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The attempt and operation of container sharing platform in the Yangtze River Delta: efficient transfer of empty containers and resources sharing

Yifei Wei

WORLD MARITIME UNIVERSITY

The Attempt and Operation of Container Sharing Platform in the Yangtze River Delta: Efficient Transfer of Empty Containers and Resources Sharing

Yifei Wei

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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):

Wei Yifei

(Date):

2020.06.11

Supervised by: Xuefeng Wang

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I would first like to express my appreciation for granting me an opportunity to further my studies and complete this topic successfully. And I also want to express my appreciation to my family for their support from a lot of aspects which help me so much in my life and study.

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Abstraction

Title of Dissertation: **The Attempt and Operation of Container Sharing Platform in the Yangtze River Delta: Efficient Transfer of Empty Containers and Resources Sharing**

Degree: **Master of Science**

During the period of time from 2019 to 2021, the container had its glorious era. Many shipping companies were considering introducing the concept of sharing economy to manage the shortage of containers in shipping industry. However, in 2022, many shipping companies were rushing to build containers, but with less demand for trade, the number of empty containers was rapidly growing. This paper will analyze the necessarily of the construction of Container Sharing Platform, although in the period of surplus empty containers.

This article will focus on the Container Sharing Platform in the Yangtze River Delta, because this region has the biggest ports in China. This article will analyze and assume the Container Sharing Platform from various aspects. In the case of excess empty containers, the Container Sharing Platform can provide countermeasures to improve the situation. For the necessity of building the Container Sharing Platform, this paper will calculate part of the cost model and operation model in a hypothetical sense, so as to prove that the Container Sharing Platform can bring a certain amount of cost savings.

Nowadays, many shipping companies, such as Maersk, have started building Container Sharing platforms. Not only shipping companies, but also ports have invested a lot of time and energy in digital transformation. This article will take part

of the Container Sharing Platform that has been put into operation as a blueprint and combine with the existing digital technology of ports in the Yangtze River Delta to build the Container Sharing Platform in this region.

In addition, for the construction of Container Sharing Platform, its business model, business subjects and support are all factors that need to be considered. This article will combine the government policy and business environment of the Yangtze River Delta region to analyze how to build. In addition, the Container Sharing Platform also needs to fulfill certain market responsibilities, such as regulatory responsibilities and so on. This article will also have a partial definition of this aspect.

CATALOG

List of Abbreviations

Container Sharing Platform —— CSP

Empty Container Dispatching Center —— ECDC

Vessel Sharing Agreement —— VSA

Mediterranean Shipping Company S.A. —— MSA

Less Than Container Load —— LCL

Container Freight Station —— CFS

Container Yard —— CY

Empty Container Exchange And Transportation Cost model — ECETC Model

Shanghai international port (Group) Co., Ltd - SIPG

China Shipping (Group) Company - CSGC

Shanghai Port Joint Container Exchange Center - SPJCEC

Container Shared Management System - CSMS

Shanghai Port Container Rental Platform - SPCRP

Chapter 1 Introduction

1.1 Background and Problem Statement

With the end of epidemic era, global shipping industry came back to the situation which it was three years ago. The freight of containers keeps decreasing, which declares the transition from the explosion to the cooling of shipping market. However, during the past three years time, a huge amount of containers were stopped in the congestion of shipping. Because of the raising demands in the supply chain, some shipping companies did not have enough transport capacity to manage the circulation of containers. In order to deal with the problem of this shortage quantities in transition, some of ship-owning companies started to exploit an online data platform, which is called “Container Sharing Platform”.

At the beginning of the invention, shipping companies expected to operate the resource replacement, which means they will share their spare space in their containers and transport capacity, so that all the resources in the transportation have the ability to rotate. Nonetheless, this sharing idea in shipping industry was born in the time which the freight rate at the apex of one decade. At the end of 2022, the rate began to fall back to the situation which it was be 3 years ago. The continue decline of freight also represent the redundant capacity. As the result, a lot of shipping companies is facing the problem of over-quantity containers now, which also makes the program of Container Sharing Platform over before it even starts.

Back to the one, the essence of this platform is sharing economy, which means shipping companies can open their spare resources to the public, and get rewards in return. But now, the biggest obstacle to sharing is that there are surplus resources, which makes container sharing becomes a joke. However, for my perspective, Container Sharing Platform still will have its own value, if it can work on another side

of aspects.

First of all, for the financial operation of shipping companies, when the daily maintenance cost of containers and the rental cost of storage yard are greater than their own cost, they will consider removing empty containers. Second, although the decline from the peak of the shipping market was predicted in advance, many retail manufacturers were still falling in the concerns about tight container capacity in 2022. IKEA, for example, bought and rented containers to support its shipping partners in 2020-2021. But IKEA later found that the containers became an unaffordable link in the supply chain after freight rates fell and sold them immediately.(One Shipping, 2022)

As it mentioned at the beginning of this essay, the purpose of shipping companies to construct Container Sharing Platform is to improve the efficiency using of containers and reduce the cost of daily transportation and operation. When many shipping companies are faced with the problem of whether to remove containers, the online sharing platform can effectively integrate and screen overlapping resources in the shipping industry. At the same time, for the future operation of reasonable distribution also has a great development.

During the peak shipping period of 2020-2021, because of lack of information and data exchange and profit sharing many companies operated independently. Therefore, they built a lot of containers, but if they are willing to join the sharing platform, the cost of the containers will be lower and lower in the future, and there will be no longer surplus of empty containers like today. In addition, shipping companies spend a lot of money on shipping containers every year, and even some of big multinational shipping companies, such as COSCO, start developing inland lines to transport containers. Which could be seen that, shipping costs are already a big expense for shipping companies, and they urgently need to find a way to reduce this expense. In my point of view, Container Sharing Platform can provide them with container

transfer services. For example, Company A has 10 spare containers at one Asian port, and Company B finds that there is a shortage of containers during shipment and needs to be transferred immediately. Then, the platform can first transfer the containers of Company A to Company B through information sharing, and then transfer other containers through the platform for Company A to load and set sail for Company A's line.

