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## Analysis of Covid-19's influence on international logistics enterprises and its countermeasures a case study of DGF

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**SHANGHAI MARITIME UNIVERSITY**  
**WORLD MARITIME UNIVERSITY**  
Shanghai, China



# **Analysis of COVID-19's Influence on International Logistics Enterprises and Its Countermeasures**

**A Case Study of DGF**

By

**Ruan Zhoutao**

**China**

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

**MASTER OF SCIENCE**

**INTERNATIONAL TRANSPORT AND LOGISTICS**

2021

## DECLARATION

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

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

(Signature): .....

(Date):.....

Supervised by  
Professor Zhang Chuan  
Shanghai Maritime University

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## ABSTRACT

Title of dissertation: **Analysis of COVID-19's Influence on International Logistics Enterprises and Its Countermeasure ---- A Case Study of DGF**

Degree: **MSc**

The spread of COVID-19 on the global scale undoubtedly has a huge impact on the whole macro-economic market. The stoppage of production and the restriction of regional mobility all over the world not only bring about the stagnation of production and the decline of trade volume, but also a series of problems such as slow logistics and collapse of supply chain nodes.

According to the previous literature survey, the current research focused more on the analysis of indicators on the macro level of the ocean shipping industry and the development of the whole port and shipping market, and little attention was paid to the analysis report of single project logistics. Therefore, this article hopes to take DHL global freight as the object of analysis, combined with the previous research foundation of project logistics and the current COVID-19. Based on the analysis of the development of the port and shipping market, this paper analyzes the specific response and performance of DHL in this epidemic crisis and summarizes the experience for the future international project logistics business.

**KEYWORDS:** COVID-19, epidemic crisis, international project logistics, port and shipping market, restriction of regional mobility

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# **1 Introduction**

## **1.1 Research Background**

The sudden outbreak of COVID-19 in 2019 has caused a great impact on the global economy in the short term. Due to the changes in macroeconomic environment and the continuous spread of the epidemic, international logistics and ocean shipping industry have been hit by hitherto unknown attacks.

The production, transportation, storage, insurance and other links related to shipping economy are impacted by the epidemic situation to varying degrees. During the epidemic period, the challenges such as the decline of profit margin, poor capital turnover and frequent supply chain problems have caused great trouble to international logistics enterprises. At the same time, international logistics enterprises also need to face the scattered ocean transportation market, the reduced transport capacity and the unstable port and shipping market.

Enterprises must have a clear understanding of their own logistics supply chain problems encountered in the crisis, combined with the background of the times, targeted to improve the logistics link, fundamentally improve the management ability, in order to better deal with the diversified problems and challenges brought by the epidemic.

## **1.2 Research Objectives**

The spread of COVID-19 on the global scale undoubtedly has a huge impact on the whole macro-economic market. The stoppage of production and the restriction of regional mobility all over the world not only bring about the stagnation of production and the decline of trade volume, but also a series of problems such as slow logistics and collapse of supply chain nodes.

Compared with other ocean transportation businesses in the international logistics industry, such as dry bulk cargo, oil tanker, etc., the transportation tasks of international engineering project logistics are more diversified and complex, and relatively more comprehensive. It is necessary to match each market information of multimodal transport and complete the coordinated development of multiple tasks.

How to timely adjust relevant coping strategies in the complex and special period of COVID-19 and smooth out the global difficulties is an urgent problem for the entire international logistics industry. Enterprises also need to think about how to further upgrade their own supply chain system in order to deal with the unstable challenges brought by the global economic recession in the post epidemic era.

According to the previous literature survey, the current research focused more on the analysis of indicators on the macro level of the ocean shipping industry and the development of the whole port and shipping market, and little attention was paid to the analysis report of single project logistics. Therefore, this article hopes to take DHL global freight as the object of analysis, combined with the previous research foundation of project logistics and the current COVID-19. Based on the analysis of the development of the port and shipping market, this paper analyzes the specific response and performance of DHL in this epidemic crisis and summarizes the experience for the future international project logistics business.

## **1.3 Research Method**

### **1.3.1 Literature Analysis**

Through consulting a large number of relevant information and collecting a large number of international logistics market data, this paper makes a systematic analysis and Research on project logistics, and forms a scientific understanding of the development of international project logistics in response to the epidemic situation by combing the shipping market information under the current epidemic situation, so as to further find out some problems existing in the process of coping with the crisis.

### **1.3.2 Case Analysis**

In this research process, in order to make the argument more convincing, this paper will introduce the actual case of DGF Shanghai to assist the research and analysis of the paper.

### **1.3.3 Combine Empirical Analysis & Theoretical Research**

Based on the theory of management accounting, this paper studies the process of DGF SH's response to the global epidemic and combines with the comparative analysis of the response strategies under the outbreak and normalization of the epidemic, analyzes the situation of international logistics enterprises under the epidemic, and draws relevant conclusions.

## **2 Literature Review**

### **2.1 Analysis on the development status of project logistics industry in China**

Compared with other ocean shipping businesses, international project logistics is more difficult to integrate. It has the characteristics of diversified transport forms, high risk coefficient and strong demand for time. Therefore, under COVID-19, the international logistics projects with complicated operation and more cooperative operations are faced with more uncontrollable factors and risks. Benefiting from the “one belt, one road” strategy, our country's project logistics has made great progress and has some experience in exporting large-scale projects. (Xie Yurong, 2020)

However, in the process of project implementation, we will still encounter a variety of problems because the multimodal transport involves many links which need to coordinate with others. For example, due to the instability of the port and shipping industry under the epidemic situation, the shipping date and shipping schedule cannot be accurately matched. If the packaging of materials and equipment is not rigorous and meticulous enough, it may cause cargo damage. The shortage of ship capacity may lead to unreasonable matching of transportation mode and ship type. Under the epidemic prevention regulations, the transportation materials are not fully prepared, which affects the customs declaration and so on.

Making efforts to make materials and equipment arrive at the destination in time and smoothly is the basic guarantee for the success of international engineering projects. Therefore, the challenging logistics transportation task is a great challenge to the whole enterprise in the face of the COVID-19 crisis. We need to timely and effectively launch corresponding coping strategies to ensure the successful completion of the project and bring more economic benefits to the company. (Li Yang, 2020)

### **2.2 Existing problems of management accounting system of**

## **international logistics enterprises in China**

The outbreak of COVID-19 caused a bumpy year for the global economic market. With the gradual development of the epidemic, the complexity of its impact has gradually become clearer. According to Clarkson's research, by the impact of COVID-19, the volume of global maritime trade in 2020 dropped by 3.8% to 115 billion tons. However, in the middle of the year, due to the strong rebound of China's demand and the uneven distribution of transport capacity, the freight market income situation has improved, and even the freight of the main ship types has rebounded to a historical high. In the face of the complicated and fierce ocean transportation market under the epidemic situation, it is not really helpful for enterprises to solve the strategic problems by relying on traditional financial accounting theory to blindly reduce the operating cost of enterprises. How to adjust their own operation strategy on the basis of improving the competitive strength of the enterprises has become an urgent task for international logistics enterprises.

Under the influence of the epidemic, the cost control of supply chain management has become the biggest management problem of international logistics enterprises. The company often emphasizes the control of transportation cost in the process of supply chain management in response to crisis and pays more attention to the control after the event but neglects the cost prediction analysis and flexible cost analysis before the project operation. This way of cost control is easy to make enterprises lose the opportunity of competition, and it is not conducive for enterprises to make timely response to the changing market.

At the same time, China's international logistics enterprises do not propose a complete set of scientific management accounting system, in terms of cost control, they just simply give the company's finance to audit and manage. In the process of project logistics operation, we may only focus on the transportation cost. There is a lack of specific and comprehensive performance evaluation for financial risk control which is not conducive for enterprises to realize the risk control of the whole project and the risk

management and financial policy of enterprises need to be improved.( Yu Qi, 2021)

### **2.3 Brief introduction of research objects**

DHL is the world's leading postal and logistics service group. Headquartered in Bonn, Germany, DHL was listed in Frankfurt in 2000 with a market value of 48.8 billion euros in December 2017. DHL is a global leader in the logistics industry. DHL Global Forwarding (DGF) is its freight logistics sector, which has a history of more than 200 years since 1815. It provides unparalleled professional logistics services in domestic and international sea, land and air freight and industrial supply chain management. With DHL's business network in more than 220 countries and regions around the world, it connects customers and enterprises and promotes global trade.

DGF is a leading international logistics industry in China and abroad. It has a complete range of products and services and one-stop services to meet almost all the needs of customers. Its main services and products include: international air transport, maritime transport, logistics value-added services such as multimodal transport, international supply chain management and industrial project logistics / chartering business. With solid logistics operation experience, the world's most extensive logistics network, professional and enthusiastic logistics specialists, advanced logistics information technology, and flexible price system, it has become the logistics partners of many industry giants, such as Siemens, Shanghai Electric, China nuclear power, etc. DHL Global Freight China's branches and offices throughout the country 44 cities, with 3600 customers.

