, and staff, as well as abstract items, such as information, particles, and energy. The logistics of physical items usually involves the integration of information flow,

material handling, production, packaging, inventory, transportation, warehousing, and often security. The complexity of logistics can be modeled, analyzed, visualized, and optimized by dedicated simulation software. The minimization of the use of resources and time are common motives.

With the continuous development of logistics industry, searching for more efficient logistics chain and more high-quality customer service become the main direction of the development of the logistics. During this period of time, a new kind of logistics concept began to come out. This concept is logistics integration. Logistics integration means that through better commercial operation and strategic cooperation to reduce the cost of the whole logistics process and improve logistics operation efficiency. For example, FedEx Corp. and UPS Corp., they have their own warehouse, transportation facilities and the unified enterprise plan arrangement. Thus, they can use these advantages to provide high efficiency, low cost and high quality logistics services to distributors and consumers, suppliers and manufacturers. However, along with the economic growth, and because the low market access threshold, more and more enterprises have joined the logistics industry. These enterprises contain a part of the cargo owner enterprise. Many powerful cargo owners want to improve their competitive advantage by using vertical logistics integration. The integrated logistics is an important part in vertical logistics integration.

The integrated logistics, for the cargo owner, customer and consumers of production materials is good. But for some professional logistics service provider, cargo owner doing integrated logistics strategy will bring them more market competitive pressure, and directly affect their performance of enterprises. In addition, there are many problems in the operating process of this strategy, these problems need to attention.

This article will discuss these problems in article Five.

## 1.2 Research Purpose

The main goal of this dissertation is to discuss integrated logistics strategy, and analyze what competitive advantage the mining companies will be achieved by doing this strategy.

## 1.3 Research Method

In this dissertation, author will analyzes the competitive advantage for the company that brought by this strategy. Further, author will put forward some problems which will appear in the integrated logistics operation process, and give some proposals about these problems. Besides, the author will give some proposals for the enterprises that sustain to the pressure of competition caused by mining enterprise doing integrated logistics.

Furthermore, the author will introduce the cases of Shenhua Group. And author will deeply analyze the integrated logistics how to bring the competitive advantage for this enterprise. And author will design a case that based on Shenhua Group strategy. Following, author will use prediction model to test whether the new integrated logistics is useful to increase the revenue of Shenhua Group.

## 1.4 Literature Review

### 1.4.1 Recent research of integrated logistics management in mining enterprise

Both scientists in China and abroad have done quite a lot of research on integrated logistics management. And there are also some researches on integrated logistics management in mining enterprise. Because I will choose Shenhua Group as the main analysis object of mining enterprise, so I just collect the research paper about Shenhua Group.

First, research on basic theory of modern logistics is abundant. In On *Traditional M. F and Modern M. F* (2004) we can see, traditional logistics service provider just furnish only transport service. However, following economic developing, goods amount and logistics service provider amount all rapidly increased, so logistics must change. Then, modern logistics has come out which integrated transportation service, warehousing service and information technology management service. In *Emerging Logistics Strategies: Blueprints for the Next Century* (1994), aim at “reduce inventory strategy” is a good thought in logistics, we can use information technology to control the inventory and transport planning to do just-in-time logistics, every logistics department quick response and efficient consumer response.

Second, there are some research is about logistics integration. Such as *The Comparison and Apocalypse of Logistics Development among USA, Japan and Europe* (2005), we can see that to realize the optimal logistics system, we need integrate the transportation, storage, handling, packaging, distribution processing and information management, and other logistics basic activities. Further, we need to make overall plans and coordinate for the flow of materials in the supply chain, and

we also need make reasonable planning and overall control for them. And in *The logistics mode in enterprise strategic alliance* (2003), we can know enterprise strategic alliance can make logistics integration. And in this way, either the large companies or logistics service providers can gain more profits. For consumers, he can enjoy more efficient logistics service and lower price commodity.

Third, for Shenhua Group logistics strategy case, we gain some research report, so that we can do detailed analysis. Such as *Shenhua group logistics and supply chain management analysis* (2007), this paper simply analyze the supply chain of Shenhua Group, except the shipping part of Shenhua Group. Besides, *Case Study on the Industrial Organization Integration Model of Shenhua Group's Development* (2008), this paper use the production function to prove the logistics integration makes the revenue of Shenhua Group substantially increasing.

### 1.4.2 Existing problems

However, problem and weakness still exist.

*Quantities of research are carried out about modern logistics and logistics integration which face to external joint，but not integrated logistics in one enterprise.*

Such as *Research on the Formation and Development Mechanism of Logistics Cluster* (2005), *Research on Formation and Evolution Model of Modern Logistics Clusters* (2008), *A Study on the Symbiotic Mechanism of Modern Logistics Industry and Advanced Manufacturing* (2010), *The Comparison and Apocalypse of Logistics Development among USA, Japan and Europe* (2005), *Logistics and Sustainable*

*Development* (2004), and other paper are all talk about modern logistics and logistics integration in whole market. But some concepts and theories in these papers are very useful to help me analyze the new logistics integration.

*Shenhua Group developed own shipping business and these articles do not mentioned this.*

Such as *Case Study on the Industrial Organization Integration Model of Shenhua Group's Development* (2008), this paper published in 2008, and Shenhua Group developed own shipping company in 2010. And, this shipping company makes all part of business of Shenhua Group become an integrated logistics chain. So, I think this shipping company is the core of the logistics integration strategy of Shenhua Group. Then, I will imitate the production function in this paper to make a new production function model in my dissertation. Besides, *Shenhua group logistics and supply chain management analysis* (2007), this paper analyze the logistics chain of Shenhua Group except the shipping part, because this paper finished before shipping part of Shenhua Group established. So, this analysis is not complete.

*Because major of research papers not focus on integrated logistics management, so they are all not do research on the problems which need to pay attention in the integrated logistics management.*

Integrated logistics management can be seen as a kind of business strategy of enterprise. So, the problems need pay attention in the integrated logistics management can be seen as the problems need to pay attention in enterprise operating. Then, these new problems cannot be considered only in logistics, but also

should be considered in enterprise operating. However, nearly all of these research papers are only focus on logistics process, but not consider on enterprise operating. Thus, nearly all of they are not research on the core problems of integrated logistics management.

In a word, major of researches are focusing on the pure logistics, but not considering on the enterprise operating. So they are just talk about modern logistics and common logistics integration. And there still need do more research on new logistics integration theory - integrated logistics management.

# Chapter two: The characteristics of integrated logistics

## 2.1 Integrated logistics management

Before the appearance of the concept of integrated logistics, enterprise's logistics activities were scattered in various functional departments. Such as, purchasing department is only responsible for procurement logistics, and sales logistics is only responsible for sales part.

In the 1970s, in order to get more benefits, integrated logistics concept began to emerge in some enterprises. This primal logistics integration is the logistics integration which more focuses on internal. Its goal just is that improve the operation and coordination between various functional departments of the enterprise. For example, many European or American countries set up logistics subsidiaries and logistics service departments. These logistics subsidiaries and logistics service departments just responsible for the management and control purchasing, materials management, manufacturing, assembly, warehousing, distribution and other aspects of logistics activities which in production and operation process. In this way, the enterprise can achieve the unified operation and management about procurement logistics, production logistics and distribution logistics. But the evils of this original

logistics integration are that companies are not only need spending some money for its own operating business, but also need spending some money for logistics equipment and logistics work.

Gradually, vertical logistics integration is no longer enclosed in the enterprise, but begins to seek external joint. In order to get more profits, many companies no longer doing the logistics work by themselves. They find some professional logistics service providers to deal with their logistics works. These logistics works as important parts of the entire logistics chain which linked all logistics nodes together. And these logistics works include raw materials procurement logistics, distribution logistics between upstream manufacturers and downstream distributors, and delivery logistics to customers. Professional logistics service providers can provide unified operation and management to these logistics work. In this way, companies can reduce their logistics costs of the supply chain, and achieve a rapid response to customers, improve service levels and competitiveness of enterprises. But this logistics integration also has many drawbacks. As professional logistics service provider is to provide logistics services for the entire market, so sometimes the logistics service does not fully meet the needs of enterprises.

In the 1980s, a kind of improved vertical logistics integration appeared in market. In order to make the logistics services more suited to their needs, some companies began to separate their logistics management departments from the company, and establish subsidiaries that have independent legal personality. And these sub companies will implement market-oriented, professional operation. Set up a logistics subsidiary, the company can enjoy a more suitable logistics services, and logistics subsidiary can make the parent company’s money more focus on their core business,

and make the capital of logistics activities complete independently. However, due to funding limitations, and information transmission speed demand and other factors, this kind of vertically integrated logistics also shows a lot of shortcomings.