For my point of view, Container Sharing Platform can be first put into trial operation in the Yangtze River Delta. Because the ports in the Yangtze River Delta have developed rapidly and are geographically close. Whether it is land transportation, railway transportation or shipping transportation, there is much more choice for shipping companies to concern about. In addition, some shipping companies, such as COSCO, have already possessed the rudiments of such business in this region, which can be referred and improved.

1.2 Aim and Objectives

This research aims to explode the deep business of Container Shipping Platform, identify the business model of the platform, understand the needs of costumers, and find the operating subject of this platform. As for the objectives are proposed as following:

1. To determine the business objective that containers achieve basic sharing in shipping industry.
2. To complete the database of Container Sharing Platform by giving each container an "ID card".
3. To find out the effective way for shipping companies to transport empty containers.
4. Based on the concept of sharing economy, to explore container information linkage between ships and ports.

1.3 Scope and Limitation of the Research

The scope of this research will not be only limited in shipping industry. The definition of Container Sharing Platform should not be signed as information sharing platform. For the review in shipping industry, this research will compare the freight rate in the past 3 years, and make the figure about the number of empty containers which are put in Shanghai port. According to the cyclicity of shipping industry, this research will definite the reason of rapid change in container market. Besides, this research also will work on the existing example of ports cooperation which must have some aspect on container sharing. This research will focus on studying the methodology of distribution of empty containers transportation in the Yangtze River Delta region to achieve one more comprehensive way. As a result, all ships docked in the Yangtze River Delta have the opportunity to enter the CSP to share data, obtain shared containers, and enjoy the convenience of shared transport capacity.

For the review in economic field, this research will analyze whether the governments will support Container Shipping Platform through the existing literature about nowadays sharing economy in China.

For the sharing platform, this research will study on the examples of DiDi Taxi and bike sharing like OFO and Hellobike, in order to find out the way for sharing platform to intervene in the market. For the example of DiDi Taxi, in 2012, private car had become one of the necessities of each family. At the same time, every city had a government-supported taxi company, but even so, DiDi Taxi could still make an entry point in the market. In addition, it also has a stable market in Shanghai, Beijing and Guangzhou where public transportation is quite developed. In the angle of successful companies from the sharing economy business model, Container Sharing Platform can get a lot of useful experiences and instruction.

For the business model of Container Sharing Platform, the research will define the feasibility of membership through the examples of Carrefour and Sam's. Both of these transnational retail corporations have their own powerful supply chain, which could provide customized service. I think this is also a good way that the sharing platform can enter global markets.

1.4 Structure of the Research

This research will consist of literature review, data analysis, case study, and methodology. After that, it is followed by a conclusion and recommendation. Chapter Two focuses on the existed literature written by scholars and journalists, which mentions CSP's business structure concept and the necessarily of development. This chapter will speculate on the dilemma of CSP's current development through literature. First, in the market, there are certain barriers on data sharing among various shipping companies. The emergence of shipping alliance has broken and deepened this barrier to some extent. Shipping companies in the same alliance have certain data sharing, but for other shipping companies not in the alliance, this sharing is closed. When the shipping alliance may collapse for some reasons, the shared content will enter a vague state again. Therefore, this chapter will analyze the feasibility of CSP in the Yangtze River Delta by studying the Empty Container Dispatching Center(ECDC) Project of SIPG Group and taking the sharing economy as the central concept.

Chapter Three defines the research methodology used to reach the aim of this research. In this chapter, the research will focus on the analysis of different empty container transport models and transport costs, such as container block chain, multi-modal transport, grid transport, etc., so as to screen out the sharing data which can be entered into CSP. This chapter will be based on the five shipping companies that account for the largest proportion of empty containers in ECDC of Shanghai Port: COSCO, Maersk, CMA CGM, MSC, and Evergreen. This chapter will compare the projects developed by the five shipping companies themselves to complete the empty

container transportation. Besides, this chapter will also focus on the optimal treatment of empty containers at the ports in yangtze river delta area. At present, shipping companies rent container yards(CY) or warehouses at ports to store empty containers. In the case of the urgent needs for expansion of the CY, the sharing optimization in the block chain mode is carried out, that is, sharing CY space. Many scholars have used DEA method and BCC model to discuss the efficiency of empty container transportation. This chapter will use the existing empty container data of Shanghai Port, multi-modal transport data, freight, labor consumption and other contents for more calculation and analysis.

Chapter Four will study the existing empty container transportation technology of shipping companies in order to make the comparison to see if they have similarities or commonalities, and the possibility of technology and resource sharing also should be considered, such as COSCO's land transportation, Maersk's surplus empty containers, etc.. At the same time, this chapter will analyze about the partners and cooperation modes of EDEC project, and explore the possibility and necessity of its sustainable development. This chapter will compare the empty container transport model of Dalian Port, and verify whether the model can be put into trial operation in Shanghai Port by substituting the combined transport data of the Yangtze River Delta. In addition, by studying other successful cases of sharing platform, this chapter will also analyze the benefits brought by its advantages and the risks brought by its disadvantages.

Chapter Five constructs a whole business blueprint, including vision and mission, objectives and goals of CSP. This chapter will declare that the operating entities of CSP are enterprises. Enterprises will join the platform through member settlement to share data and resources. The specific business model and economic benefits will be analyzed through the model of Carrefour and other large-scale membership supermarkets. In addition, this chapter will explain that government support plays an indispensable role in the development of CSP, especially in the sharing of port space

and multi-modal transport modes. For example, by studying the export restriction orders of New York and New Jersey ports, this research will calculate the operation possibilities in the Yangtze River Delta ports and their positive effects on the container sharing section of CSP. This chapter will also define the platform responsibilities of CSP, such as container quality monitoring, multi-modal transport route planning, warehouse allocation, etc.