Project transportation is one of DGF's core businesses, inheriting DHL's 100 years of professional experience in international project transportation, focusing on international multimodal transport, chartering, packaging, warehousing, port transit, customs declaration, inspection, insurance and consulting services for large-scale domestic and international projects and general contracting projects, relying on professional project team and perfect project service network, To provide professional and personalized engineering logistics solutions and consulting services for customers, covering business

areas including oil and gas, chemical, power and energy, mineral exploration, large factories, engineering projects and infrastructure projects, etc. Through the internal resource integration of the whole company and the group, the Project Logistics Department of DHL global freight provides customers with comprehensive business services for the whole project. Generally, DHL will provide logistics solutions including multiple services for different project situations:

**a) Project freight and logistics**

To provide project technical solutions for the delivery of special goods in engineering projects to designated locations, including the handling and installation of heavy goods, as well as the binding and filling of heavy goods in the process of shipment, and ensure the correct process operation and delivery time.

**b) General cargo transportation**

In order to realize door-to-door air transportation, container and other conventional cargo transportation, comprehensive air transportation, sea transportation, road freight transportation, railway freight transportation and other freight modes, provide comprehensive multimodal transport services.

**c) Air charter**

With the help of DHL's own internal freight system and other strategic partners' internal systems, charter airlift can handle the charter business of special cargo, urgent cargo and overweight cargo with different aircraft types.

DGF, with the help of its parent company DHL and a strong aviation network of more than 400 freighters, is able to meet the urgent logistics needs of almost any place in the world.

**d) Charter transportation**

Coordinate transportation of large equipment for oil and gas, ore and other international project materials such as injection pipeline, jack up drilling tower equipment, platform,

offshore oil jacket and components. At the same time. The project logistics department will also undertake the regular business of bulk dry bulk cargo transportation.

This paper takes DGF SH as the research object and takes "Shanghai Electric - Dubai photovoltaic project" in DGF SH project logistics department as the breakthrough point. In this international logistics project, DGF SH is responsible for the general contracting logistics and transportation scheme of "Dubai project phase V 900MW photovoltaic turnkey project" of Shanghai Electric Hong Kong Co., Ltd, including transportation and related services of some equipment, materials, special tools, construction machines and tools and missing parts. This paper analyzes the operation situation under the influence of epidemic situation by using management accounting tools and summed up the experience and lessons of DGF SH in the process of coping with the epidemic crisis.

### **3 Overview of related concepts**

#### **3.1 Management accounting tool system**

Management accounting mainly forecasts, makes decisions, controls, analyzes and evaluates the economic activities within the enterprise, and provides relevant information for the managers of enterprises, in order to maximize the economic benefits and the maximum value of the enterprise. Management accounting emphasizes that by embedding the tool method and knowledge concept of management accounting into relevant fields, levels and links of the company, based on business process and using management accounting tools, the management accounting tools can integrate finance and business organically, so as to expand accounting functions from record value to value creation, from back office to business front end, and to improve the ability of value creation of the unit. ( Li Yang, 2021)

Therefore, the main purpose of management accounting is to provide enterprise managers with accounting information needed for business decision-making, especially in strategic and daily decision-making, which plays an important and positive role in assisting managers to guide and control business activities, measuring and evaluating the performance of business activities, departments, managers and other employees and we can evaluate the competitiveness of enterprises at the right time.

In the process of analyzing the operation of international logistics enterprises under COVID-19, this paper analyzes the performance of enterprises by means of management accounting tools. It is not just a set of tools, but a system that takes into consideration the stakeholders of multiple capital and achieves the goal of serving enterprises.

Management accounting tools and methods are the specific means to achieve the objectives of management accounting, which are mainly used in the following areas: strategic management, budget management, cost management, operation management, investment and financing management, performance management, risk management, etc. This paper mainly selects two of the specific tools for demonstration and analysis.( Li Yang, 2020)

### **3.1.1 Value chain management**

Porter, an American scholar, put forward the famous value chain theory in the mid-1980s, which defined the business activities of enterprises as a chain composed of a series of interrelated value-added activities. All links in the chain are divided into basic value-added activities and auxiliary value-added activities. Each activity has a different cost input and brings the corresponding value-added. In essence, modern enterprises can be regarded as a collection of a series of orderly operations established to meet the needs of customers. Among the operations such as product design, work preparation, marketing, inventory receiving and sending, there is an operation chain that starts from suppliers, passes through the enterprise, and finally provides products for various departments. Therefore, the modern enterprise is an operation chain from one side to another, from the inside to the outside. Value chain analysis has become a method used to comprehensively analyze the competitive advantage of enterprises and help enterprises to formulate, implement and test competitive strategies.

The value chain not only exists inside the enterprise, but also has close external relations with the value chain of suppliers and customers. That is to say, the value chain inside the enterprise and the value chain of other organizations in the upstream and downstream industries of the enterprise can be integrated into a dynamic and complete value network. Therefore, in management accounting, the use of value chain analysis is to analyze the industry value chain from a strategic point of view to

understand the position of the enterprise in the industry value chain, analyze the internal of the enterprise to understand its own value chain, and analyze the value chain of competitors to understand its own value chain, so as to know yourself and the other. In addition, from the perspective of "competitive advantage", since the difference between the value chains of competitors is a key source of competitive advantage, the activities that constitute the value chain must be the key factors that determine the difference of the value chain. Therefore, by analyzing the value chain from a strategic perspective, enterprises can not only understand the whole process of value generation from within the enterprise. We can also understand the relationship between ourselves and upstream and downstream value chains from the analysis of industry value chain and understand the differences between ourselves and competitors through the analysis of competitors' value chain.

Value chain analysis is not only to help enterprises to improve their competitive advantages in the fierce market to obtain greater profits, but also for the common value of the whole supply chain network, which is a strategic alliance based on the principles of collaborative commerce, collaborative competition and win-win, including its own enterprises, manufacturers, suppliers, customers, R & D centers and logistics suppliers, a complete network chain system. We can Use the current management concepts, methods and the integration of information technology to achieve the effective planning and control of logistics, information flow and value chain in the whole supply chain. Therefore, the strategic alliance constructed by the value chain needs the coordination of information, resources and decision-making process, and needs to face the complex competitive environment together. The current network information technology ensures the timeliness and visibility of information flow in the value chain, and realizes the information sharing and integration among the members of the logistics supply chain. It is more conducive for enterprises to understand customer needs and reach an agreement with suppliers in time, which can enhance the rapid response ability of the whole value chain. Of course, in the decision-making process, each member of the supply chain needs to deeply analyze the current market environment, cooperation and competition

environment and interest risk environment, and make strategic planning combined with the long-term goal of the value chain system, so as to make the best decision for the entire strategic alliance.

Combined with the above concepts, value chain theory emphasizes not only the logistics supply chain based on resource integration, but also a strategic alliance of collaborative operation and win-win. We should not only pursue the competitive advantage of enterprises in the market, but also ensure the value-added of the whole supply chain network. Therefore, we should pay attention to the internal value chain construction and optimization services of core enterprises, such as the cost risk management of their own operation and emphasize the link relationship with other enterprises in the strategic alliance, and establish the cooperation mechanism of information sharing, benefit win-win and risk sharing, so as to ensure the competitive advantage of the whole value chain system.

### **3.1.2 Cost management of value chain**

The main purpose of enterprise operation is to make profits. The factors that affect enterprise profits mainly come from sales revenue, sales cost and various expenses. In the fierce competition environment, increasing revenue and reducing expenditure is the direction that enterprises must strive to survive and increase competitiveness. After the business objectives of the enterprise are determined, it is necessary to organize and implement cost control around the business objectives and supervise the business activities of the enterprise. The cost involves all aspects of enterprise operation, so cost control is an indispensable important aspect of the whole business activities.

Value chain cost control is to help enterprises improve cost control from the perspective of value chain analysis. Generally speaking, the cost control of enterprise's value chain can be divided into two meanings. On the one hand,

enterprises need to constantly improve and perfect their value chain and be familiar with their own value chain activities. At the same time, understand the industry situation and analyze the characteristics of the competitive environment, and then put forward relevant improvement measures; Secondly, the implementation of cost control must be combined with the analysis of suppliers, downstream customers and external competitors to achieve information sharing and resource complementarity, shape common interests, and strive to form a good situation of risk sharing and common development.

The purpose of cost control in the production and operation activities of enterprises is to continuously reduce costs and improve economic benefits, manage various factors that affect costs, timely find the difference between the target cost and the predetermined target cost, take certain measures to ensure the completion of the predetermined target cost, and achieve the maximum results with the least cost as far as possible. Each link of the value chain contains different value chain cost control objects. The internal value chain focuses on the resource consumption activities in the operation and management of the enterprise, such as the daily management expenses of the company. The external value chain focuses on the influence on the whole value chain network, including the business transactions between suppliers, customers and enterprises, as well as the interaction between them.

In order to control the cost of the value chain effectively, it is necessary to clarify the responsibilities and authorities of the management organizations and personnel at all levels, decompose the cost according to the Department and place where it occurs, control the cost by the relevant person in charge of the value chain, and reward or punish the cost according to the good or bad situation, that is to say, local level centralized management. Secondly, according to the reality of different situations, the formulation of practical cost control standards should not only meet the actual situation of the market, but also be modified at any time with the change of business objectives and objective conditions. Furthermore, it is necessary to do a good job in the daily accounting of the cost to provide economic, true and relevant information

for cost control.