In the 1990s, as improvements of this strategy, market seek external joint again. In order to reduce capital investment and establish stable relationship, companies began looking for some enterprises that have long-term contracts with them, co-invest a logistics subsidiary that controlled by two company. And this subsidiary is just responsible for handling the long-term logistics activities between the two enterprises. Furthermore, a number of logistics companies also began to seek cooperation with enterprises. They want to co-invest logistics subsidiary that just focus the enterprise's logistics activities. Under the enterprise's and logistics company's management, the logistics subsidiary both can provide more professional logistics services to enterprise, but also can provide more appropriate logistics services based on the understanding of the enterprise goods.

But the logistics integration model also has disadvantages. Due to market fluctuations, volume and capacity is often not in equilibrium in real shipping activity. So, freight, particularly bulk freight, often has a greater degree of change. This is also reflected in the change of the BDI index. Therefore, when the logistics subsidiary is controlled by the enterprise and shipping companies, these two parent companies will are frequently in disagreement with the freight of logistics services. This situation will affect the benefit of the enterprises.

With the developing of network technology, information management and information control are become more and more easily for enterprises. In this background, for

some enterprises that have enough capital, using vertical logistics integration strategy to build a logistics chain that can achieve full control, will bring more competitive advantage to them. This vertical logistics integration that can be completely controlled is the integrated logistics. The integrated logistics is take logistics section in enterprise, and makes it parallel with the original sales or production department, form a collectivization system in enterprise. Then, use the complete and efficient information management system to manage the entire logistics chain working. In this mode, the funds of logistics department need not be provided by other department of enterprise. In opposite, logistics department as a separate subsidiary will has own funds for logistics operations. And, as part of the enterprise group, the logistics subsidiary will constitute the logistics chain with the core business departments of enterprise, and cooperate to achieve enterprise's strategic objectives, reducing capital flight, increase profits jointly. This dissertation wills focus on the using of this integrated logistics in mining company, and how competitive advantage it will take to the mining company.

The integrated logistics has three characteristics. They are logistics process is collectivized, has an integrated logistics chain, and has excellent information management system. Next, I will discuss the concept of these three characteristics.

## 2.2 Collectivized logistics process

Collectivized logistics process, means using the logistics activities that under the overall control, make the different functional departments of enterprise joint together, form a group. In this situation, logistics is a part of group, but not separated away

from enterprise business operation. Actually, enterprise funds will be scattered in different functional departments. But with using of a good group strategic thinking and complete information management system, group's logistics activities can be the connecting line, make the different functional departments work together. Then operator activities will be more efficient, and customers will enjoy better service. Furthermore, enterprise can increase competitive advantage and get more profits.

Compared to the logistics integration model of 1970s and 1980s, in this mode, the logistics is no longer set in the position that providing service to enterprise business, but providing service to enterprise's strategy with other departments of enterprise. If there is a unified strategic planning in group, the difference of development idea will not occur between the subsidiaries. The difference of development idea may lead to the unbalanced development appeared between departments in the enterprise development process. And this unbalance will lead to enterprise operation efficiency is limited, then affecting the enterprise's overall development.

Compared to the 1990s, in the integrated logistics strategy, the logistics subsidiary provides service under only one company's strategy. This making its development and other departments' development can form a more complete development system. In this way, logistics subsidiary's operation principle will not have severance with other departments of enterprise, because of that there just one parent company it should serve and their just one strategic thinking it will consider.

Because it can use strategic to guide the development of each subsidiary, so the companies are no longer gained market by selling products, but to win market through providing more efficient and convenient services to customers with the

logistics chain strategy. Therefore, in order to increase profits, company should improve the operating efficiency of the logistics chain. And if company wants to let the group work more efficiently, it needs to create a complete and appropriate group strategy. Moreover, in this integrated logistics strategy, each business functions department are required to obey group strategy, and to develop their own development strategies in accordance with the group's logistics chain strategy. The logistics subsidiary, as the core of logistics integration, requires high degree obedience for group strategy. And it need formulate development plans under actively cooperate with other business functions departments.

## 2.3 The integration of logistics chain

Integrated logistics strategy mainly reflected in forming a complete logistics chain. In the logistics chain, every business functions subsidiary is the node of chain, while the logistics activities which provided by logistics subsidiary are cables. These cables connect every node and let them to form a complete logistics chain. So, in the whole system, operation part and logistics part supplement each other. If the operation part’s running is not good, even the logistics doing perfectly, the chain will still be interrupted. Relatively, if the logistics doing not good, even enterprise have a strong operational segment, logistics chain also will still lose its efficient. In this way, entire group’s efficiency will be affected.

Integrated logistics chain is the logistics system that formed by all the logistics chain nodes and the logistics connecting lines, through the group's strategic guidance and the supporting of modern information technology and information management

system, which service to provide efficient logistics. Integrated Logistics chain is the essential factor of integrated logistics strategy. Therefore, if enterprise wants to use the integrated logistics strategy, it needs to construct integrated logistics chain according to its own development strategies and market demand.

In practice, the carrying capacity of railway is much smaller than the water, and the cost of rail transport is much higher than water. In addition, although rail transport is faster, rail road resources is limited, so railway transport cannot be so free like shipping. So, for some mining companies in landlocked countries, if only involve small quantities and short distance inland transportation, they can use dedicated railway lines to construct an integrated logistics chain. However, for the majority of mining companies, in order to construct an integrated logistics chain, they need to create separate shipping subsidiaries. And, if the mining companies have the strength to build their own bulk handling port, even if just to obtain the controlling stake of the port, then they can further enhance their competitive advantages and enterprise profits, this upgrade is not just reduced port expenses. Specific competitive advantage will be discussed in detail below.

## 2.4 Information management system in integrated logistics

### 2.4.1 Information management system

For the integrated logistics strategy, the key that make logistics chain integrated closely is to use the Internet and database technology to establish a complete information management system. In integrated logistics strategy, a complete

information management system has to manage control four types of information.

a) Basic business data

Such as accounting information and human resource information are basic business data. Enterprise basic data information is the basis of entire enterprise information. Accounting information is conducive to count the amount of fund of Group, especially with the money for invest and the funds for operations.

When knowing the amount of the invest money, company can plan to invest in creating a more comprehensive logistics chain, or use to reinforce business sector which the operational capacity is relatively weak. For the enterprise who using logistics integration strategy, its maximum production capacity is the maximum production capacity of the weakest business sector of it. So reinforcing the weak department is very helpful to the enterprise to improve profits.

When knowing the amount of available operating funds, the Group can develop operational plans and development strategies based on the amount of funding.

In addition, human resources information is beneficial for personnel management, enhance Group's discipline, as well as to keep abreast of the needs of employees, to create a good working environment, and improve staff efficiency. Company can also use HR information to find business talents. This is very helpful for the future development of enterprises.

b) Plan information

Plan information needs every business subsidiary provides their short-term business plan, such as production plan, financial planning, procurement plans. And, every section requires to be provided reports to appropriate department in accordance with the different levels of management. Then these plan reports will be gathered in the information system. Finally, the enterprise wills adjust various departments' plans, and fed new plans back to the every business sector. Plan information is good for Group allocates its resources and balances the product capacity of every business subsidiary. Plan information also can let company give logistics plan to logistics subsidiaries according to production and sales plans, so that the logistics efficiency will be maximize, and company can reduce costs and unnecessary expenses, then increase corporate profits.

c) Planning and control information

Planning and control information including plan completed progress of each subsidiary. This information requires company collect planning performance information timely, according to the data provided by each business subsidiary. Then enterprise will compare the differences between original plan and plan's implementation, and analyze the reasons for the differences. This wills help to increase enterprise's ability of response, and the ability to control the operator. So, planning and control information can help enterprise deal with the problem in a timely manner, then ensure the logistics chain keeping in normal operation, so that reduce unnecessary losses.

d) Logistics information

Logistics information include raw materials information, the product flow and storage conditions. Corporate management can formulate and adjust all business departments' operating plan in advance, according to this information,. And, corporate management also can base on this information, strengthen the tightness of the logistics chain, and enhance operational efficiency of logistics chain, so that reduce warehousing costs and increase profits. In addition, provide products' logistics situation to customers timely and accurately, can make customers to enjoy better services, increase customer loyalty and win the reputation, then developed market.

### 2.4.2 Logistics information management system

Among the above four kinds of information, logistics information is the core information, because the purpose of established logistics information management system is mastering and optimizing the whole logistics process, and logistics activities is the embodiment of company operating. Furthermore, logistics information is visible form of the running of logistics chain. If company wants to control the logistics chain, it must base on the analysis of logistics information. Therefore, the quality of logistics information system determines the quality of the entire information system. But among these four types of information, achieving logistics information is the most difficult. Compare to the simple digital data and information reports of basic information, written report of plan information and planning and control information, logistics information is changing at every moment, because the goods is keeping flowing in the logistics chain. Therefore, to get the logistics information need for the support of information technology. Using new technologies obtain logistics information timely, is the most important differences between integrated logistics

strategy and traditional vertical logistics integration.