Chapter Six will summarize this research and give recommendation on the possibility of sustainable development of CSP in the future.

Chapter 2 Literature Review

2.1 Introduction

The shipping industry is closely related to trade and economy. When the global economy is on the upswing, trade becomes positive. Therefore, shipping industry can also get some development from trade. In 2021, freight rates in the international container market continued to rise, which had made a huge impact on international logistics transportation and trade. By the end of August 2021, China's export container freight index had reached 3,079 points, 240.1% higher than the same period in 2020, which was more than double the record high of 1,336 points before this round of rise.(Li Bo, 2021).

For Container Sharing Platform(CSP), it has three basic responsibilities: logistics tracking, container positioning, and storage space sharing. However, such a simple feature is simple and easy to develop for every shipping company. If CSP is limited to the container itself and information sharing, it will lose its great advantage of having a powerful shared database. With the research on the shipping industry, empty container transportation, terminal storage, sharing economy and other aspects, CSP can fully enter the market as a third party platform.

2.2 The Necessity of Container Sharing Platform(CSP)

While shipping industry was raising at its peak period, CSP can integrate the shipping companies' existing container quantity and shipping capacity, so as to ensure the smooth progress of trade at maximum efficiency.(Lan Hui, 2016) The emergence of shipping alliance is also to integrate the resources of each shipping company within the alliance.(Jiang Yujie, Gao Zhuo, 2018) However, now there are too many containers piled up in the yard, actually, because of information distortion. For most

shipping companies, resource sharing only exists within the shipping alliances (eg. 2M, THE), or several subsidiaries of a parent company (eg. SIPG Group). Therefore, interoperability across the whole industry is difficult to achieve. As a result, there are a lot of empty containers and excess capacity today. After the contribution of CSP, the scope of resource integration will be expanded, and the overall efficiency of the shipping industry will be improved. CSP is not entering the market as a distributor, it's entering the market as a sharer. The biggest difference between them is that there will be no company who would lose its own benefits because of CSP.

2.2.1 Container Sharing Platform(CSP): An Uncompleted Field

For a lot of shipping companies or shipping alliance, CSP is a platform which is only used to share information and data of their own containers. Information distortion still exists.

In January 2022, Maersk and MSC said that they would not renew their vessel sharing agreement(VSA) in 2025. This news indicates that the 2M alliance is about to disintegrate, which will also have a certain impact on the shipping industry, because 2M alliance is currently the largest shipping alliance in the world, with a market share of about 34%.

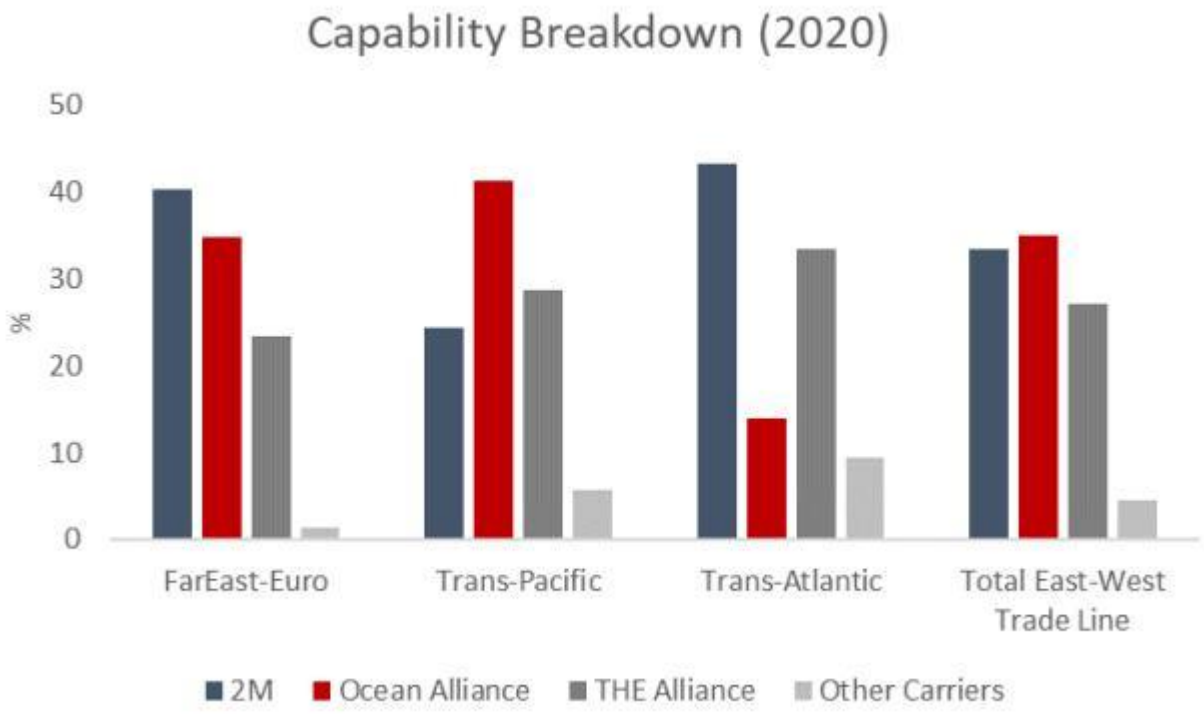

Figure 1: Shipping alliance route capacity distribution (Resource: Clarkson SIN)

Shipping alliances are a series of VSA combinations that are more global in nature. Shipping alliances enable shipping companies to achieve efficient utilization of shipping capacity resources, but gradually, with the continuous expansion of MSC capacity and the divergence of development goals of them became more and more obvious. The foundation of this alliance is not stable. The disintegration of 2M will undoubtedly bring a short-term impact on the shipping market. But when part of the sharing can be done through a third-party platform, such a market shock can be avoided.