### **3.1.3 Service quality performance management**

The essence of modern international logistics management is to help customers provide products and services efficiently and rapidly on the basis of customer satisfaction. With the maturity of logistics concept, customer service quality has become the key to the successful operation of international logistics system and even the whole enterprise. It is an important factor to enhance the difference of enterprise products and improve the competitive advantage of products and services. The choice of logistics customer service mode plays an important role in reducing logistics cost. Management accounting tools with the goal of customer service quality help enterprises achieve the goal of cost control by choosing logistics customer service mode, which often involves the whole process of commodity production to circulation. In order to achieve the organizational goal of ensuring the quality of customer service, through the relevant performance management, the enterprise formulates the performance plan, carries on the guidance and communication to the staff, from the performance appraisal and evaluation, the application of performance results to the continuous cycle process of improving the performance objectives, improves the performance of individuals, departments and organizations, and achieves the ultimate goal of the enterprise.

International logistics services include the planning, implementation and management of supply chain projects, from the integration of supply chain services at the port of departure to air, sea, road and railway transportation, to customs clearance services, warehousing, order management, goods distribution, reverse logistics, etc. In terms of data management, logistics process integration, data transparency, overall key performance indicators and process optimization, we should focus on customers to ensure the transparency and efficiency of the whole process.

The customer service quality performance management of international logistics is a set of performance evaluation, which usually includes order cycle and reliability evaluation, flexibility evaluation of service system, etc. The order cycle and reliability evaluation include the time from receiving the order to the goods ready for delivery, the time from receiving the goods to delivering to the customers, whether the goods are delivered within the specified time, whether the goods are in good condition at the time of delivery, and whether the solution of logistics service products is optimal. Flexibility evaluation of service system includes minimum order quantity, possibility of express delivery or delayed delivery, convenience and flexibility of ordering, etc.

## **4 Operation background of DGF SH under epidemic situation**

### **4.1 Background information of shipping market under epidemic situation**

The sudden outbreak of COVID-19 in 2020 had a huge impact on the global economy in the short term. As a derivative industry of international trade, shipping industry is vulnerable to the macro-economic environment and the overall demand of domestic and foreign markets. The first to be affected is the cargo side. In order to minimize the number of new cases of COVID-19 infection, governments around the world have implemented strict containment measures, including a wide range of temporary stoppage and mobility restrictions. Although these measures are necessary and necessary in the face of humanitarian crisis, continuous shutdown will inevitably lead to a sharp decline in global economic growth. For example, in the early stage of the outbreak of the epidemic from January to February in 2020, strong measures have been taken in China to quickly block the spread of the epidemic. Domestic demand has decreased, while foreign demand is still on the rise; On the other hand, affected by the Spring Festival and epidemic control, enterprises cannot start production normally, resulting in the phenomenon of "reduced demand and insufficient supply". Since the end of February, after China's gradual resumption of work and production, the epidemic has spread all over the world, and domestic demand has increased, but foreign demand has decreased sharply, forming a phenomenon of "surplus supply and reduced demand". With the above phenomenon, there is a shortage of orders, cancellation of orders, and even no payment after the goods are transported abroad, which seriously affects the production activities of the shipper. This repeated imbalance between supply and demand has seriously restricted the development of the cargo side and brought great development.

Secondly, due to the particularity of the shipping industry, the spread of the epidemic has also increased the risk of virus infection of ship crew and cargo, which has brought all kinds of uncertain factors. The most intuitive problem is crew

replacement and repatriation, because many ports at home and abroad have taken epidemic prevention measures to strengthen health and quarantine, including health declaration, route report and other inspection and screening measures, centralized isolation and restricted replacement of crew. The shortage of crew and the difficulty in recruiting workers directly caused many ships to stop sailing. Other reasons include the superposition effect of bad behavior caused by delay of shipping schedule, for example, a series of problems caused by shipyard shutdown, such as difficulty in delivery of new ships and high maintenance costs, have brought a series of challenges to the shipyard.

Finally, the twists and turns experienced by the cargo side and the ship side will eventually be reflected in the port as the node of the shipping network, including the impact of the reduction of shipping volume, the reduction of shipping routes and the change of shipping routes. In addition, due to the stoppage and inefficient operation of the terminal operation, as well as the reason that no one picked up the goods or the goods were not picked up in time, the port was blocked for a long time. Ships in operation have to queue up to load and unload goods at the port. The long delay of ships at the port leads to serious delay of shipping schedule, too many containers piled up at the wharf and low turnover efficiency. It not only increases the difficulty of collecting port charges, but also increases the tension of shipping capacity.

## **4.2 Analysis of DGF SH operation in different stages of epidemic**

### **4.2.1 Outbreak stage of COVID-19**

At the stage of the outbreak of the epidemic, the "Shanghai Electric - Dubai photovoltaic" project of the Logistics Department of DHL project is in the concrete implementation stage, and the logistics task has reached the fourth phase of the transportation task. With the sudden outbreak of the epidemic, DGF itself is not the first to be affected, but the shippers at the front end of the whole external value chain.

It is difficult for the domestic inland motorcade to pick up the goods at the factory. Affected by the national epidemic, the factory has to shut down and stop production. Although the ready goods have been placed in the preparation workshop in advance, the relevant Shanghai electric project leader cannot be present to sign and authorize the delivery. At the same time, the inland motorcade also encountered traffic difficulties, because the road transportation was gradually paralyzed by the impact of the epidemic and national policies. Not only can the fleet not continue to undertake the transportation task, but also the drivers who are already in the task cannot smoothly pull the goods to the established gathering yard, even at the most serious point of the epidemic, they have to park their cars and goods in the service area of the expressway and leave by themselves.

With the rapid spread of COVID-19 in China, the state has formulated a strict travel restriction policy. The port and shipping system has been severely restricted, and Shanghai port, the regular delivery port of DHL Shanghai electric project, has also been affected at the first time. For a long time, the terminal operations have to stop or operate inefficiently, which leads to the fact that the Shanghai electric goods that have been gathered in the port have to be placed in the cargo yard of the port for a long time, almost in an unattended state. However, the originally scheduled berthing ships can only be postponed due to the suspension of the wharf, and even have to cancel the original routes and chartering business.

In DGF, the staff of the project team are mostly at home. At the same time, the rapid spread of the epidemic also limits the possibility of them returning to work or dealing with emergency problems at the paralyzed logistics site. Therefore, during the outbreak of the epidemic, the implementation of the whole project was in a state of stagnation.

Of course, the middle and senior management of the enterprise also communicated with customers and suppliers on this emergency in a timely manner, reached a consensus and made a decision at the first time to temporarily freeze the project operation status so as to minimize the risk of the project within the known

operational scope and try to keep the safety of the goods and update the working status of all parties at any time.

#### **4.2.2 Normalization recovery stage of COVID-19**

Due to a series of emergencies caused by the outbreak of the epidemic, DHL has to freeze the operation of the project to reduce the risk and cost of the whole project. However, in the normalization recovery phase of the epidemic, DHL has encountered more challenges and difficulties. Although the domestic epidemic situation has been relatively controlled, but the rapid spread of COVID-19 worldwide has caused serious impact on almost all countries and regions in the world. Under such circumstances, the implementation of international project logistics has been greatly challenged.

On the one hand, the transportation capacity of the shipping market affected by the epidemic is sharply reduced, and the shipping industry is in short supply caused by the recovery of the domestic trade market, resulting in the soaring freight rate. Moreover, the chartering and container markets are still hard to find, and the special ships with the most demand in project logistics are even harder. As the contract price of the whole project, including sea freight and port miscellaneous charges, was signed according to the market situation before the epidemic. Therefore, the project team not only needs to search for ships that can complete the transportation task in the tight shipping market, but also has to face the cost control problem brought by the soaring freight rate.

On the other hand, although the domestic ports have gradually restored their operation capacity, due to the impact of the epidemic, the port operation efficiency is low, the waiting time for warehousing is long, and the cargo yard is crowded and disordered, which leads to the vicious circle of port congestion caused by the ships in the port. In addition, the goods carried by the logistics of engineering projects are

basically the major motor goods that need to be loaded by crane, and they often face more difficulties and obstacles in loading and unloading. For example, the operator of heavy crane is short of manpower, the heavy cargo cannot be transported to the site and the ship is easy to cause cargo damage and so on.

In addition to the above two difficulties, DGF also needs to constantly communicate and negotiate with all parties in the value chain to deal with the unexpected problems that may occur during the epidemic period. For example, the problems of receiving and delivering goods between customers, the epidemic prevention requirements of export customs declaration, and the paralysis of international logistics nodes when docking with foreign DGF sub stations. DGF project logistics department is also in the process of constantly solving problems, facing new problems and promoting the development of the project under multi-party coordination.