Nowadays, the main way to get the logistics information is using electronic logistics mode. This mode requires two kinds of information technology. The one is electronic data interchange technology, which is called EDI. And the other is barcode technology. Barcode technology is the auxiliary technology to run EDI systems, and also an important technical condition of modern management. Next, I will describe the way of electronic logistics collecting logistics information, and the purposes of using electronic logistics.

In electronic logistics, the method of collect logistics information mainly divided into three steps:

a) Use barcode technology. Through one-dimensional or two-dimensional code give each batch of materials with an independently coded. This way is helpful to identify different batches of materials in logistics process.

b) Using EDI system input each batch of materials' information and bar coding into the computer, and sent them to the main system.

c) Set of personnel and equipment to scan the bar code on each material logistics chain node, scan the barcodes of materials. After obtaining the code information, the device will uploaded the information to logistics information system automatically. Then, the master system will handle the material position information according to the scanning position and the code.

There are five purposes of using the electronic logistics:

a) Can tracking the material's flow information and basic information.

b) If the material is lost, company can know it in a timely manner in the logistics chain operations process

c) If the market trade in a large range and company has a number of sales subsidiaries, using the electronic logistics can prevent the sales ranges overlap.

d) Can improve the quality of customer service

e) If some materials have problems, company can find the logistics situation of the same batch of material timely by using the system. It is good for monitor the quality of materials

Although electronic logistics mode can collect logistics information easily, it still has some problems. For example, if the enterprise is not a producer of raw materials but is a manufacturer or a processing enterprise, in order to operate the logistics chain, it needs to collect the raw material logistics information. Then it must encode the raw material at provider's factory. But many raw materials do not provide encoding services, so the enterprise requires encoding the raw materials themselves at provider's factory, which will greatly increase the cost. Besides, some raw materials suppliers have their own logistics information system, and they just provide to enterprise with their own logistics information. In this situation, due to the inconsistent system, enterprise's logistics chain monitoring will lack integrity.

In addition, to manage and control logistics chain need to continuously monitor and manage all aspects of logistics process, and can know the status information of items at every moment. And these information should feedback to the enterprise manage department timely and accurate. However, electronic logistics cannot do that completely. Because using bar code can only monitor the material flow process, and company only can monitor these materials while them are scanned at the entrance of each node of the logistics chain. Once materials are put into the warehouse and logistics tools, company will lose track of individual material. Moreover, barcode information can only show basic information of materials, if a material is damaged in the logistics process and was not showed from the packaging (such as container's wet damage), it will affect the normal operation of the following logistics chain node. Therefore, in order to cover the weakness of e-logistics, there is a new logistics information access mode put forward, called intelligent logistics.

Intelligent logistics concept, is no longer using a fixed identity or code scanning method to obtain logistics information, but use the information generating device (such as radio frequency identification devices, sensors, and global positioning systems, etc.) to form Internet of Things, feed the logistics information back to the main system automatically and at all time in logistics processing.

Intelligent logistics can make logistics information more accurate, and can get real-time status of materials. Using this concept to collecte logistics information, companies can control the operation of the logistics chain more precisely, which will minimize the costs and unnecessary expenditure.

# Chapter Three: The competitive advantage of mining enterprises in integrated logistics strategy

The previous chapter introduced the three kinds of features of the integrated logistics strategy, then this chapter I will analyze what competitive advantage can be bring by these three characteristics.

## 3.1 The competitive advantage from collectivized logistics process

Make all business nodes and logistics nodes of logistics chain to become subsidiaries, and collect these subsidiaries to make up a Group. And every subsidiary should obey the management of Group's leader department. This situation is called collectivized logistics process. I think that collectivized logistics process can bring competitive advantage to mining companies from three situation.

### 3.1.1 Improving logistics efficiency

For present mining companies, customer demand is no longer just product quality. In the middle of last century, as the different mining levels, the qualities of minerals are

very different. But the current level of mining technology have been more and more similar in every region, although regional factors will affect mineral quality, but the quality differences of same kind and same standard mineral are not very large. Therefore, customers began to pay more attention to product transporting speed, quality of service and other additional requirements of products. Therefore, reducing the products operating process time and improving logistics service quality has becoming the major way that mining enterprises to improve their competitive advantage.

The products operating process time is not the mining time of minerals, but is the time from the point of customer ordering mineral to the point of minerals pass to logistics chain to customer storage. The products operating process time including the planned consumption time, production preparation time, logistics preparation time, and total logistics time. In detail, the products operating process time is begin at marketing department receipt of customer orders. Through the information exchange between marketing department and production department, the production sector design production planning. When production finished, minerals will begins to load on trains or trucks (some precious minerals will using container trucks transport). When trains or trucks arrive at the port, minerals will be stacked in yard. And when the ship arrives at the port, minerals will be load on ship. After the ship arriving at the destination port and discharge, then the products operating process time will end when customer receipting cargo. The products operating process time is an important standard to measure the efficiency of entire logistics chain.

This process may seem simple, but it contains a lot of information exchanges between the logistics chain nodes. For example, the exchanges of production orders

between sales department and production department, the exchanges of transport plan between production sector and land transport sector, the exchanges of cargo unloading and stacking plan between land transport sector and ports, the exchanges of ship entry plan and loading plan between port and shipping sector, the exchanges of discharge planning between shipping departments and discharge ports. These exchanges' speed and response time will directly affect the length of the products operating process time. Moreover, due to the science and technology becoming more balance, the production time of mining companies and the shipping time of shipping companies have not too much difference. Therefore, reducing the communication time and response time between every logistics chain nodes become the core strategic objectives of mining enterprises.

In the Collectivized logistics process mode, the long-term plans of every logistics nodes will be gathered to Group manager sector, then Group manager sector can design integrated plan in advance and fed back to every business subsidiary. This way can reduce the communication time and the response time between logistics chain nodes. And designing integrated plan to control the logistics chain is good for reducing the unbalance and conflict between every business subsidiary. For real-time trading plan, information transfer can be done in the company's information management system. This way can reduce communication time between logistics chain nodes. And when sale subsidiary upload a piece of deal information to information management system, not only the product subsidiary can arrange production planning in advance according this information, but also logistics and ports and other subsidiaries can doing arrangements in advance according this information. This way also can reduce communication time between logistics chain nodes.

But if the enterprise does not adopt Collectivized logistics process mode, that means it has not logistics subsidiary or just have a logistics subsidiary which enterprise have no controlling stake. Then the Group will not be able to collect logistics information effectively, and cannot control the logistics chain effectively. This will impact on the design and implementation of business plan. And in the operating process of logistics chain, there will be more communication time and longer response time.

And in practice, we found that, for some enterprises who have long-term cooperation with logistics service providers, there will be a relationship between them. This relationship is between unity (Recognizing that in commercial relationships they need for coordination and cooperation) and separation (strategic interests are inconsistent or contradictory). And these two states have different characteristics.

**The characteristics of unity are:**

a) Has a same target
b) Has good information sharing
c) Has a balanced coordination mechanism
d) Decisions are relatively unified
e) Has a common knowledge base

**The characteristics of separation are:**

a) Lack of clear common goal
b) Lack of information sharing
c) Wages and bonus plans are inconsistent
d) Make strategic decisions independently
e) Just focus on own company's benefit

In these two states, unity can maximize the logistics efficiency, and the separation will reduce the logistics efficiency. Therefore, in order to improve logistics efficiency, we need to make the relationship more close to unity. But for corporate strategic alliances, their relationship must stand between unity and separation, the best case is just close to unity. So, if want to make the logistics efficiency to maximize, we need to make the relationship in the state of unity. And the only way make the relationship in the state of unity, is adopt the Collectivized logistics process, so that the logistics chain will all belong to one Group leadership for management. Moreover, more complete logistics chain the Group controls, the higher logistics efficiency it will has, the greater competitive advantage it will achieves.

### 3.1.2 Reducing cost

Starting from the economic crisis of 2008 until today, the global demand for mineral products growth rate is slow, even sometimes there will be a decline in demand. For the mining companies, increasing the sales volume is getting harder and harder. Therefore, reduce costs becomes very important when mining company seek the strategic goals of increasing in gross profit.