In addition, data on shipping capacity and container numbers will become more transparent. Many shipping companies keep their route distribution a trade secret. Therefore, there is only one third-party platform——CSP, that can collect all the information and sit in a relatively neutral position. If the purpose of a partial alliance can be realized by paying a part of the amount as rent to CSP, the shipping company need not bear the risk of the collapse of the alliance and the different strategic

development of the alliance; for the shipping industry, capacity efficiency can also be increased by another level.

2.2.2 Existing Technology to Support Container Sharing Platform(CSP)

The construction of CSP is not a massive project that starts from the origin. On the contrary, many existing businesses and technologies can be introduced to CSP in the shipping industry. For example, the most basic business: container tracking, logistics and location sharing. Today, many shipping companies make this by inputting the number of a container, as easily as looking up the tracking number.(Zhang, 2019) If this technology can be improved again, for example by using QR codes to cover container numbers. Because QR codes can build information that is more three-dimensional than a single container number, it can even move to a URL.

Besides, Many shipping companies have their own Less Than Container Load(LCL) department.This technology can be introduced by CSP, which is also a convenient technology for carriers. At present, the handover mode of LCL is divided into: Door to Door, Door to Container freight station(CFS), and Door to Container Yard(CY). For CSP, however, anything that leaves the container is out of the picture. That is to say, when the carrier complete LCL, there is no need to consider the problems in the transportation process. Similar shared business technologies has already existed in the shipping industry. For the CSP, it needs to integrate them and share them with shipping companies in the form of platforms.

2.3 The Economic Benefits from Container Sharing Platform

The entry of CSP into the shipping market can also bring new opportunities and vitality to the market, just as the entry of DiDi Taxi into the market has done. DiDi Taxi was born in 2012, when private cars have become a must-have item in every

household. Meanwhile, each city has its own taxi system and public transport system. This is the same as when CSP entered the shipping market. DiDi Taxi was originally launched to serve taxis, to reduce information asymmetry between passengers and taxis, point to point order to reduce the number of empty miles taxis cruise on the road.(Ma, 2020) The CSP, when initially opened, can also reduce the information asymmetry between shipping companies, thus reducing the waste of redundant resources.There are already major container leasing companies and storage services, but the emergence of CSP can still change the market environment and bring some economic benefits.

2.3.1 The economic benefits of China (eg. yangtze river delta area)

Taking the Yangtze River Delta port association as an example, CSP can bring a new ecosystem to the shipping industry in the Yangtze River Delta region. It can complete the transportation of empty containers by land and water, with Shanghai as the center.

First of all, the Yangtze River Delta has the geographically advantage. The ports of Jiangsu, Shanghai and Zhejiang are near the sea and not far apart. Among them, Ningbo, Taicang, Nantong port scale is not small enough to complete the transfer and stacking of empty containers. Second, the turnover of empty containers is slow. Due to the low inland collecting and distributing capacity of the port area, the container turnover time in the inland is longer.(Xie, 2019) In addition, due to the management factors, the circulation of container transport documents is not smooth, and the handover procedures are complicated, resulting in the shipper can not pick up the container in time and the port serious pressure. Shipping companies are forced to divert containers from other ports. However, CSP are the perfect solution to this problem. Through the sharing of container data, each shipping company can use the shared container for shipment. The pressure of the empty container is given to the sharing platform itself. Although the turnover pressure has not changed, the platform

will have a looser time limit than the shipping companies' transfer. Finally, with the flow of cargo in shipping itself, the container itself has liquidity, and the gap of empty containers can also be made up through CSP.

2.3.2 Empty Container Dispatching Center Project of SIPG

Previously, major ports around the world faced problems such as queuing for unloading containers and slow return of empty containers due to the COVID-19 pandemic, as well as the disruption caused by the Suez Canal congestion incident, exacerbating the regional shortage of containers.(Xie, 2019) The shortage of empty containers will lead to insufficient supply of empty containers and affect marketing supply. When the market demands became weak, the problem of excessive supply of empty containers and occupation of CY space will arise.

In December 2022, SIPG built EDEC at Yangshan Deepwater Port. At present, EDEC's CY covers an area of 450 thousand square meters and has an annual throughput of 3 million TEU. After completing the construction of such a huge project, SIPG reached a cooperation agreement with MSC and CMA CGM. These three have become a community of financial benefits, planning the development of empty container transportation, empty container turnover base, repair center and block chain technology. (Zhang, 2022) In other words, the sharing of CY is not only the sharing of empty CY, but also the sharing of empty container transportation technology. Although many shipping companies will rent warehouses to alleviate the pressure of empty container stacking in the port, the shortage of dispatching technology will still increase the burden of costs. By using the sharing platform of CSP, the EDEC project will find more allies in the community of interests and seek common development.

2.4 Summary

Although CSPS were originally created to make shipping more efficient when there were not enough containers, they are no longer needed in an oversupplied market. However, the objective of CSP is for the efficient integration of resources and the improvement of transportation efficiency. Therefore, CSP still have a reason to exist and continue to be developed. In my opinion, it is urgent to develop CSP because the 2M alliance is about to break up and the shipping market is bound to be hit. If CSP can appear at this time, some shipping companies will find that CSP can help them offset part of the trade risk and join.

In addition, CSP can optimize the circulation of the market, thus stimulating trade and economic improvement. By saving costs and speeding up freight efficiency, container turnover will also be accelerated. What CSP can bring is a virtuous circle in shipping.

Chapter 3 Research Model

3.1 Research Design

In Chapter 3, this article will focus on the transportation efficiency issues that CSP can solve. As mentioned in the part before, the primary purpose of CSP construction today is to reduce the stacking capacity of empty containers, reduce the necessary expenses for empty container transportation and daily maintenance. According to the purpose of CSP's establishment, it still faces many operational issues. In this chapter's analysis, we will focus on analyzing the cost savings that CSP can bring through the Empty Container Exchange And Transportation Cost Model (which will be mentioned as ECETC Model in the following context).