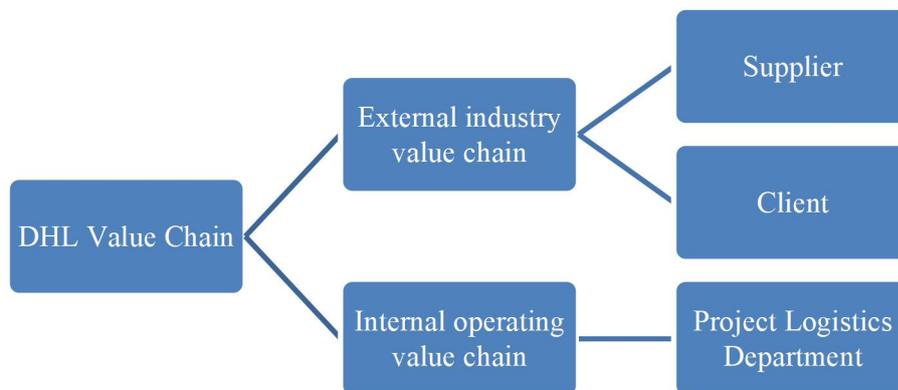
## **5 Analysis of DGF Project Logistics Based on management accounting tools**

### **5.1 Value chain analysis of DGF Project Logistics**

The construction of value chain makes the growth and development of international logistics gradually have two development directions. On the one hand, the logistics activities exist in the international engineering project manufacturing industry. Although the transmission of information flow will be more smoothly under certain circumstances, the huge operating costs and professional technical barriers also restrict the business development of enterprises. On the other hand, as an independent form of service industry, the third logistics industry not only needs to maintain and obtain the competitive advantage of its own internal value chain in the fierce market competition, but also needs to maintain the competitive advantage that can influence enterprises from the outside in the industrial value chain. Obviously, in the field of international engineering project logistics, the third-party logistics has gradually grown into a mainstream operation channel, especially in the form of DGF, which makes the complex international engineering logistics transaction more routine and creates greater value for the whole value chain. DGF creates a greater competitive advantage by promoting the improvement of the channel structure in the value chain, consolidating the relationship between suppliers and customers, and constantly improving its own internal value chain management mode, reducing operational risks and costs.

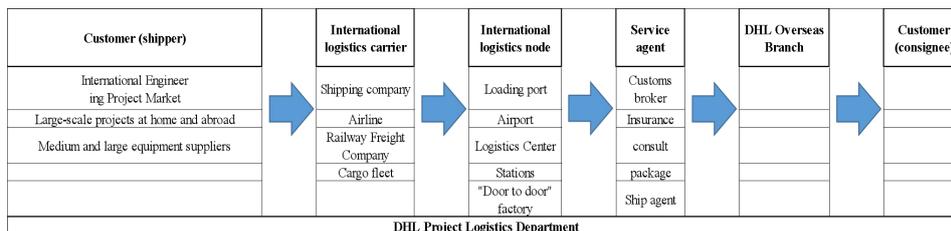
This section will use the value chain analysis tool of management accounting tool theory to analyze the international logistics industry and DGF company, so as to provide effective cost management information for enterprises to make correct strategic decisions in different periods. Every activity in the value chain constitutes a node in the value chain, and the business activity of creating value is a strategic link that enterprises must focus on. As an international logistics company focusing on providing customized solutions for customers in the heavy loading field, the Project

Logistics Department of DGF plays an important role in the whole transportation supply chain. The upstream connects the international trade market and important global engineering suppliers, and the downstream connects the carriers and important logistics nodes of various nodes in the world, Therefore, it is necessary to analyze DHL global freight company in the whole industry in order to effectively identify the value of each link in the value chain, become the core competitiveness of the enterprise in the development stage, and reduce the risk of enterprise operation in the crisis period. Value chain analysis mainly includes internal and external value chain analysis, as shown in Figure 1 below. This section will analyze the internal and external value chain of DGF according to the characteristics of international project logistics industry. Among them, the external value chain mainly focuses on the industry value chain including suppliers and customers, while the internal value chain focuses on the whole operation with the Logistics Department of DGF project as the core.



**FIGURE 1**

### **5.1.1 Analysis of DGF's external industry value chain**



**FIGURE 2**

It can be seen from Figure 2 above that the international logistics value chain is an important link in international trade, which runs through the whole transaction. Its essence is to help customers shift their import and export commodities. Although the international logistics itself does not increase the value of import and export commodities in kind, the services it provides for customers make the international transactions smoothly concluded and ultimately create economic value. Therefore, in the industry value chain, DGF plays a very important role. The above two figures directly reflect the position of DGF in the process of logistics operation of international engineering projects. It includes the whole process from the collection of market information in the early stage and the bidding of the project according to the needs of customers, to the specific implementation of the tasks in each stage of international logistics, the picking up of goods from domestic shippers through international multimodal transport and the final delivery of goods to overseas consignees. It can be a full door-to-door service, or a single segment or multi segment combined service. At the same time, in the process of project implementation, due to the complexity and difficulty of project logistics, DGF can provide customers with a series of professional one-stop supply chain services, including chartering, packaging, warehousing, port transit, customs declaration, insurance and consulting, with its professional project team and perfect project service network in the industry value chain. It can be said that DGF's perfect industry value chain management is one of its core competitiveness ahead of other competitors in the industry.

In the industry value chain of DGF, the most important thing is the port and shipping

industry which undertakes the task of ocean transportation and the customers themselves at both ends of the value chain, that is, the supplier value chain and the customer value chain.

Firstly, from the perspective of suppliers, the supply chain of international logistics industry is complex, including the supply process of services and actual goods. It is not only necessary to rely on ocean transportation enterprises to complete the transportation task by means of aviation and navigation, but also coordinate and cooperate with other freight forwarders, shipping agents, insurance companies, customs declaration companies, ports and other enterprises to perform their duties and efficiently complete the operation of the whole supply chain. It is not only the first step to attract customers to inquire, but also the basic guarantee for the successful completion of the whole project logistics. This is also directly related to the main profit of the enterprise. As an international logistics service company of DGF, DGF undoubtedly has the world's top brand influence. In the shipping industry, we not only have a strategic partnership with many shipping companies, but also have strong booking capacity and price advantages, especially in the heavy loading field where special transport ships are needed. We have more than 15 years of professional operation experience in multi-purpose ships, double deck heavy lift ships and handy ships, and have deep supplier resources. As for the ports which are the world's important logistics nodes, DGF has more than 3000 branches all over the world, which can guarantee the implementation of various logistics and transportation stages, including one-stop customs clearance service ability and local instant response ability, and so on. Compared with other enterprises, DGF also has more advantages.

Secondly, from the perspective of customer value chain, international project logistics is more complex than general international trade logistics. The goods consigned by both import and export parties are often important equipment in large-scale international engineering projects, which are not only difficult to transport, but also have high requirements for cargo damage. DGF, relying on more than 15 years

of professional operation experience of multi-purpose ship, double deck heavy lift ship and handy ship, and relying on large-scale projects, customized the sea transportation scheme of engineering projects for customers, which is different from the traditional route and navigation area restrictions, and provides reliable and flexible combination services. In the process of transportation, it shows the strong technical ability of the Logistics Department of DGF project, covering the loading scheme, stowage plan, heavy cargo lifting arrangement, ocean air navigation, port sequence management, terminal loading supervision and other aspects, so as to ensure the safe and timely delivery of the project to customers. According to the current hardware facilities and staffing of DGF and the business requirements of the project logistics department. In the process of project implementation, we need to provide "point-to-point" phased real-time services to customers, including setting up special personnel to make documents for customers, assisting customers to supervise and cancel relevant licenses, etc.

After the outbreak of the epidemic, the project team of DGF project logistics department got in touch with all partners in the value chain for the first time, including the supply chain department of Shanghai Electric, the shipping manufacturer, the person in charge of the departure factory, the inland transport fleet, the wharf warehouse of Shanghai port, the ship owner and the Dubai branch of the project receiving terminal. After confirming the safety of human and goods to all parties, a multi-party epidemic Crisis Group was established, an epidemic cooperation mechanism was set up, and online meetings were held every day to follow up the epidemic situation of human and goods and discuss the project operation decision. Finally, in the outbreak stage, it was decided to adopt the project freezing strategy. The shippers Shanghai Electric suspended all the current shipping plans of the Dubai project. On the one hand, DGF project logistics was responsible for following up the goods that had been sent by the factory, including the inland fleet in the course of transportation of goods into the warehouse storage as smoothly as possible, has been loaded goods timely follow-up shipping information to ensure the safety of goods and so on. On the other hand, DGF is also constantly negotiating

with cooperative ports and shipowners to timely update the situation of ships in and out of port and ships whose berthing plan has been cancelled due to the impact of the epidemic situation and negotiate corresponding solutions to ensure that the project operation risk is minimized under the epidemic situation.

Two months after the outbreak of the normal development stage, although the speed of COVID-19's spread has been gradually controlled, the government has also relaxed the control policies of various regions to a certain extent, allowing enterprises to resume work and resume production on the premise of strict compliance with the epidemic prevention regulations. But the rapid spread of the epidemic on a global scale has brought greater challenges to the whole global economy. The epidemic crisis team of DGF project logistics department also held a project exchange meeting with all parties in the value chain immediately after the resumption of work and made the decision to restart the power on photovoltaic project. According to the existing shipment situation, including the goods trapped in the logistics node during the outbreak of the epidemic, the batch shipment plan will be readjusted, and the project plan and consignment contract will be made again after the plan has been discussed and approved. After the application for shipment is approved, the DGF project team will continue to follow up the specific implementation of the project. There are also great difficulties and challenges in this link. The shipping market turbulence caused by the outbreak of the epidemic has brought about the problem of transport capacity and freight rate, which has made the operation specialists of the project team get into trouble in the specific operation of ordering ships and warehouses. At the same time, the soaring price has also brought great transportation costs and risks to DGF, which has signed a project contract for transportation.