In the above, there are many exchanges between the logistics chain nodes in mining companies trading process. The response time of exchanges will directly affect the length of the products operating process time. In logistics chain, the products operating process time will affect storage time. And the longer storage means that storage cost of per unit of product is higher. So, using collectivized logistics process to reduce the products operating process time can directly reduce storage time of per

unit of product. Then inventory efficiency will be improved, and demand of storage area will be decreased. In this way, the company cans not only reduce inventory costs, but also reduce the cost of purchase or lease for more storage area.

In practice, many mining companies ignore the logistics integration. This lead that a large number of minerals being cumulated at mining area and yard of port. Strong wind will cause the amount of the mineral which in open storage decreasing. In some port, every year they will face to lose more than ten thousand tons coal because the strong sea wind. However, the mining companies who adopt collectivized logistics process, because of the high efficiency logistics chain, the storage of mineral is little. Even some enterprises' information management system can make trains or trucks arriving at port when the ship is berthing. So, using collectivized logistics process can reduce the loss costs caused by wind.

In addition, using complete information management systems, both ship handling time and berthing time can be arranged in advance. So the time waiting for berth can be shortened. The ships need not waiting goods in a long time. Even trains or trucks can always arrived at port when ships entry the port. Lower waiting handling time and lower waiting berth time means the ship have more time engaged in transportation work. Then shipping subsidiary can use fewer or smaller vessels to handle same amount cargo. So the construction costs of leasing costs of ships can be reduced.

For mining companies, warehousing costs, cargo loss costs are huge cost. If the company has not the shipping subsidiary, it will have to hire ships from other shipping companies to doing transport. In this way transportation costs must increase. However, if mining companies using collectivized logistics process achieve the

controlling stake of the shipping subsidiary or port, then the storage costs, cargo loss costs, freight costs and ships construction cost could be decreased, and company profits will increase. While costs are reduced, companies will have more money to expand the market or improve the logistics chain, so that enterprises can get greater competitive advantage.

### 3.1.3 Unified strategic concept

In practice, some mining companies do not use collectivized logistics process, but choose to cooperate with professional logistics service providers. In this way, although the logistics chain is relatively complete, logistics chain development strategy will be divided into several parts because of different enterprise development strategies. In this situation, the logistics chain development will be unbalance, and the operation of logistics chain will be not effective. For example, if shipping companies make a corporate alliance with other powerful bulk cargo company, the cooperation between shipping company and other companies will stand in unimportant place, logistics service of shipping company will face to the powerful company bulk firstly. In another case, if mining company looking for expands ocean trade market and shipping company has not enough ocean vessels because of it just focusing costal transport, mining company development plan may be affected. This unbalance development strategy will lead logistics efficiency being affected, and then the development of mining companies will be influenced. Because of that, company's competitive advantage will reduce.

## 3.2 The competitive advantage from the integration of logistics

chain

In integrated logistics strategy, logistics chain is always integrated. And this integrated logistics chain will bring more competitive advantage to mining companies from three aspects.

### 3.2.1 Integrated with shipping

For most of mining companies, water transport is the necessary logistics way. This means that the shipping logistics is necessary lines which connecting logistics chain nodes. So, if mining company wants to build a complete integrated logistics chain, it needs to get controlling stake of shipping departments. Therefore, as the mining companies, establishing a shipping subsidiary is good for building integrated logistics chain. If companies want to reduce investment, it can try to build joint ventures of shipping with a shipping company, then get controlling stake of the shipping subsidiary and let the subsidiary obey the Group's strategic.

Having controlling capacity of the shipping, mining company can use information management system to build high efficiency logistics chain. Because the shipping subsidiaries can design shipping plan based on the logistics information from Group's information management system. And vessel position information and handling information can feed back to the information management system at all times. Then producing subsidiary and land transport subsidiary and ports can design working plan in advance. These exchanges of information makes the logistics chain can be run efficiently.

In addition, if having the controlling stake of shipping subsidiary, mining company can make shipping subsidiary's development strategy according to Group development strategy. More important is that company can choose ships according to their market and the demand for transport. If the company more focuses on ocean trade, it can construct or lease ocean vessels. If the company more focuses on coastal trade, it can construct or lease coastal vessels. If the company more focuses on big quantity trade, it can construct or lease large vessels. If the company more focuses on little quantity trade, it can construct or lease small vessels. Choosing ships according to the demand of trade can help mining company to save broken stowage costs and ships constructing costs.

If mining enterprises have not shipping subsidiary or have not controlling stake of shipping subsidiary, their shipping logistics are always affected by shipping companies' operating plan. Due to the changes in the cargo volume or the deployment of vessels, Mining enterprises are often achieved inappropriate vessels from shipping companies. Moreover, in recent years, standards for ship safety, crew living and environmental are rising. And some new International vessels provisions begin to apply. Sometimes the ship cannot be allowed entry in destination port because the ships of shipping company have not met the standards. If shipping company provides other available ship to do transport, the logistics chain of mining company will still be impacted.

So, in the integrated logistics chain, shipping subsidiary is very important. It can bring more competitive advantage to mining companies.

### 3.2.2 Integrated with port

Same as shipping subsidiary, port is also an important logistics chain node. But different with shipping subsidiary, getting the controlling stake of ports need pay more money, and the operating of port is more complex.

If the company can control the port, it will have a right to arrange berthing. So, it can arrange his ships berthing earlier. Even this port can only service to the company’s ships. Moreover, the port operating information can be uploaded to the Group's information management system. And the port can make the handling plan in advance according to the logistics information from the Group's information management system. At this point, the port as a node will greatly enhance the efficiency of the logistics chain. Thus, every node of this logistics chain will achieve more time for business operations rather than waiting. Operating time is increased, which means the production capacity of company increased. In this situation, companies can expand the market, and seek more customers.

In addition, achieve the controlling stake of port, mining companies can allocate handling equipment and yard equipment according to their products demand. For example, Coal Company can allocate automatic sprinkler system for their coal, and water can be controlled according to the type of coal. Appropriate devices can handle the goods better, and then improve the efficiency of cargo turnover at the port.

Therefore, although putting the port in integrated logistics chain should takes a lot of money and effort, but it will bring more efficiency to the logistics chain, and bring greater competitive advantage to mining company.

### 3.2.3 Integrated profit and unified salary system

In the integrated logistics chain, all the nodes in the logistics chain are under the management of the Group. So the business profits of subsidiaries will gather to the Group, and the Group will redistribute the fund. And in the Group, every subsidiary's salary system is designed by the Group according to the workload.

The benefit of integrated profit is that remove the interests conflict between the subsidiaries. Then each subsidiary can concentrate on finishing Group's plan. In this way, bargaining time will be saved, so that efficiency of logistics will be improved. Furthermore, removing the benefit conflict can also enhance the cooperation between every node of the logistics chain, so that the logistics chain will run smoothly. In opposite, if there are benefits conflicts between every node of the logistics chain, they will more focus on price competition. In this way, the logistics costs of mineral will increase, and the products operating process time will rise.

Thus，integrated profits and uniform salary system can improve operating efficiency of logistics chain, so that mining company can achieve more competitive advantage.

## 3.3 The competitive advantage from the information management system in integrated logistics

Compare with the 1980s vertical logistics integration, integrated logistics strategy is

very dependent on information technology. Because information management system is an important tool that making the logistics chain bonding together. And it is also the key that the Group's managing and controlling logistics chain. Therefore, the use of information management system is the basement of using collectivized logistics process and making integrated logistics chain. This means that information management system is the key to using integrated logistics strategy, so it must bring competitive advantage to mining company.

The two core functions of information management system will affect logistics chain, and these functions both can bring competitive advantage to mining company.

### 3.3.1 The function of Logistics management

One of important function of information management system is monitoring and managing the logistics process.

In integrated logistics strategy, every parts of the logistics chain upload the logistics information into the information management system at all time. The Group leaders can monitor the running of logistics chain and modify the development plan according to the logistics information. This will helps logistics chain running smoothly, and correct chain’s operation problems in time, so that improve the efficiency of the logistics chain.

In addition, if a node of the logistics chain encounters an unexpected situation, the situation can be promptly reflected in the information management system. Then the Group leaders and other nodes of the logistics chain can know the situation, and they

can adjust the logistics processes in time. Thus, information management system can improves the logistics chain's response capacity about problem, and help the Group control the risks.

Thus, using information management systems to monitor and to manage the logistics process can improve the mining companies' competitive advantage effectively.

### 3.3.2 The function of Customer service

Information management systems can improve the quality of customer service in several ways.

First, because the information management system can record customer information, so mining companies can know the customer needs based on the customer information. Then the Group can provide more suitable products to customers. In addition, complete customer information can bring more convenience to communication between companies and their customers.

Secondly, the information management system can provide logistics information of goods. So customers can search the location information of goods from the system at any time. This service makes customers can designing their production plans in advance or adjust the production plan in time.