At present, the accumulation of empty containers in some ports in the Yangtze River Delta is severe. Although the current container utilization rate in the Yangtze River Delta is relatively high, in terms of the situation of ports in this delta, there are more empty return containers than departure, because this region is China's manufacturing and trade center. As a result, there is a large amount of goods that need to be exported. However, under certain comparison, the quantity of imported goods is relatively low. Therefore, many containers often fail to fill up again on the return journey after being loaded. This phenomenon has led to an increase in empty return containers. In addition, shippers and logistics companies in the Yangtze River Delta region usually choose to return containers in an empty state in order to reduce costs, which is also one of the reasons for the phenomenon of empty container return. Besides, due to the imbalance in the import and export of goods on some routes, the number of containers may be unbalanced, with too many boxes in some regions and too few boxes in others, thereby reducing transportation efficiency.

For CSP, if these issues can be addressed, it will bring certain positive economic

benefits to ports and shipping companies in the Yangtze River Delta. This article will use empirical analysis, case analysis, comparative analysis, and literature research methods to focus on the operation mode and function of CSP. Due to the concept of "shared container" being first proposed in 2003, it is difficult to find who first proposed such a theory through literature search. However, in practical practice, the Chinese company Qingdao Lenovo Logistics launched the shared container project in 2010, making it one of the earliest companies in the world to launch shared containers.

Although shared containers have over 10 years of exploration experience, there is still a certain lack of data research —— that is, some application data, such as empty container reuse rate, container recycling rate, etc., are confidential data of shipping companies and are usually not disclosed. Therefore, in the research of this article, some assumed data will be used as invariant for comparative analysis. Part of the port data in this article is obtained from the platform Yijia Data created by Shanghai E&P International Co., Ltd. Part of the cost data is sourced from various official websites, such as fuel fees, etc., which are sourced from Clarkson's online website, and transportation costs are sourced from freight quotes. Among them, using the quotation of LaLa Move as the cost data for land transportation is because LaLa Move is both a participant and a builder in the already constructed Yangtze River Delta shared container logistics network. In addition, the changes in the 10 week empty container data of Shanghai Port from January to April 2023 are sourced from the official release of the ECDC.

3.2 Methodology: Empty Container Exchange And Transportation Cost model

3.2.1 Data Collection and Cost Calculation: ECETC Model

In the previous article, we have been exploring the concept that “excessive empty containers are a significant cost expenditure for both shipping companies and ports”.

In addition, the stacking of empty containers is not limited to a single port in the region of Yangtze River Delta. They are usually stacked in a certain amount in different ports, and the stacked ports are related to specific shipping routes. After assuming that, if the shipping company and port do not use CSP and only use container transportation to meet the cargo demand on the route, the following model can be obtained:

For most shipping companies, some of the data about empty containers are trading secrets, which is difficult to obtain. Therefore, model calculation is carried out by assuming some invariant number. To manage an ECETC Model, data collection also needs to be completed. For the model construction, we assume that there are two ports named Port A and Port B. They need to arrange the empty containers exchange between Port A and Port B. We assume that the type and standard of containers in these two ports are the same one, and there are an enough amount of quantity of empty and full containers in both two ports. In order to manage the calculation, we assume that the standard container is 20TEU. And then, we finish the assumption and arguments of the ECETC Model:

- The quantity of empty containers in Port A is X_1, the quantity of full containers in Port A is Y_1.
- The quantity of empty containers in Port B is X_2, the quantity of full containers in Port B is Y_2.
- The cost of the shipping transportation of a standard container is C, the cost of the land transportation of a standard container is L.
- The distance between Port A and Port B is *D(km)*.
- The oil price of the region of Port A and Port B is *F(L/Box/100km)*
- The rent fee of a standard container is S.

Based on these assumption and arguments above, we could manage the model in the following:

1. The Cost of Empty Container Exchange:

   From Port A to Port B: L+2*C

   From Port B to Port A: L+2*C

2. The Cost of Full Container Exchange:

   From Port A to Port B: $C*D*P*Y_1*F/100+S*Y_1$

   From Port B to Port A: $C*D*P*Y_2*F/100+S*Y_2$

After the arguments, we should do assumption. First, for the two ports for container transportation, it is assumed that they are Shanghai Port and Ningbo Zhoushan Port in the model, as they are the two most prosperous ports in the Yangtze River Delta and these two ports with the highest demand for containers. Therefore, in this ECETC Model, it is assumed that empty containers will be transported between Shanghai Port and Ningbo Zhoushan Port, and the costs will be calculated. Due to the inability to obtain accurate data because of trading secrets, it is assumed that the shipping company——Company A will transport 500 empty containers and 300 full containers per day between Shanghai Port and Ningbo Zhoushan Port, respectively. Since the main purpose of establishing the ECETC Model is to reflect whether Company A can achieve cost savings after using CSP, the number of containers is invariant, which can be assumed.

Second, the transportation method for empty container transportation is proposed to be multi-modal transportation. According to previous analysis, ports within the Yangtze River Delta region generally use sea or inland waterway shipping to transport containers, which has the reason of that the Yangtze River channel flows through the inland and ocean, making waterway logistics transportation more convenient, efficient, and economical. However, in order to further improve logistics efficiency, consideration will also be given to combining land transportation methods such as railways and highways with sea or inland waterway shipping to achieve multi-modal transportation. As mentioned earlier (in Chapter 3.1), LaLa Move has already

participated in the land transportation project between ports in the Yangtze River Delta. Therefore, the official quotation of LaLa Move will be used as the transportation cost, with an empty container transportation price of CNY 2,000; The full container transportation price is CNY 2,200. Meanwhile, according to LaLa Move's official quotation, the land transportation distance from Shanghai Port to Ningbo Zhoushan Port is 180 kilometers. According to the quotation on Clarkson's official website, the current fuel consumption per 100 nautical miles for inland container ships is 300 L, while the current fuel price is converted to CNY 3.32 per liter (due to the previous cost calculation unit for multi modal freight being RMB, the data found on Clarkson is converted to the exchange rate between USD and RMB to achieve standard consistency).