Specific cases:

As shown in Figure 3 below, before the outbreak of the epidemic, DHL quoted us \$29 / T for the fourth batch of special shipping charges to Shanghai Electric, and did not charge other related fees.

| <b>DHL Project Logistics Department Quotation Form Multi-deck ship type</b> |   |                                     |
|---|---|-------------------------------------|
| <b>Port of departure</b>  | <b>Destination</b>  | <b>Logistics rate (USD/per ton)</b> |
| Shanghai Port   | Jibari Port   | 29                                  |
| Other fee   | In the event of other expenses other than the contract price, the amount confirmed by both parties shall prevail. |                                     |

**FIGURE 3**

With the turbulence of shipping market brought by the outbreak of the epidemic, the special ships scheduled to carry out the fourth batch of heavy machinery transportation tasks were also affected by traffic control, and finally cancelled the shipping schedule

In the next period of practical operation, DGF encountered unprecedented challenges. The scarcity and high price of special vessels in the charter market brought great cost pressure and risk to the project team to implement the transportation plan. In addition to the soaring freight, DGF also has to bear all kinds of other costs caused by the epidemic congestion. Although DGF adopts a flexible financial audit system, unlike the traditional financial accounting, which focuses on the cost audit of each freight item, it allows the project to carry out over cost transportation while ensuring the total cost of the batch. However, as the increase of freight rate caused by the epidemic has far exceeded the regular fluctuation of market freight rate, the management accountant in the project team resolutely rejected the application for the implementation of the fourth batch of transportation tasks, and the whole project once again stagnated.

Based on this situation, in order to complete the project under the premise of controlling the cost risk of the value chain, after negotiation in the whole value chain, all parties made a compromise, and DGF reached an agreement with the shippers

Shanghai Electric Group. Before the outbreak of the epidemic, the transportation batches that had started were charged according to the signed price in the contract (as shown in Figure 3 above). After the outbreak of the epidemic, the prices of the transportation batches were renegotiated according to the market changes. In addition, Shanghai Electric Group also needs to bear part of the other expenses caused by the epidemic, such as the storage fee and ranking fee caused by port congestion. DGF also reached a corresponding price agreement with shipping company on booking and chartering business, and finally made a new project proposal and quotation sheet according to the new market situation, as shown in Figure 4 below. Through the efforts of various parties, we have shared the risks and crises brought by the global epidemic, which has reduced the freight pressure and cost risk of DGF to a certain extent.

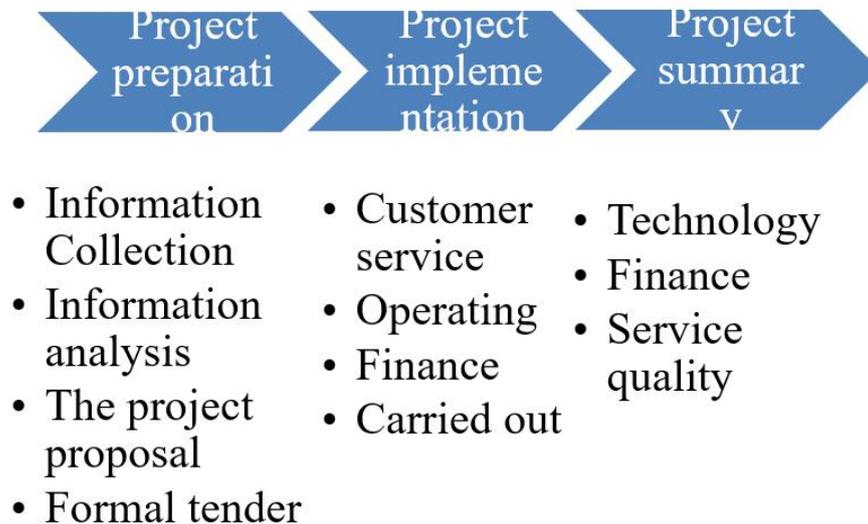
| Cost description                        | unit of charging  | Rate (USD) |
|---|---|------------|
| Shanghai Port-Jibari Port shipping fee  | USD/Ton   | 35         |
| Port charges                            | Times   | 200        |
| Shortfall fee for heavy cargo port area | Times   | 100        |
| Other fee                               | Subject to the actual amount confirmed by both parties. |            |

**FIGURE 4**

### **5.1.2 Analysis of DGF's internal enterprise value chain**

As the internal operation process of DHL global freight is affected by the international logistics industry, it has certain particularity. DGF does not produce its own products but obtains service fees by helping customers transport goods. Therefore, the internal value chain activities of the Project Logistics Department of DGF can be divided into three parts, as shown in Figure 5 below. They are the preparation stage, the implementation stage and the final project summary stage. The Project Logistics Department of DGF will lead the business progress and coordinate

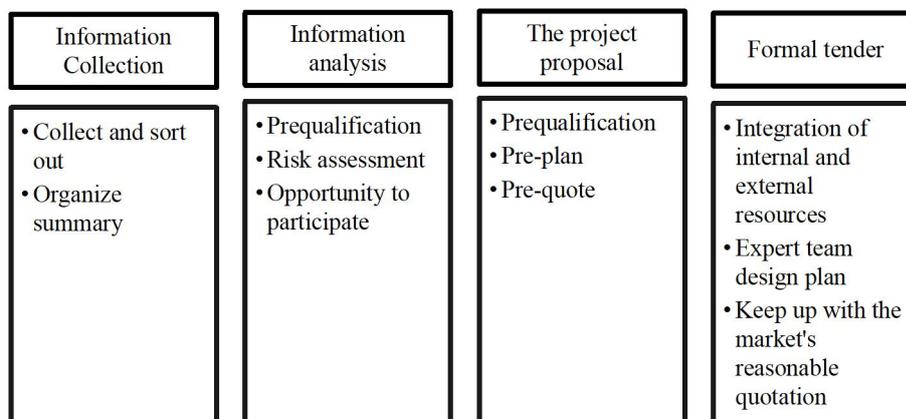
the financial and legal departments to assist the implementation of the whole project business.



**FIGURE 5**

The internal value chain of DGF mainly includes three stages:

The first stage is the early stage of project preparation. As shown in Figure 6 below, due to the business particularity of international engineering project logistics, customers will also have high requirements for project undertakers, and choose their own international logistics suppliers through project bidding. Therefore, the project team needs to make detailed preparations, including the collection, collation and summary of market information, and coordinate with the enterprise finance department and the legal department to prepare the prequalification of both sides of the project, as well as the project risk and Opportunity Assessment. According to the suggestions of the internal support department of the enterprise, the project team began to draft the plan for the project proposal, including the qualification review of external audit, pre scheme and pre quotation, etc. And then through the customer and enterprise internal suggestions for modification and adjustment, prepare the final formal tender.

**FIGURE 6**

Through preliminary preparation, DHL Project Logistics Department will integrate its internal and external resources, including the professional design scheme obtained from the cooperation of the expert team of various departments. DGF will carry out the special on-site investigation at various stages of international logistics, finally make a reasonable quotation according to the market situation and achieve the success of the project bidding.

The second stage is the specific implementation stage of the project. After the successful bidding, DHL Project Logistics Department will start to implement logistics activities according to the action plan in the project plan. The project team will be divided into four positions: customer service, operation, finance and execution. Customer service specialist is mainly responsible for the information flow of the whole logistics supply chain, including the delivery situation, ship dynamics, port gathering update and the docking situation of DGF sub-station at the destination port. The operation specialist mainly implements the logistics content according to the project plan, including chartering the ship and booking the space according to the cargo situation, arranging the port gathering and loading according to the dynamic situation of the ship, and timely updating the documents according to the logistics situation to ensure the customs declaration and inspection. The treasurer is not affiliated to the internal finance department of DGF, but a staff member in the

project team who is responsible for managing the financial situation during the operation of the project, including monitoring the cost control of the supply chain process, follow up the payment and collection of the project according to the project schedule. The executive officer is mainly the staff in the project team who are responsible for the field work and solve the unexpected problems, including supervision at important nodes. For example, the third party of the customer to the wharf for measuring and loading, or the project delivery to the site for coordination and contact, etc. Based on the work of the above four specialists and the supervision and guidance of the project leader and project manager to the whole project. The internal finance department, legal department and shipping and air transportation department will also assist the project team to complete the logistics task of the whole international engineering project.

The third stage is the final stage of the project. After the successful completion of the project, the project team needs to summarize according to the specific implementation of the project. On the one hand, it is the technical summary of the whole logistics scheme, including the matching degree of special cargo conditions and special ships in the project, the binding effect and cargo damage in the process of cargo transportation, and whether the multimodal transport route design at each stage can give full play to DGF's maximum effective transport capacity, etc. On the other hand, it analyzes and summarizes the financial situation of the whole project operation, finally establishes the corresponding database of the project, and sorts out and archives the project summary and scheme. Of course, there is also the customer service quality that DHL attaches great importance to. DGF will conduct business follow-up visit after the completion of each batch of tasks to evaluate the service quality at this stage and summarize after the final completion of the project.