In addition, if there is a situation affecting the running of logistics chain, mining companies can communicate with customers in time according to customer information, and customers can adjust production plans based on the information

which provided by companies.

Therefore, the information management system can make the relationship of mining companies and customers closer, and let customers to enjoy better service, so that enhance the competitive advantage of mining companies.

# Chapter Four: The case of Shenhua Group Corporation Ltd.

Shenhua Group is a large energy enterprises, its main business is the production and sales of coal. In 2001, Shenhua Group forms a joint venture shipping subsidiary with China Shipping. In 2010, Shenhua Group achieved the controlling stake of the shipping subsidiary, so that finished the construction of integrated logistics. Can this Group obtain more benefits by using this strategy, we will analyze in below.

## 4.1 Analysis of current market situation

Shenhua's coals are transported mainly by ships, so the shipping subsidiary is an important part of its integrated logistics chain. Therefore, author will analyze the recent shipping and coal market conditions firstly.

### 4.1.1 The situation of shipping market

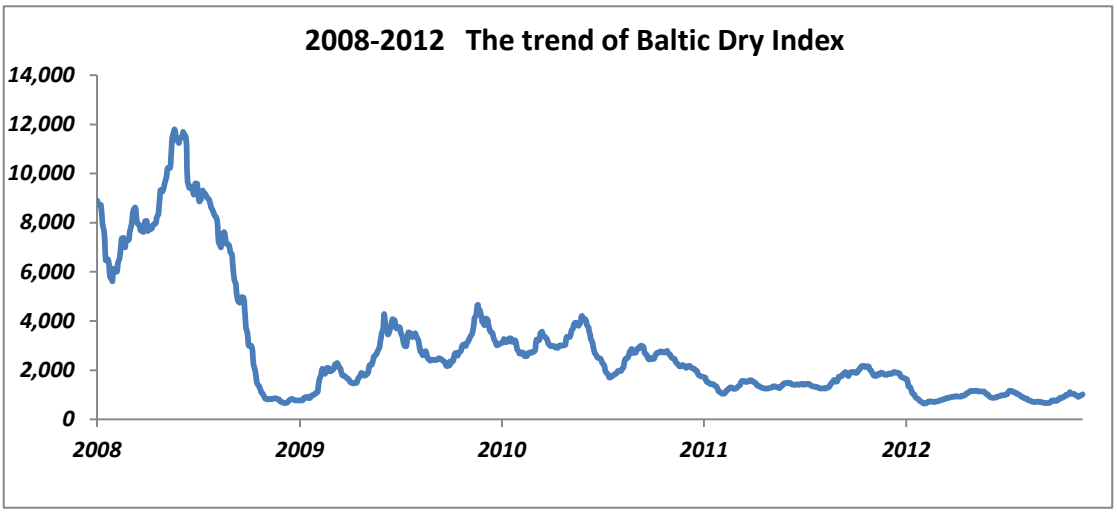


Figure 1 The BDI index

Figure 1 is the BDI index trend from 2008 to 2012. In the middle of 2008, the global market meets economic crisis, market demand suddenly dropped. The bulk cargo market began to decline, and freight volume was dropped lower and lower. Due to the economic boom before the crisis, a large number of shipping companies ordered new vessels. This led the shipping capacity becoming extreme excess. Therefore, from the second half of 2008, BDI index dropped significantly, the freight was also rapid decline. Many shipowners had to operate at a loss.

**Total orderbook** ('000 dwt)

| | Handysize | | Handymax | | Panamax | | Post-Panamax | | Capesize | | VLOC | | Total | | % of Fleet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | |
| 2006 | 271 | 7,888 | 297 | 15,924 | 124 | 9,382 | 120 | 10,391 | 112 | 19,801 | 68 | 16,730 | 992 | 80,116 | 20.1% |
| 2007 | 574 | 17,703 | 728 | 40,503 | 204 | 15,004 | 386 | 33,440 | 479 | 81,921 | 106 | 27,967 | 2,477 | 216,537 | 55.2% |
| 2008 | 868 | 27,216 | 969 | 54,367 | 235 | 16,772 | 541 | 46,699 | 652 | 109,929 | 146 | 39,951 | 3,411 | 294,935 | 70.4% |
| 2009 | 788 | 25,106 | 883 | 49,733 | 258 | 18,500 | 445 | 38,800 | 610 | 102,644 | 148 | 43,170 | 3,132 | 277,954 | 60.8% |

Source: Drewry Research

Table 1 Total orderbook

**Dry bulk orderbook and delivery schedule** ('000 dwt)

| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015+ | | Total | | % of Fleet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | *No.* | *Dwt* | |
| **Handysize** | 323 | 9,894 | 275 | 9,135 | 121 | 4,054 | 20 | 684 | 3 | 88 | 0 | 0 | **742** | **23,855** | 31.0% |
| **Handymax** | 364 | 20,511 | 342 | 19,293 | 117 | 6,530 | 23 | 1,245 | 0 | 0 | 0 | 0 | **846** | **47,579** | 48.4% |
| **Panamax** | 81 | 5,915 | 96 | 7,004 | 90 | 6,387 | 20 | 1,389 | 0 | 0 | 0 | 0 | **287** | **20,695** | 20.5% |
| **Post-Panamax** | 166 | 14,461 | 205 | 17,722 | 121 | 10,137 | 21 | 1,794 | 4 | 328 | 0 | 0 | **517** | **44,442** | 153.2% |
| **Capesize** | 254 | 43,589 | 212 | 35,120 | 99 | 16,501 | 20 | 3,277 | 3 | 530 | 3 | 525 | **591** | **99,542** | 69.9% |
| **VLOC** | 33 | 8,721 | 56 | 16,960 | 63 | 17,450 | 22 | 5,483 | 1 | 225 | 0 | 0 | **175** | **48,839** | 117.6% |
| **Total** | **1,221** | **103,090** | **1,186** | **105,234** | **611** | **61,059** | **126** | **13,872** | **11** | **1,171** | **3** | **525** | **3,158** | **284,951** | 58.3% |

Source: Drewry Research

Table 2 Dry bulk orderbook and delivery schedule

Table 1 and Table 2 are the Drewry data in 2010.

In Table 1, from 2007 to 2012, bulk vessels delivery quantity is always in a high level. In Table 2, from 2009 to 2012, a large number of orders delivered, resulting in the amount of bulk vessels increased relative to 2008. At the same time, an international oil price was always in high level, and the cargo volume is still shortage. Then bulk cargo shipping market fall into downturn until today.

### 4.1.2 The situation of coal market

World coal trade is mainly concentrated in the Asia-Pacific, Europe and North America, and the volume of trading of Asia-Pacific is the largest. Recent years, Australia becomes the world's coal export superpower, and its share of global coal export volume has been reached 30%. And because the transport distances limitation, Australian coal exports are relatively stable. Recently, due to the application of shale gas, coal consumption began to declining in North America. Because of lower export prices, coal production also began to decline in North

America. The importance of North American coal prices becomes smaller. Therefore, this thesis chooses the Australian coal price as the international coal price standard.

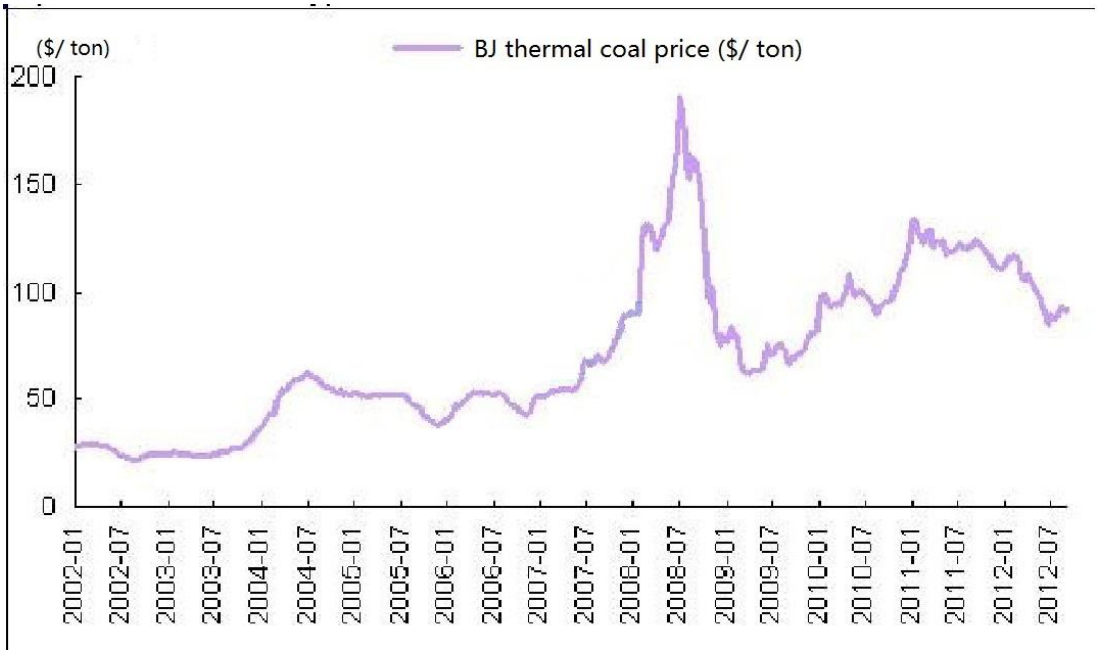


Figure 2 BJ coal price index

Figure 2 is the BJ coal price index from 2002 to 2012. BJ index is released by a well-known coal and energy consultancy- Barlow Jonker Pty Ltd. And BJ index is the Asian market thermal coal spot price index, which reflects the contract price of spot thermal coal between buyers and sellers. The port of dispatch is the Newcastle port, Australia. Destination port is uncertain. BJ index is published once a week. It is a major index of prices which reflects the Australian coal price.