Through the above explanation, we can obtain the cost model of Company A in transporting containers without sharing containers between Shanghai Port and Ningbo Zhoushan Port.

TABLE 1: Empty Container Exchange and Transportation Cost Model (Unsharing)

	SHANGHAI PORT	NINGBO ZHOUSHAN PORT
Empty Container Transportation Cost	￥1,896,400.00	￥1,896,400.00
Full Container Transportation Cost	￥1,197,840.00	￥1,197,840.00
Total Cost	￥3,094,240.00	￥3,094,240.00

Empty Container Quantity at Shanghai Port(per day)	Full Container Quantity at Shanghai Port(per day)
500	300

Empty Container Quantity at Ningbo Zhoushan Port(per day)	Full Container Quantity at Ningbo Zhoushan Port(per day)
500	300

Tank Fuel Consumption （L/box/100 nautical miles）	Current Oil Price (CNY/liter)	Distance between Shanghai Port and Ningbo Zhoushan Port	Cost of Empty Container Land Transportation	Cost of Full Container Land Transportation
300	￥3.32	180	￥2,000.00	￥2,200.00

Based on the above table, we can conclude that without sharing containers between Shanghai Port and Ningbo Zhoushan Port, Company A's expenses at both ports are ¥3,094,240. The scenario assumed by this ECETC Model is that Shanghai Port and Ningbo Zhoushan Port do not share containers, so full containers exported from Shanghai Port or Ningbo Zhoushan Port need to be returned to the export port as empty containers. When Company A needs to transfer containers, they must also be transported from the other party's port.

However, after Shanghai Port and Ningbo Zhoushan Port shared containers, the most obvious change was the decrease in the number of container shipments. For example, full containers departing from Shanghai Port and unloading at Ningbo Zhoushan Port do not need to be transported back to Shanghai Port, and can be stacked at Ningbo Zhoushan Port until the next use. At the same time, the number of containers will also sharply decrease. Because in the case of shared containers, Company A does not need to transfer containers from the other party's port. Originally, Company A's containers formed a circular pattern between Shanghai Port and Ningbo Zhoushan Port, but under the operation of CSP, some containers were fixed at two ports, eliminating the need for transportation by land or sea, increasing cost consumption.

TABLE 2: Empty Container Exchange and Transportation Cost Model (Sharing)

	Container Sharing Shanghai Port and Ningbo Zhoushan Port	
Empty Container Transportation Cost	￥758,560.00	
Full Container Transportation Cost	￥3,194,240.00	
Total Cost	￥3,952,800.00	
	Quantity of Empty Container Shanghai-Ningbo Zhoushan	Quantity of Full Container Shanghai-Ningbo Zhoushan
	500	300

From the comparison between Table 1 and Table 2, it can be seen that in the shared container mode, Company A's cost will be reduced by nearly half, and the utilization rate of containers will also be reduced by half. This will also provide Company A with cost reductions in container stacking rent and daily maintenance. In fact, many ports in the region of Yangtze River Delta have already established cooperation on shared containers. Currently, the ports under cooperation include Shanghai Port, Ningbo Port, Hangzhou Bay Port, Nanjing Port, Changzhou Port, Zhangjiagang Port, Huai'an Port, etc. The implementation of these collaborations helps to improve the efficiency and service level of ports, reduce logistics costs, and promote regional economic development. In addition, the construction of the shared container model eliminates

the need for so many containers for shipping companies and ports. Therefore, some ports even have specially built storage yards to store empty containers.

3.2.2 Empty Container Stacking Cost

Empty Container Dispatching Center (ECDC) of SIPG was established to store empty containers, although its function is not just to stack empty containers. In Chapter 3, we collected information on the number of empty containers and holding companies of EDEC for 10 weeks starting from January 2023.

Due to the fact that Table 3 is an artificial statistic, there may be some errors. In addition, it must be stated that all data in Table 3 is reported by the empty container holding shipping companies and included by EDEC. Therefore, these data only represented the number of empty containers in EDEC within ten weeks, and do not represent the number of empty containers in all Shanghai ports or the entire Yangtze River Delta region.

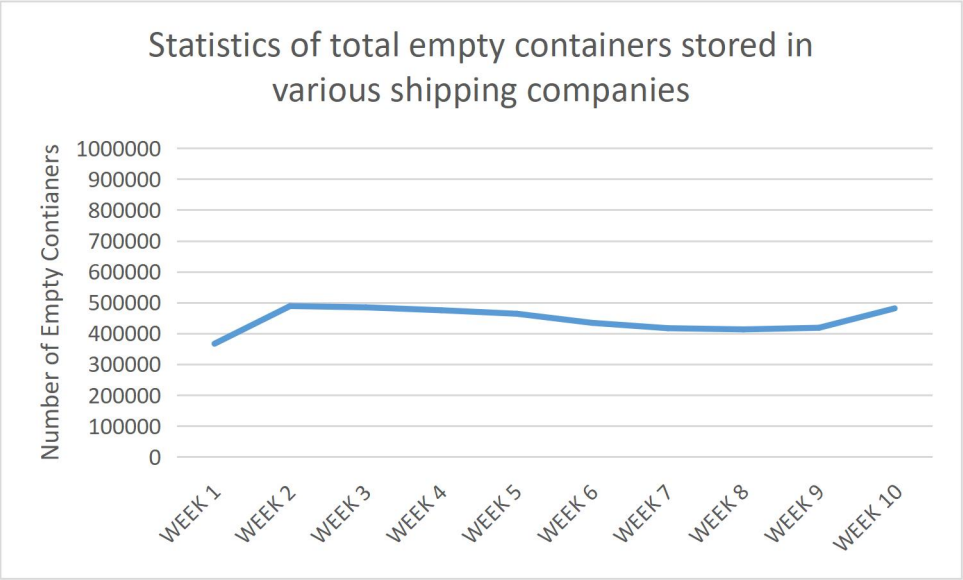

Figure 2: Statistics of Total Empty Containers Stored in Various Shipping Companies