DGF's Shanghai electric Dubai photovoltaic project has certain particularities. At the first stage of the project, COVID-19 has not yet erupted, and the global economic market is in a relatively stable environment. DGF logistics department can succeed in its own mature project experience and perfect working system. Under the leadership

of the project team, the internal resources of the enterprise were integrated and closely related to the shipping market situation at that time. The booking specialists of shipping, air transportation and chartering all made single batch quotation according to the designed shipping plan and make a detailed and perfect project bidding plan under the financial and legal audit. After two rounds of negotiation and modification, the project was small and successfully completed the project bidding task, and obtained the international logistics general contracting business of this Shanghai Electric Dubai photovoltaic project.

In the second stage of the project is the specific implementation stage. DGF successfully completed the logistics and transportation tasks of the first three batches of Shanghai Electric Dubai project, from factory delivery, port collection, shipment to DHL Dubai branch station, and then completed the delivery to Shanghai Electric at the destination terminal. And after the completion of each batch of tasks, we successfully completed the payment task and finishing service of payment for goods and freight.

In the fourth batch of transport tasks, which just started, it was in China's Lunar New Year holiday. The sudden outbreak of COVID-19 made DHL's entire external value chain temporarily paralyzed for the first time. DGF's own enterprises, including global freight, have lost certain productivity due to the epidemic, and even have an emergency of "disconnection of people and goods". In order to deal with the huge crisis brought by the epidemic situation, DGF's enterprises also made a rapid response. The senior management of the group launched the home office system during the epidemic period, which quickly restored the basic operation of the enterprise. And the team quickly confirmed the supply chain situation with the logistics nodes of DGF's global branch stations and fed back to the company's enterprise mailbox every day. In response to the special situation of the project logistics department, the project team held an internal seminar with other internal support departments of the enterprise and conducted an online meeting with customers after integrating the internal resources under the epidemic situation. The

two sides exchanged current opinions on the feasibility analysis of the project operation. The final conclusion is: In order to minimize the logistics risk and cargo loss, temporarily freeze the shipment plan of Shanghai Electric Dubai photovoltaic project, track and control the delivered goods, and restart the project after the epidemic is relieved.

At the normalization recovery stage of the epidemic, with the gradual relaxation of domestic control and the gradual recovery of domestic and international logistics capacity, DHL global freight has also made some adjustments and implemented a flexible home office system. DGF project team also restarted the project after multi-party communication and consultation. After experts re planning and design, according to the current situation of the logistics market, re formulate the corresponding project plan. As the link between the internal and external value chains of the enterprise, customer service specialists update the status of goods preparation, port gathering, shipping schedule and ship status every day to ensure the timeliness and accuracy of the whole logistics information flow during the epidemic period, and actively communicate with customers on the soaring shipping freight rate caused by the epidemic and negotiate the solution of cost sharing.

According to the new shipping plan, the operation specialist arranges the booking and chartering work, integrates DHL's own internal transport capacity and the resources of the external supplier ship owner company, actively responds to the shortage of epidemic shipping space, makes use of the industry brand influence and cargo volume advantage to complete the booking and chartering task, and ensures the timely completion of the scale and customs declaration before the shipment of each batch of goods, Especially in the epidemic period, the special work of Customs epidemic prevention documents. During the epidemic period, the financial officer is responsible for the cost control of the whole project operation, which is also the core of the value chain cost management in the whole management accounting method. In addition to strict financial approval procedures and perfect and convenient internal financial CW1 system, the financial officer of the project team will audit the

operation cost of each batch. Considering the complexity and particularity of international engineering project logistics, DGF project logistics department adopts a relatively flexible cost management system, which is not so strict with the financial audit of single ticket goods, but it must ensure the profitability of the whole batch. At the same time, it also has strict schedule rules for the collection and payment of each batch, which is the operation guarantee of the whole project. The executive commissioner is relatively the hardest member of the project team in the whole epidemic period, and also undertakes the most challenging task, especially when the fourth batch of transportation task begins. In order to ensure the smooth completion of the transportation task, the executive officer personally went to the scene to supervise the implementation of the whole supply chain link and coordinate the unexpected problems that may occur in the whole process from receiving the goods from the delivery factory to loading the goods from the yard at the gathering port, and even to docking with the Dubai branch at the destination port. For example, the efficiency of crane loading and unloading in port loading, the responsibility of cargo damage caused by poor binding in heavy lifting cargo loading, and so on. In addition, other functional departments in the enterprise's internal value chain, including the enterprise finance department, the legal department and DGF's own transportation department, are also supporting the specific implementation of the whole project, ensuring the quality and efficiency of international logistics tasks during the epidemic period.

## **5.2 Service quality performance management analysis of DHL project logistics**

The international logistics advantage of DHL Global Freight lies in its strong supply chain management ability and high customer service quality. Each branch in China has its own customer service department. Not only has a sound customer service system platform, responsibility system, system specification system, process control

system and complaint management system, but also continuously improves customer satisfaction, customer retention rate and single customer contribution rate based on customer demand and market competition. Through a variety of ways to reduce customer churn rate, win the market, increase brand reputation, regular and irregular customer return visits, on the basis of scientific analysis to the business department to put forward improvement opinions and suggestions.

Due to the particularity and complexity of international project logistics business undertaken by DHL Project Logistics Department, Shanghai Electric, as a specific customer of DGF, will set up a special dispatching group to provide services. Therefore, the responsibility of customer service quality management is directly in the charge of the project team of the specific business, and the customer service department, as the support department, assists in the supervision, and carries out the crisis public relations treatment in an emergency. As the first responsible contact person of Shanghai Electric, the project team will continuously optimize the process and resource allocation in the whole supply chain to improve the service quality and meet the requirements of customers. At the strategic level, DGF will also launch the corresponding service quality assessment system for the Shanghai Electric Dubai photovoltaic project to monitor the achievement rate of service indicators of the whole team, and fully consider the specific requirements of customers when formulating the indicators. It is precisely this strict and perfect service quality management that enables the DGF project team to deal with the crisis public relations immediately after the outbreak of the epidemic. And DGF actively adjust in the normalization stage of the epidemic which enable themselves to complete the transportation task of the project with high quality and high standard.

After the outbreak of the epidemic, the DGF project team, under the guidance of the enterprise customer service department, also made some adjustments to the service quality management system of the project to deal with the special crisis situation. For example, the customer service specialist needs to collect the cargo information of each logistics node every day and make a detailed cargo report to submit to the

customer to ensure the cargo safety status during the epidemic period. The operation specialist needs to strengthen the centralized management of the documents. From the examination of documents to the completion of customs clearance at the port of destination, he must ensure that he keeps communication with customers in every operation. The financial officer needs to negotiate with the customer in advance to formulate and strictly implement the collection process in line with the customer's requirements, and strictly control the cost control to ensure financial stability. The executive officer coordinates the abnormal management in the whole process of transportation, supervises the whole process of goods transportation and damage, tracks customer complaints and proposes solutions to quell customer complaints, etc.

DHL's customer service quality management performance is mainly divided into the following aspects:

- Accident control:

Is there any quality accident in the process of logistics transportation? For example, whether there is loss or damage of goods or other negligence in the process of operation, which leads to the loss of customers, and the severity level is determined according to the amount of loss and the division of responsibility caused by the quality accident.

- Time control:

The time management of the supply chain in the process of logistics transportation, whether the whole process logistics service can be provided according to the time batch of the project plan, such as whether the goods are picked up on time, whether the customs clearance is completed on time, and so on. Of course, considering factors like the epidemic situation, it can be divided into DGF controllable delay and DGF uncontrollable delay.

- Customer satisfaction:

In the event of an accident or delay, whether the DGF project team can track and solve the problem to the satisfaction of the customer, whether it can reply to the customer's inquiry on time, and whether the project team can negotiate with the customer in time and finally solve the sudden problem. Whether it can timely handle customer complaints and anomalies, whether it has flexible service ability, and meet the changing needs of customers, etc.

Specific cases:

In the actual operation of several months after the outbreak of the epidemic, DGF encountered the challenge of service quality in the process of carrying out the project transportation task. In the post epidemic period, DGF mainly carried out the task of the fourth batch of Shanghai Electric, and mainly transported the heavy motor goods in the project. The value of the goods was very high, and the customers had extremely strict requirements on the loss and damage of the goods. Affected by the epidemic, the executive director of DGF project team was unable to supervise the cargo collection at Shanghai port for a long time. During the freezing period of the project, there were five cases of unattended goods loss, which were all caused by the failure to enter the warehouse in time due to the regional control after the outbreak of the epidemic. The tangible loss reached as much as 100000 US dollars, and the intangible loss was immeasurable. During the epidemic period, serious loss and damage of goods will not only delay the construction progress of Shanghai electric customers in Dubai, but also have a huge impact on DGF's reputation and compensation.