In Figure 2, we can know the price of coal is similar to bulk cargo shipping price. In the middle of 2008, BJ index had reached its peak. But because of the economic crisis, it plummeted in the second half of 2008. But the difference with the bulk freight

is that coal prices meet a rebound in 2010, and it declined again at the beginning of 2012. Recent decline is mainly due to the economic growth of U.S., Europe, Japan and other developed economies are slow. And the economic growth of the BRIC countries and other emerging economies are slowdown. The demand for coal in Europe is decreasing, and the U.S. develops shale gas as the alternative fuels of coal. So the international coal market becomes depressed. According to analysts' forecasts, the golden era of coal has ended. In recent years, there will be no significant increase in coal price.

In summary, in recent years, the bulk cargo shipping prices and coal prices are not very good. The prices are relatively low and stable. In this situation, both the shipping companies and the coal companies are hoping to use some strategies to increase profits.

## 4.2 The collectivized logistics process of Shenhua Group

Shenhua Group does a good job in collectivized logistics process. It has a number of railways, and these railways can handle the land transport of the Group's coal. Moreover, Shenhua Group has its own port- Huanghua Port- in Hebei Province, China. The port is an important node of the Group’s logistics chain. In 2001, Shenhua Group forms a joint venture shipping subsidiary with China Shipping. And in 2010, Shenhua Group achieved the controlling stake of the shipping subsidiary. This shipping subsidiary is responsible for transporting Group's coal. When Shenhua Group obtains the controlling stake of shipping subsidiary, the Group achieved huge economic benefits.

## 4.3 The integration of logistics chain of Shenhua Group

In 2010, the shipping subsidiary was integrated in Shenhua Group's logistics chain. This means the Shenhua Group finish the construction of integrated logistics strategy. Then, Shenhua Group has controlled coal production subsidiary, rail transport subsidiary, ports and shipping subsidiary. These subsidiaries include every nodes of coal logistics chain. Even, Shenhua Group also has controlled electric power plant. But, in this dissertation, we do not count consumer as a node of logistics chain. In coal trade, electric power plant is seen as the consumer, so we do not analyze plant parts.

Will the shipping subsidiary was integrated in Shenhua Group's logistics chain, the efficiency of logistics of the Group got a big increasing. Shenhua has a complete information management system. This information management system will make every logistics chain nodes to link more closely. In practice, when the sales subsidiary of Shenhua Group receives order, the order information will pass to production subsidiary in few minutes through the information management system. Then production subsidiary can arrange the product plan according to the order information. At the same time, rail subsidiary has ready shipment, and loading work can be done at the same time with production. When the train is full load, the train will start its journey from mining area to port. The train will arrive at Huanghua port in 20 hours. And when the train entered into the port, Shenhua's vessel is always waiting for loading in berth. After two days of loading operations, the vessel begins to transport. Under normal circumstances, the vessel can arrive in East China port for

unloading in three days, and arrive in South China port for unloading in five days.

Therefore, in most cases, after customers place an order, he will receipt of the Shenhua's coal cargo in 15 days. Compared to the majority of coal enterprises, Shenhua Group has a very efficient logistics chain. And the customers will enjoy their delivery service. Therefore Shenhua Group has more customers who want to enjoy rapid logistics services.

## 4.4 The information management system of Shenhua Group

Shenhua Group has a complete information management system. Except for the information exchange system which building in computer network system, at every morning, every subsidiary has to participate in video conferencing. In the video conferencing, every subsidiary should report the performance of the plan and the problems in the operating to the Group leadership. Then the Group leadership will adjust some subsidiary's working plan so that to maintain the logistics chain running smoothly.

In this way, the logistics chain of Shenhua Group is always maintained a stable and efficient operation.

## 4.5 The model analysis

### 4.5.1 Model introduction

In order to analyze the economic benefits differences between Shenhua Group obtained the controlling stake of the subsidiary and not obtained. I assume a background, and using a trend line prediction function model to analyze.

### 4.5.2 Model background

The seaborne coal of Shenhua Group coal products is 10million tons in Jan. 2010. And average monthly growth rate of this amount is 0.6%. Average coal price is $90/ton. Average handling time is 2 days per voyage. Average duration of voyage is 6.9 days. As a compensation of maintenance time, we will take off 0.1 day per voyage, as the average compensatory maintenance time. And average monthly working days is 30 days.

We design Shenhua Group obtained the controlling stake of the shipping subsidiary in the Jan. 2010. And the core capacity of this shipping subsidiary is 40 bulk vessels. Every vessel's DWT is 70 thousands. The average operating cost for each vessel is $6/ton. The Group wants to have complete proprietary rights of these 40 vessels, so the Group orders these vessels with shipyard. The manufacture price of per vessel is $4200, and manufacture period is 1 year. In addition, the Group will lease some 70 thousands DWT vessels to deal with surplus transport task. Average time charter price is $7/ton. Furthermore, because of the effectiveness of integrated logistics strategy, Average vessel demurrage time is 0.5 day per voyage. Demurrage is $50000 per vessel per day. And every vessel need pay operating cost, and the cost is $6 per day per vessel.

As the compare, we assume another situation. In this situation, total transport tasks

will be finished by voyage charter vessels. Average voyage charter price is $11/ton. Because lacking the management of information, average wait berth time is 7 days per voyage. And because of waiting time, port will take $0.7/ton as the cargo storage fee.

All the estimate data in this case is based on real data. In order to eliminate the market changes, the coal prices, voyage charter freight, time charter freight and demurrage fees and other fee are based on the estimated average value in recent years.

### 4.5.3 The formula of Model

In the situation that using integrated logistics strategy,

**Total time per voyage**= *Handling time+ Duration of voyage+ Compensatory maintenance time+ Demurrage time=2+6.9+0.1+0.5=9.5 days*

**Necessary amount of vessels**= *Seaborne coal/ (Monthly working days/ (Total time per voyage*2)*Average DWT per vessel)*

**Investment of shipping subsidiary**=*Vessel price* Amount of core vessels*

**Transportation by time charter vessel**= *Seaborne coal-(Amount of core vessels* Average DWT per vessel* Monthly working days/ (2* Total time per voyage))*

**Cost of time charter**= *Transportation by time charter vessel* time charter price*

**Demurrage costs**=*Total vessel amount*(Monthly working days* Demurrage time/ Total time per voyage)* Demurrage*

**Shipping operating cost** = *Average operating cost*(Amount of core vessels* Monthly working days/(2* Total time per voyage))*

In the situation that not using integrated logistics strategy,

**Total time per voyage**= *Handling time+ Duration of voyage+ Compensatory maintenance time+ Demurrage time*

**Necessary amount of vessels**= *Seaborne coal/ (Monthly working days/ (Total time per voyage*2)*Average DWT per vessel)*