For a more concise representation, I calculated the number of empty containers in EDEC within ten weeks and found that the change in this number is not significant, basically between 400000 and 600000. Among them, the standard container of 20 TEU is 427109 (more than 420 thousand); The standard container for 40 TEU is 3822988 (more than 3.82 million); The standard container for 45 TEU is 46891 (more than 40 thousand). According to the official website of Shanghai Port, as of March 31, 2021, the storage cost of 20TEU containers is CNY 0.64 per day; 40TEU container is priced at CNY 1.27 per day; 45TEU container is CNY1.41 per day. Therefore, based on this data, the average weekly expenditure is CNY 53,583,625.8 (over 50 million). This is a very large number. Although this fee is jointly paid by dozens of shipping companies, it is also a significant expense.

3.3 Analysis on The EDEC Project of SIPG

In 2019, SIPG constructed the Yangshan Deepwater Port Empty Container Center, also known as EDEC. The purpose of SIPG's construction of this EDEC is to improve the service capacity and efficiency of containers, and provide customers with more high-quality and diversified services.

The construction of EDEC involves multiple fields such as sea and land logistics, automation technology, green environmental protection, etc., including a modern container maintenance workshop with an area of over 100000 square meters, as well as an intelligent storage yard and automated operation system. At the same time, the center is equipped with advanced information systems and equipment, which can monitor the position, status, and maintenance status of containers in real-time, improving the management and maintenance efficiency of containers. As a global logistics distribution center specializing in freight services, our main service targets include Maersk, COSCO, EVA, MSC, CMA CGM, etc. Therefore, I specially made a line chart to show the empty container data of these five shipping companies.

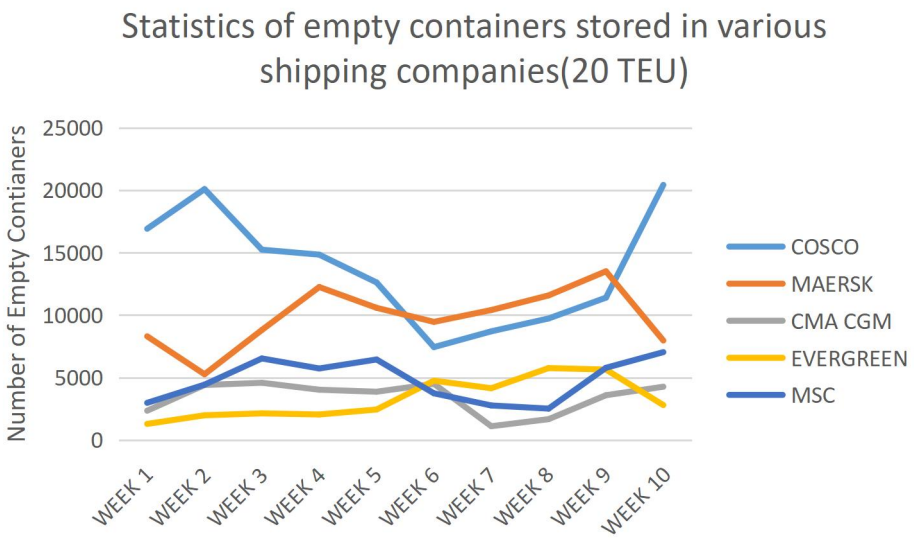

Figure 3: Statistics of Empty Containers Stored in Various Shipping Companies (20TEU)

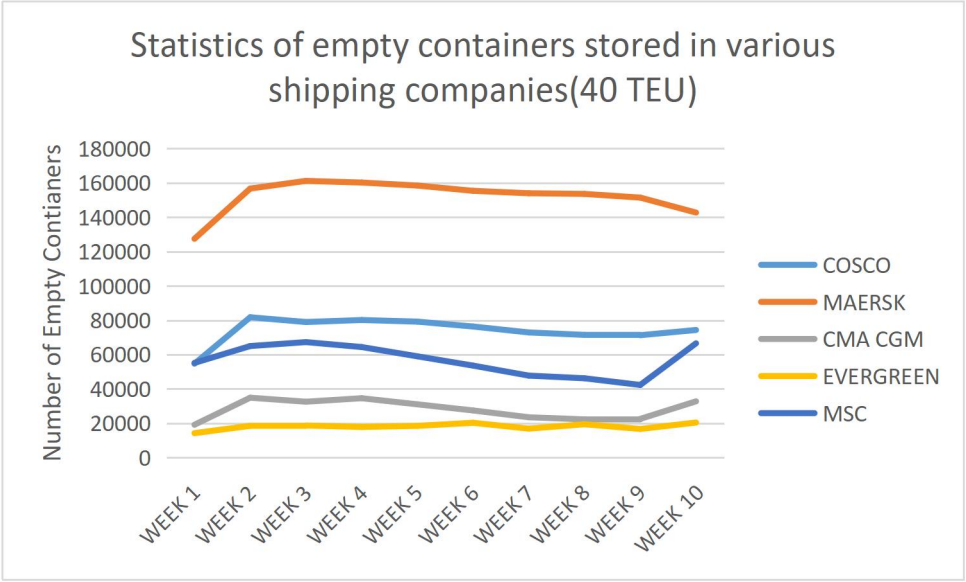

Figure 4: Statistics of Empty Containers Stored in Various Shipping Companies (40TEU)