In order to deal with the customer trust crisis caused by the loss of goods crisis, the DGF project team not only provided compensation and follow-up services for the loss of goods accident, but also confirmed a set of whole process control solutions to ensure the safety and quality of goods under the epidemic situation in view of the process loopholes and defects exposed in the whole accident. As shown in Figure 7 below.

| <b>Logistics stage</b>                    | <b>Solution</b>  | <b>Purpose</b>  |
|---|--|---|
| <b>Factory receiving stage</b>            | Each piece of cargo is affixed with DHL Logo label, and DHL's own fleet is escorted.   | Used to identify goods, avoid wrong delivery and delivery; improve cargo safety protection.   |
| <b>Port consolidation stage</b>           | The port yard uses fences to distinguish DHL cargo from other cargoes, cover with DHL banners and tarpaulin, and regular inventory inspections.      | Avoid possible mixed equipment and distribution, and strengthen yard safety management.   |
| <b>Export declaration stage</b>           | DHL sends a commissioner to check the customs lock number and condition when the customs blockade is unlocked.                                       | Ensure the safety of goods during customs clearance and customs inspection.   |
| <b>Shipment and measurement stage</b>     | DHL dispatched commissioners to coordinate the three parties to carry out on-site measurement, inspect the goods on-site, and implement supervision. | Ensure the safety of the cargo before loading at the port of departure, and update the shipment status to customers in a timely manner. |
| <b>Maritime transport stage</b>           | Install DHL's own monitoring equipment on goods of great value.  | Ensure that the status of significant value goods in transit is visible.  |
| <b>Delivery stage at destination port</b> | Coordinate the DHL destination port branch to assist customers to complete the harvest.  | Make full use of the resources of DHL sub-stations to ensure the safety of the goods during the receiving process.                      |

**FIGURE 7**

In each specific implementation stage of the solution, detailed and comprehensive implementation rules will be formulated to train the staff of DGF project implementation team and supporting functional departments at the first time. In the actual implementation process, it will constantly improve according to customer feedback. This scheme has been implemented since the restart of the project in 2020. So far, there has not been a cargo loss accident, and the probability of cargo damage has been greatly reduced,

DGF's leading and perfect solutions and service processes have won the trust of Shanghai electric customers in DGF Shanghai company again. In the post epidemic era, the export of engineering projects has recovered, attracting more attention in the

industry. It also fully reflects the implementation effect and strategic success of service quality performance management under DHL management accounting tool system.

## 6 Analysis and Thinking on the application of management accounting in international logistics enterprises

### 6.1 Performance analysis of DGF management accounting system

At present, DGF is in a leading position in the international logistics industry, with a strong global transportation network as the support, and has the ability of information tracking and service in the whole process of logistics transportation. These excellent performances not only benefit from the accumulated business experience and ability of DGF over the years, but also play an important role in the process of enterprise development with scientific and perfect internal system and strategic decision-making.

With more and more diversified markets and more and more customers' demands, the problems encountered in the process of international logistics transportation are becoming more and more complex. Through the construction of internal and external value chain management and service quality management system, DGF found many hidden dangers in the operation of enterprises and helped itself to upgrade its service ability. However, due to the lack of popularity of modern management accounting system in enterprise strategic management, DGF's management accounting system is still not perfect. In the crisis brought about by the outbreak of the epidemic, the fast response and complete and comprehensive crisis solutions fully reflect the flexibility of DGF's supply chain and the service management. However, there are still some potential defects to be solved in the process of project operation.

| DHL "Shanghai Electric" project fourth batch of cost composition schedule |            |              |
|---|------------|--------------|
| Cost composition  | Percentage | Cost         |
| Transportation costs  | 62%        | 81796997.59  |
| storage fee   | 16%        | 21108902.60  |
| service fee   | 8%         | 10554451.30  |
| Labor costs   | 5%         | 6596532.00   |
| Other   | 9%         | 11873757.71  |
| Total   |            | 131930641.20 |

FIGURE 8

| DHL "Shanghai Electric" project third batch of cost composition schedule |            |             |
|--|------------|-------------|
| Cost composition   | Percentage | Cost        |
| Transportation costs   | 54%        | 42470649.79 |
| storage fee  | 19%        | 14943376.78 |
| service fee  | 14%        | 11010909.21 |
| Labor costs  | 9%         | 7078441.63  |
| Other  | 4%         | 3145974.06  |
| Total  |            | 78649351.47 |

**FIGURE 9**

From the Figure 8 and Figure 9 above, the cost comparison of the third and fourth batches of DGF project logistics is shown, the soaring market freight rate caused by the epidemic directly led to a substantial increase in the transportation cost of the fourth batch, which increased from 42470649.79 yuan in the third batch to 81796997.59 yuan in the fourth batch, with a 92.6% increase in transportation cost. In addition, other unplanned expenses in the whole logistics process were mainly anti epidemic expenses, and their proportion increased from 4% to 9%. DGF has no way to directly control the cost factors affected by the market under the epidemic situation. However, through the application of management accounting tools under the epidemic situation and value chain cost management, DGF controls the cost risk of the fourth batch of project operation from other perspectives: improving the frequency and time interval of goods shipment, reducing the dependence and pressure on logistics node storage, improving the logistics service process of DGF project, reducing the number of transportation accidents, reducing unnecessary labor costs and compensation. As shown in the figure above, although the storage cost, service cost and labor cost are higher than those of the third batch, their proportion in the whole batch has been reduced, from 19%, 14% and 9% to 16%, 8% and 5% respectively. Under the premise of ensuring business progress and service quality, the operation cost and risk of the whole project are controlled to the greatest extent.

In terms of value chain management, influenced by COVID-19, the international

logistics supply chain of DGF was also forced to freeze due to domestic and international regional control and shipping industry. When the impact of the epidemic slows down and the project re operates, the high freight rate in the shipping market makes DHL face great cost control pressure and project operation risk. Although the price of shipping market is unpredictable, DGF still needs to improve the ability of cost management and integrate cost management into the process of value chain management. In the face of such a public crisis as the epidemic situation, DGF can control the operating cost of a single batch by setting up a special project team's financial specialist, which can ensure financial stability to a great extent. However, there is still a need for a more perfect management accounting system to support the operation of the whole project and reduce the operational risk in strategic management.

In terms of service quality management, DGF has established a world-renowned brand influence through years of experience and reputation in the industry. High quality supply chain value-added service has always been the reason why DGF is ahead of other competitors, and it is also an important reason for helping the DGF project team deal with the coordination relationship between the upstream and downstream of the supply chain during the epidemic period. However, DGF still needs to improve its performance management system, decompose the long-term corporate strategy into objectives, and refine the content into daily executable service standards and norms, rather than relying solely on performance appraisal standards to constrain employees. This process may lead to the execution of the business operators are not willing to carry out the psychological resistance. It is also worth discussing how to adjust the service management system of the project according to the special situation during the epidemic period. Instead of blindly pursuing cost control or blindly meeting customer needs, we can improve long-term customer satisfaction by continuously optimizing the service process.

## **6.2 Existing problems and Countermeasures of management accounting system of international logistics enterprises in China**

### **6.2.1 The shortage of management accounting talents in enterprises and Its Countermeasures**

With the development of modern management accounting system in recent years, many large companies begin to integrate management accounting tools into their daily business operations. Usually, in the process of leading the application of management accounting, the financial department adds a lot of work to its own department and other departments, but it does not achieve the same effect as expected. The main reason is that the promotion and application time of management accounting system in enterprises is relatively short, and the cooperation between relevant financial personnel and other functional departments is limited. The understanding of cross level management theory system is not deep enough, and more attention is paid to financial accounting rather than strategic management tools. As a result, the application of management accounting tools is superficial and does not play its due role, which also affects the development of the company's business.

For most enterprises, want to quickly apply the management accounting system to the daily operation of the company are facing the problem of management accounting talent shortage, this problem cannot be solved in a short time. Because in the whole talent market, there is a shortage of comprehensive talents who can combine the theory and practice of management accounting with practical experience. Therefore, enterprises should solve this problem from many aspects. First of all, we should refer to the business direction of our own enterprise development, and recruit suitable management talents with business operation experience and financial knowledge. Secondly, enterprises should pay attention to the cultivation of their own internal talents. Management accounting talents serve for the internal management decision-making of enterprises. Not only need to be familiar with the company's specific business market and operation process, but also need to have a full understanding of the basic ethics of enterprise strategic development. Therefore, it is

a good choice to cultivate accounting talents or business elites in enterprises. Finally, enterprises should not only pay attention to the training and recruitment of management talents, but also improve the importance of management accounting system in the whole enterprise and enhance the treatment and discourse power of talents. Let the application of management accounting go deep into the daily operation of other functional departments to help the company create more value.

The promotion of management accounting system and the cultivation of related talents' ability is a gradual process. In the use of various management accounting tools to improve the operation and management of enterprises, we should not only use the theory to guide in the process of practice, but also return to the theory to achieve a virtuous circle. Moreover, there should be more communication between management accounting and other functional departments to enhance mutual understanding. Management accounting must have a comprehensive understanding of the company's operation, such as arranging to study business in various functional departments. At the same time, we can often organize relevant management accounting seminars for employees of other functional departments to participate. And to encourage and reward the departments and employees who cooperate well, the two-way integration can help the management accounting system to better improve the overall efficiency of the company.