**Demurrage costs**=*Total vessel amount*(Monthly working days* Demurrage time/ Total time per voyage)* Demurrage*

**Total storage fee**= *Seaborne coal* Average storage fee*

### 4.5.4 The figure of model

According the data and formula, we can count the capital amount from Jan.2010 to Mar.2013

| 32 | With the controlling stake | | | | | | |
|---|---|---|---|---|---|---|---|
| 33 | Year | 2010-1 | 2010-2 | 2010-3 | 2010-4 | 2010-5 | 2010-6 |
| 34 | Seaborne coal(ton) | 10,000,000 | 10,060,000 | 10,120,360 | 10,181,082 | 10,242,169 | 10,303,622 |
| 35 | Coal price($) | $90 | $90 | $90 | $90 | $90 | $90 |
| 36 | **Total Earnings** | $900,000,000 | $905,400,000 | $910,832,400 | $916,297,394 | $921,795,179 | $927,325,950 |
| 37 | Necessary amount of vessels | 90 | 91 | 91 | 92 | 92 | 93 |
| 38 | Amount of core vessels | 0 | 0 | 0 | 0 | 0 | 0 |
| 39 | Investment of shipping subsidiary($) | $1,680,000,000 | $0 | $0 | $0 | $0 | $0 |
| 40 | Transportation by time charter vessel | 10,000,000 | 10,060,000 | 10,120,360 | 10,181,082 | 10,242,168 | 10,303,621 |
| 41 | Average time charter price($) | $7 | $7 | $7 | $7 | $7 | $7 |
| 42 | Demurrage costs($) | $7,105,263 | $7,184,211 | $7,184,211 | $7,263,158 | $7,263,158 | $7,342,105 |
| 43 | Total storage fee($) | $0 | $0 | $0 | $0 | $0 | $0 |
| 44 | Shipping operating cost($) | $6 | $6 | $6 | $6 | $6 | $6 |
| 45 | **Total Cost** | $1,757,105,263 | $77,604,211 | $78,026,731 | $78,530,733 | $78,958,338 | $79,467,456 |
| 46 | **Net Cash Flow** | -$857,105,263 | $827,795,789 | $832,805,669 | $837,766,662 | $842,836,841 | $847,858,494 |
| 47 | **Total Capital(Controled)** | -$857,105,263 | -$29,309,474 | $803,496,196 | $1,641,262,857 | $2,484,099,698 | $3,331,958,192 |

Table 3 the capital amount with integrated logistics strategy

| 33 | 2010-7 | 2010-8 | 2010-9 | 2010-10 | 2010-11 | 2010-12 | 2011-1 | 2011-2 |
|---|---|---|---|---|---|---|---|---|
| 34 | 10,365,443 | 10,427,636 | 10,490,202 | 10,553,143 | 10,616,462 | 10,680,161 | 10,744,242 | 10,808,707 |
| 35 | $90 | $90 | $90 | $90 | $90 | $90 | $90 | $90 |
| 36 | $932,889,906 | $938,487,245 | $944,118,168 | $949,782,877 | $955,481,575 | $961,214,464 | $966,981,751 | $972,783,641 |
| 37 | 93 | 94 | 94 | 95 | 96 | 96 | 97 | 97 |
| 38 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 40 |
| 39 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 40 | 10,365,443 | 10,427,636 | 10,490,201 | 10,553,143 | 10,616,461 | 10,680,160 | 6,323,189 | 6,387,654 |
| 41 | $7 | $7 | $7 | $7 | $7 | $7 | $7 | $7 |
| 42 | $7,342,105 | $7,421,053 | $7,421,053 | $7,500,000 | $7,578,947 | $7,578,947 | $7,657,895 | $7,657,895 |
| 43 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 44 | $6 | $6 | $6 | $6 | $6 | $6 | $6 | $6 |
| 45 | $79,900,209 | $80,414,505 | $80,852,465 | $81,372,001 | $81,894,180 | $82,340,072 | $78,446,534 | $78,897,792 |
| 46 | $852,989,697 | $858,072,740 | $863,265,704 | $868,410,876 | $873,587,395 | $878,874,393 | $888,535,217 | $893,885,850 |
| 47 | $4,184,947,889 | $5,043,020,629 | $5,906,286,332 | $6,774,697,208 | $7,648,284,603 | $8,527,158,996 | $9,415,694,213 | $10,309,580,063 |

Table 4 the capital amount with integrated logistics strategy

Table 3 and Table 4 is the capital amount from Jan.2010 to Feb.2011, in the situation that Shenhua Group has obtained the controlling stake of the shipping subsidiary. Because the amount of data is very large, so I only intercept the data from Jan.2010 to Feb.2011.

Because of the construction time of the core fleet of shipping subsidiary is 1 year, so from Jan.2010 to Dec.2010, the number of core fleet of the shipping subsidiary is set to 0. In Jan.2011 the vessels are delivered, so it is adjusted to 40.

In the Figure,

**Total Earnings**= *Seaborne coal*Coal price*

**Total Cost**= *Investment of shipping subsidiary+ Shipping operating cost+ Transportation by time charter vessel* time charter price + Demurrage costs*

**Net Earnings** = *Total Earnings- Total Cost*

Total capital is the accumulation of net earnings.

| 15 | Without the controlling stake | | | | | | |
|---|---|---|---|---|---|---|---|
| 16 | **Year** | 2010-1 | 2010-2 | 2010-3 | 2010-4 | 2010-5 | 2010-6 |
| 17 | Seaborne coal(ton) | 10,000,000 | 10,060,000 | 10,120,360 | 10,181,082 | 10,242,169 | 10,303,622 |
| 18 | Coal price($) | $90 | $90 | $90 | $90 | $90 | $90 |
| 19 | **Total Earnings** | $900,000,000 | $905,400,000 | $910,832,400 | $916,297,394 | $921,795,179 | $927,325,950 |
| 20 | Necessary amount of vessels | 152 | 153 | 154 | 155 | 156 | 157 |
| 21 | Average voyage charter price($) | $11 | $11 | $11 | $11 | $11 | $11 |
| 22 | Demurrage costs($) | $99,750,000 | $100,406,250 | $101,062,500 | $101,718,750 | $102,375,000 | $103,031,250 |
| 23 | Total storage fee($) | $700,000 | $704,200 | $708,425 | $712,676 | $716,952 | $721,254 |
| 24 | Shipping operating cost($) | $0 | $0 | $0 | $0 | $0 | $0 |
| 25 | **Total Cost** | $210,450,000 | $211,770,450 | $213,094,885 | $214,423,330 | $215,755,807 | $217,092,342 |
| 26 | **Net Cash Flow** | $689,550,000 | $693,629,550 | $697,737,515 | $701,874,065 | $706,039,372 | $710,233,608 |
| 27 | **Total Capital(Uncontroled)** | $689,550,000 | $1,383,179,550 | $2,080,917,065 | $2,782,791,130 | $3,488,830,501 | $4,199,064,109 |

Table 5 the capital amount without integrated logistics strategy

Table 5 is the capital amount from Jan.2010 to Jun.2010, in the situation that Shenhua Group has not obtained the controlling stake of the shipping subsidiary. Because the amount of data is very large, so I only intercept the data from Jan.2010 to Jun.2010.

In the Figure,

**Total Earnings**= *Seaborne coal*Coal price*

**Total Cost**= *Seaborne coal*Average voyage charter price+ Demurrage costs+ Total storage fee*

**Net Earnings** = *Total Earnings- Total Cost*

Total capital is the accumulation of net earnings.

### 4.5.5 Model analysis

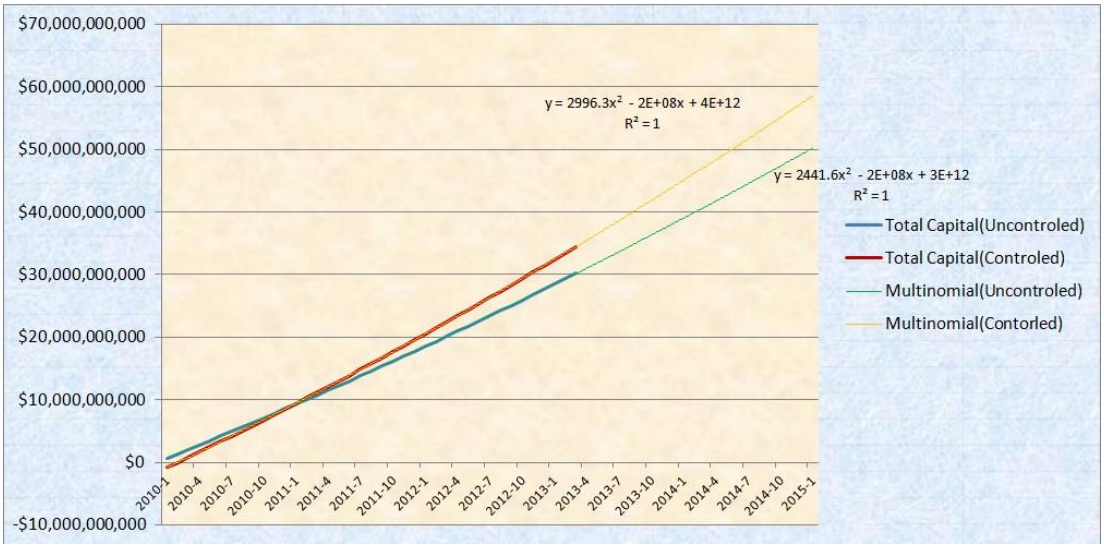


Figure 3 the line graph of capital accumulation and trend lines

Figure 3 is the line graph based on capital accumulation data which from Jan.2010 to Mar.2013. According to line graph, I made capital accumulation trend lines of the two strategies. The type of trend line is the polynomial trend line, because in this type, $R^2$ is 1, so the reliability maximum.

In the Figure 3, the red thick line is the capital accumulation data curves under the situation that the Group adopts integrated logistics strategy. The blue thick line is the capital accumulation data curves under the situation that the Group does not adopt integrated logistics strategy. And, the green thin line is the capital accumulation data trend line under the situation that the Group does not adopt integrated logistics strategy. The yellow thin line is the capital accumulation data trend line under the situation that the Group does not adopt integrated logistics strategy.

The Figure 3 shows, when the Group using the integrated logistics strategy, the

capital accumulation rate will become higher.

Thus, we can believe that using integrated logistics strategy can help mining companies to improve profits.

## 4.6 The analysis of Shenhua Group case

Using integrated logistics strategy, the turnover and net profit of Shenhua Group has been steadily rising. In the situation that coals prices continually decline, compare to the first half of 2012 and 2011, Shenhua Group's coal sales increased 31 million tons. Relative to the total amount increased 16.2%. Operating income increased 20.3 billion Yuan. Relative to the total amount increased 20.1%. When the shipping market declined, Shenhua's shipping subsidiary transports more than 80 million tons coal in 2011. This let it become one of the few profitable shipping companies in China.

These increases can reflect the huge competitive advantage of Shenhua Group. And this competitive advantage is brought by the integrated logistics strategy. Therefore, the case shows using the integrated logistics strategy can bring competitive advantages to mining companies.

# Chapter Five: Some problems of integrated logistics strategy

Enterprises adopting integrated logistics strategies can make logistics activities to constitute a complete chain. And let all parts of logistics chain forming an organic whole that every part is closely linked to each other, so that enterprises can develop steady and rapidly. However, a coin has two sides. Creating a highly integrated logistics chain will always bring some drawbacks and unavoidable problems which need to be pay attention and to do prevention. These drawbacks and problems are mainly concentrated in four areas.

## 5.1 Fund demand

First, in order to achieve the overall control of the logistics chain, when investing in core industries, mining enterprise need to try to invest in create a complete logistics chain. And, for ensure it can control logistics chain effectively, enterprise must have controlling stake of every major component of the logistics chain. This requires that companies must have sufficient financial support.

Furthermore, in order to keeps logistics chain running steadily, company must purchase equipments which have reliable quality. Therefore, in the initial investment

of logistics chain, the reliability of logistics equipment quality has to become an important factor. However, the reliable quality equipments are often very expensive.

In addition, the logistics chain maintenance costs are usually higher. In order to keeping the stable operation of the logistics chain, the regular maintenance of logistics chain to become day to day work. To do this, companies need to pay the corresponding cost of human resources. Moreover, in order to balance the maintenance period, when a part of logistics chain running repair and maintenance, other sectors will be forced to sync running repair and maintenance, although some parts are not meet the service life cycle. And in order to obey the entire logistics chain maintenance requirements, these good parts must be updated in advance, for avoiding unplanned stop to affect the operation of the logistics chain.

## 5.2 Complete emergency measures

Because integrated logistics has a feature that having a highly integrated logistics chain, so if any parts of logistics chain break down or appear some unbalance operation, it will give a impact to entire logistics chain. Even these breakdown or unbalance operation will lead to all logistics chain being paralyzed, and will transfer this stop running from the logistics chain to the core business activities which caused by industrial stagnation. For mining companies, mining area usually has not large warehouses for the mineral storage. Therefore, if the logistics chain has running problem and it caused the backlog of goods in logistics chain, the production of mining operations may be faced a direct impact.

Therefore, the enterprise who using integrated logistics strategy, must establish a sensitive and efficient scheduling system. This system needs not only to constantly monitor the implementation of the logistics chain, and needs making accurate and effective decision-making when the logistics chain has changes. In this way, the entire logistics chain can achieve adjustment program in a very short period of time. In fact, integrated logistics chain is an organic chain which achieves a continuous dynamic equilibrium, through continuously command and adjust.

In addition, mining companies also need to prepare a complete and effective contingency plans. And prepare the perfect adjustment measures for the stable operation of the logistics chain. Such as arrange the emergency reserve for the most vulnerable part, and establish alternative solution on key aspects, etc.

## 5.3 Impact on related industry

When mining companies use the integrated logistics strategy, other related industries in mineral logistics process will certainly suffer impact. Especially today's bulk shipping market is not good, mining enterprises adopt integrated logistics strategy, bulk shipping market will be faced to further squeezed, that will leading shipping company being affected.

Thus, the companies who are in relevant industry need to seek joint with mining enterprises, establishing a subsidiary with jointly funded. The controlling stake and the strategic decision-making powers of this subsidiary should give to mining companies. Thus, the mining companies could build the integrated logistics strategy

model, while save a lot of money. Moreover, the mining companies usually do not have the relevant experts to build integrated logistics chain. So, establishing subsidiary with joint funded can bring a lot of professionals to the subsidiary. This way can reduce the problems caused by unskilled business, and make the logistics chain running more smoothly.

Besides, for related industry enterprises, they can gain profit from enterprise cooperation, and they also can increase their competitive advantage by cooperation. For example, shipping can actively seek to cooperate with mining enterprises, to create a shipping subsidiary by joint funded. And let this subsidiary to be joined in the integrated logistics chain of mining companies. Moreover, shipping companies can also provide professionals and ship resources for the shipping subsidiary, making the subsidiary more complete. With the continuous development, even shipping companies can give up to operate the shipping business, but get profit just through cooperate with the upstream company and provide their own ship and professional human resources to the upstream enterprises, for helping them to build integrated logistics chain.

## 5.4 Monopoly prevented measures

The enterprises who want to adopt integrated logistics strategy need have strong capital strength. Therefore, if a few strong companies to do enterprise cooperation, making one of them can build integrated logistics, that may lead to monopoly. And this monopoly will affect the market. So, government should design more policy to make market developing healthier, and reduce the monopoly. In Europe, there were

some professionals notice the vertical logistics integration may bring the monopoly, so European governments design a lot of policies to prevent monopoly.

However, only for companies, adopt integrated logistics strategy will let them getting more benefits. In the top 20 of the world's leading companies for 2012 by Forbes, apart from the companies who need not logistics in their business, all of them adopt vertical logistics integration strategy.

So, although integrated logistics strategy may lead to monopoly, it stills a very effective way to make company having more competitive advantage.

# Chapter Six: Conclusion

Compare to ordinary logistics integration strategy, integrated logistics is that puting logistics section in enterprise, and making it parallel with the original sales or production department. Making the enterprise forms a collectivization system. Then, use the complete and efficient information management system to manage the entire logistics chain working. This integrated logistics has three characteristics. Logistics process is collectivized, has an integrated logistics chain, and has excellent information management system.

Logistics process collectivized, means using the logistics activities that under the overall control, make the different functional department of enterprise together, form a group.

In the integrated logistics chain, every business functions subsidiary is the node of chain, while the logistics activities which provided by logistics subsidiary are cables. These cables connect every node and let them to form a complete logistics chain. So, in the whole system, operation part and logistics part supplement each other.

For integrated logistics, using the Internet and database technology to establish a complete information management system is the key to make logistics chain

integrated closely. In integrated logistics, a complete information management system has to manage control four types of information. Basic business data, plan information, planning and control information, and logistics information. Among these four kinds of information, logistics information is the core information, because the purpose of established logistics information management system is mastering and optimizing the whole logistics process and logistics activities is the embodiment of company operating.

These characteristics of integrated logistics strategy can take a lot of competitive advantage to mining enterprise, like making mining companies cargo logistics activities more efficient, reducing mining companies' costs that caused by price competed with service providers at every segment of logistics chain, reducing the cargo handling costs at every segment of logistics chain. So that can enhance the profits of mining companies.

However, if mining companies want to use integrated logistics strategy, they need prepare enough fund, and set out a lot of emergency measures for keeping the logistics chain in normal operation.

Besides, establishing a joint subsidiary with related industries is a good plan with mining companies. But, in this way, mining companies have to get the controlling stake of the subsidiary. In this situation, mining companies can not only reduce the amount of the initial capital invested, but also can improve the emergency measures for keeping logistics chain in normal operation, through get professional resources from related industries companies.

In addition, because integrated logistics strategy may lead to monopoly, so there have some policies to limit it. But, if using wisely, logistics strategy will take a lot competitive advantage to mining companies.

In conclusion, for the mining companies, although ordinary logistics integration model can bring improvement in enterprise revenue, but if they want to further improve enterprise competitiveness, collectivized logistics integration strategy is a very good choice.

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