### **6.2.2 Unclear function of management accounting organization and its countermeasures**

In the process of implementing the management accounting system, most enterprises do not set up a special management accounting organization. They are all done by the original financial staff part-time, and a lot of work is very different from the traditional financial work. Not only will the staff of the financial department question the existing work, but also other business departments and functional departments do not have a clear understanding of the work content of management accounting,

leading to disputes on work cooperation. For example, when DGF is implementing the management accounting system, the members of the project team will have business conflicts with the financial department on the cost management. Sometimes, the financial personnel will be questioned by the business functional departments in the process of cost management, thinking that it will hinder the normal operation of the whole project business, seriously affect the development of the enterprise business, and thus muddle through. Another example, DGF is a leading international logistics service provider in the world. As a core business department, the project logistics department plays an important role in cost control. Especially after the outbreak of the epidemic, the high shipping market price makes the project operation extremely risky. The corresponding cost reduction strategy launched by the financial department cannot be completed by the project logistics department alone, but by the collective cooperation of multiple departments of the enterprise, especially the participation of the shipping and air transportation departments. In addition, at the project meeting, members of the project team pointed out that it is relatively difficult to establish a foothold in the market under the epidemic situation, and then artificially control various costs, which will not only affect the service quality of the original project business, but also have no advantage in developing market business under the recovery of the epidemic situation.

At the present stage, if enterprises want to effectively promote management accounting, they must go out of the traditional circle of financial personnel doing part-time management accounting. The internal design of management accounting organization is clearly separated from the traditional accounting and financial functions, and combines the internal and external value chain management, flexible cost control, performance management system serving the enterprise strategy with the specific business of the company. The management system will participate in the daily management of the enterprise, and ultimately directly report the work to the general manager level management of the enterprise.

### **6.2.3 Lack of financial software support and countermeasures**

In the process of promoting the use of management accounting tools, enterprises encounter a series of problems that conflict with the original financial system, including in the application of financial software, for example, there are many cases where the data source cannot meet the requirements of management accounting. For example, during the epidemic period, the DGF project team needs to control the cost of the value chain in strict accordance with the new management accounting requirements. In this process, it needs to input the cost data and expense management of each batch in the CW1 system of the enterprise, and the management accounting and financial department of the company in the team will audit the operation. However, the outbreak of the epidemic led to unconventional changes in freight rates within a certain period of time. Although DGF's internal and external value chain negotiation can deal with this problem, it can't make corresponding adjustment immediately in the application of management accounting software. This situation requires the cooperation of employees in various departments to help management accounting analyze and sort out the data, but there are many data. In order to get comparable data, employees in various departments complete the data collection and sorting on the premise of increasing a lot of work. Although DGF uses its own internal CW cost management system and commonly used SAP software for financial accounting, the existing software can only export the internal management report for data reprocessing in response to the outbreak of the epidemic, so as to obtain the internal management data needed to control the cost. The case of DHL directly reflects that in the process of promoting management accounting tools, the lack of technical support of financial software directly increases the workload of various departments and financial departments, and also adds human factors to the application effect of management accounting. For example, in the process of data processing, the possibility of incorrect results caused by improper data processing is increased.

On the one hand, at the beginning of the design and development of financial

software, the application needs of management accounting were not considered. On the other hand, it is also because the unexpected situation brought by the epidemic situation has brought a lot of accidental factors and difficulties to the application of management accounting. Management accounting in the actual use will deal with a lot of data processing methods, which requires enterprises in the digital process of computer software can provide greater help, so the later financial software development needs more consideration of management accounting needs and public crisis operation factors. The advantage is that it cannot only reduce the workload of employees, but also reduce the error rate of data in manual processing. The data obtained through the financial key calculation can provide reliable information for the enterprise management at any time, and meet the needs of the management in decision-making and planning. This also requires enterprises to combine management accounting experts and software developers more effectively in the process of developing financial software. It is also the research direction for enterprises to promote management accounting tools and further systematic management.

#### **6.2.4 Insufficient attention to service quality performance management and countermeasures**

With the application of management accounting tools in international logistics enterprises, most companies expect to achieve cost control through the application of management accounting tools but ignore the premise of cost control is to ensure the business quality of their own enterprises. In order to reduce the workload of internal management in the process of promoting management accounting system, some logistics enterprises only pay attention to the performance management related to cost control, but do not pay enough attention to the performance management of service quality.

In fact, international logistics enterprises are participating more and more in the

global real economy, from the traditional international trade commodity transportation to the relatively complex international engineering project logistics. The quality of international logistics service directly affects the customer's product competitiveness and the overall business process, so the customer's logistics experience determines the purchasing behavior of logistics supply chain to a large extent. In such a market environment, international logistics enterprises should pay more attention to their own service quality management, process improvement and staff training. Through the performance management of management accounting tools to form a set of scientific and efficient service quality management system to apply to customer service.

Although China's real economy and international trade are among the best in the world, looking at the world's influential international logistics enterprises, China's local enterprises still need to make continuous progress. Combined with the case analysis and Empirical Study of DGF, in addition to foreign international logistics enterprises started earlier than domestic enterprises, the infrastructure configuration is more perfect. Another important reason is that the world-famous international logistics enterprises, taking DHL as an example, attach great importance to customer logistics service experience, and instill this concept into specific logistics service details through scientific and perfect performance management, which ultimately affects customers' logistics supplier selection behavior, so as to establish a long-term and stable win-win cooperation. Therefore, through the study of DGF's service quality performance management behavior under the epidemic situation, it can bring some experience sharing to the local logistics enterprises' continuous progress. It is hoped that international logistics enterprises will pay more attention to service quality performance management in the process of applying management accounting tool system in the future.

### **6.3 Research on management accounting response of international logistics enterprises under public crisis**

After the outbreak of the new epidemic at the end of 2019, the world economy will be greatly affected by the public crisis brought by the epidemic, and the demand for international transportation will be sluggish in 2020. According to the data released by the International Monetary Fund in January 2021, compared with 2019, the world economy and Global trade will decline by 3.5% and 9.6% respectively in 2020. The border blockade management brought about by the worldwide outbreak of COVID-19 epidemic has not only changed the pattern of international trade. It has also changed the traditional shipping mode, resulting in the suspension of a large number of routes around the world, which has brought challenges to the sustainable and stable development of international logistics enterprises. As an international trade extension industry with less elasticity of demand, in the face of such a complex and severe public crisis, enterprises need to strengthen their own cost management and do a good job in crisis risk response strategies.

Cost risk analysis of international logistics enterprises is the starting point and key of cost control. Before management accounting tools are widely used, traditional cost analysis divides the cost of international logistics enterprises into operation cost and management cost

In the actual operation process, the sum of all kinds of expenses generated in the actual process of cargo transportation, including the carrier's freight and logistics node costs in each stage, is attributed to the operating cost, while the management cost is the internal management cost in the auxiliary production and operation process. Under the public crisis brought by the epidemic situation, the traditional cost classification model is more extensive in the application process of international logistics enterprises. In many emergencies, it is impossible to trace the causes of the cost, which also makes it difficult to effectively manage the enterprise cost risk under the crisis.

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This paper studies the performance of DGF under the new crown epidemic management accounting tool to deal with the global public crisis. This paper argues that international logistics enterprises can manage the crisis through the application of management accounting tools. On the one hand, it can strengthen the cost risk management of enterprises, on the other hand, it can also improve the performance of enterprises in business operation and enhance the comprehensive competitiveness of enterprises from both internal and external directions. In the post epidemic era, although the international logistics market has recovered, the global economy and trade will still have greater uncertainty for a long time and the market competition will be more intense under the public crisis. Under such circumstances, the international logistics enterprises need to size up the situation, adjust the enterprise strategy, abandon the traditional mode of operation and financial audit methods. We should actively combine business management mode with cost risk management mode and make use of various branches of management accounting tools. According to the actual situation of the enterprise, the corresponding management accounting system should be formulated to form a real organic combination of business management and financial management. It will provide a solid foundation for enterprises to tide over the difficulties of public crisis and maintain stable development.

## **7 Conclusion and prospect**

Based on the project operation of DHL Global Freight (Shanghai) Co., Ltd. under the epidemic situation, combined with the characteristics of international project logistics and the situation of global shipping market, this paper summarizes the experience and lessons of DHL as an international logistics enterprise in dealing with the public crisis through two management accounting tools: value chain management and service quality performance management in order to solve the problems and deficiencies in the application of management accounting system, and realize the wide application of management accounting system in the field of international logistics industry. First of all, through the analysis of the retrieved literature, this paper reviews the understanding and understanding of domestic and foreign scholars and industry experts on the management accounting tool system and introduces the current situation of the international logistics industry and the global port and shipping market. Then, it introduces the current situation of DGF, and from an international project business in operation of DGF, it expounds the two management accounting tool systems that DGF has been using under the epidemic situation and analyzes how DGF can guarantee the project operation quality and risk under the global public crisis brought by the epidemic situation from the perspectives of value chain management and service quality performance management. Finally, it summarizes the problems encountered by DGF project logistics department in the application of management accounting system since the outbreak of the epidemic, and puts forward the corresponding solutions, so as to summarize the experience and lessons of international logistics industry in improving its own supply chain management and enterprise operation through the application of management accounting tools.

With the continuous innovation and development of modern logistics services, the market environment and customer requirements of international logistics enterprises are becoming more and more challenging. The use of management accounting tools to help enterprises realize the optimization of enterprise internal process management

has gradually been valued by the management of various companies. The theory of how to rely on management accounting tools to improve the service quality and supply chain elasticity of international logistics enterprises need to be more perfect and practical, and finally form a complete and scientific application system to optimize the internal and external operation management of enterprises and minimize the operation risk. We should constantly improve the quality of international logistics enterprises' transportation tasks and strengthen their supply chain response speed and recovery ability in response to public crisis, so that the future international logistics enterprises can more calmly provide efficient logistics services in various situations.

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