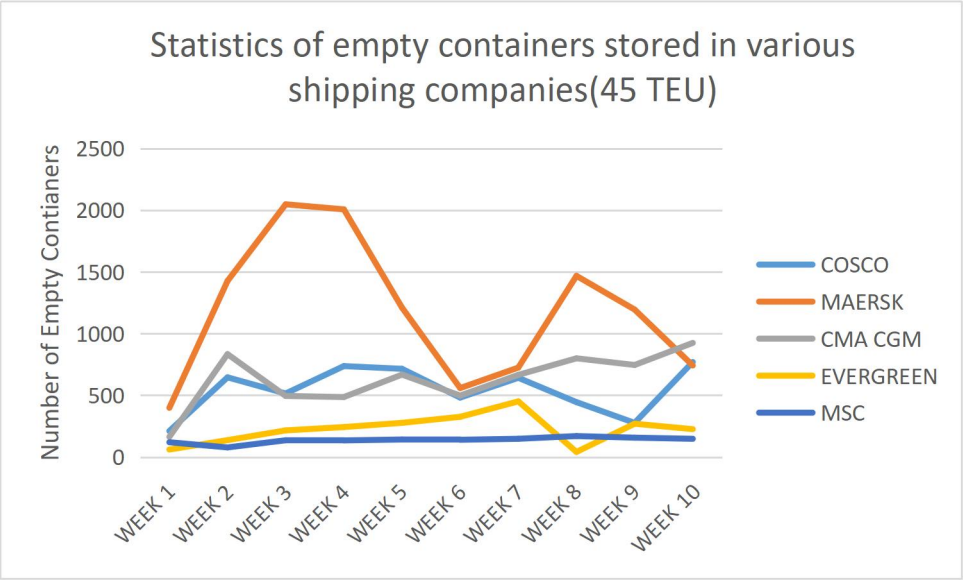

Figure 5: Statistics of Empty Containers Stored in Various Shipping Companies (45TEU)

From the data, it can be seen that the total quantity of containers with 40 TEU is the highest, followed by containers with 20 TEU, and finally containers with 45 TEU. Because Yangshan Deepwater Port is one of the largest container terminals in China, its empty container center stores unused empty containers. Among these empty containers, the 40TEU container is currently the standard container commonly used in the international shipping industry, and the 40 foot container has a higher cargo capacity and load-bearing capacity compared to other sizes of containers. Therefore, it is widely used in international trade. As a large container terminal, Yangshan Deepwater Port needs to meet the needs of various ships, so it stores the most 40TEU empty containers. This indicates that even with the sharp increase in the number of empty containers nowadays, 40TEU containers are still the mainstream demand. Such data can be included in the CSP database.

Among them, Maersk's 40TEU containers far exceed those of other shipping companies. Because Maersk was one of the earliest companies to promote 40TEU standard boxes. As early as the early 1980s, Maersk began producing 40 foot standard containers and put them into use, while other shipping companies generally used a

mix of 20TEU and 40TEU. Maersk has a large number of terminals and warehouses worldwide. The size and design of these docks and warehouses are designed to accommodate the use of 40TEU standard containers. Therefore, Maersk is able to operate and manage 40TEU standard containers more efficiently. This is also another advantage of EDEC: dividing empty container stacking areas according to the scale of different shipping companies. EDEC's approach helps to improve the efficiency of empty container stacking, avoid mixing empty containers together, reduce handling and search time, and improve the efficiency of empty container stacking. At the same time, EDEC can also effectively plan empty container stacking areas through this operation, reduce operating costs such as handling, storage, and maintenance, and reduce enterprise operating costs. This method will also improve customer satisfaction and ensure that the shipper and their agents can find the required empty boxes more quickly when picking up the goods.

This operational model is worth learning and imitating by CSP. EDEC uses advanced digital technology to reduce the cost of empty container stacking through operations. Minimizing consumption without directly affecting the number of empty containers.

3.4 Summary

In conclusion, it can be seen from the results of ECETC model that container sharing between two ports can achieve certain cost savings. No matter in full or empty container transportation, resource integration can bring certain economic savings. For the internal container transportation in the Yangtze River Delta, multimodal freight is the choice of empty container transportation for most shipping companies. If the Yangtze River Delta is shared as a whole port, it can not only reduce the waste of resources caused by empty container transportation, but also balance the number of empty containers in various places, so as to achieve the purpose of cost saving.

With the increasing number of empty containers, the area of storage yard needs to be

expanded. Sipg completed the EDEC Project by building a new storage yard at Yangshan Deep Water Port. With the advent of digital transformation technology, the EDEC Project has opened the entrance to many shipping companies to share the yard space. Such a project can not only better monitor the number of empty containers in the port, but also share the yard with different shipping companies to improve the efficiency of empty container stacking. EDEC can help shippers and their agents find the empty containers they need faster and reduce operating costs.

Chapter 4 Case Study

4.1 Introduction: Study Area

In Chapter 4, many aspects of CSP will be analyzed through case studies. First, in the context of China's economy and shipping industry, sharing containers are an imperative operating model. Therefore, the construction of CSP is inevitable. However, as we mentioned earlier, CSP is a product of the sharing economy. Therefore, in Chapter 4, the role and concept of the sharing economy in the construction of CSP will be analyzed at a deeper level. After having a basic understanding of the concept of shared economy, Chapter 4 will also analyze the existing shared container models and systems between shipping companies and ports, such as Maersk's iBox system and SIPG's ECDC project. Among them, container sharing among shipping alliances will be emphasized for analysis. Because in the concept elaborated in the previous article, CSP's customer base is not only for some shipping companies or some shipping alliances, but also for the entire shipping industry. Therefore, the advantages and disadvantages of sharing container models among shipping alliances will be emphasized and analyzed.

4.2 The Embodiment of Sharing Economy in The Container Sector

4.2.1 The Main Idea of Sharing Economy

When it comes to the embodiment of the sharing economy in the container sector, the prior thing to analyze for this issue is the sharing economy model. The sharing economy is a rapidly developing new economic model in China in recent years, and its causes can be summarized into two categories: ideology and development.

First, in terms of ideology, nowadays, while businesses are constantly exploring new

fields, they also need to have some cost savings in order to build a more stable business model. Therefore, the sharing economy is very effective in saving costs at this time. In order to discuss the savings in cost, the incurred cost which can be separated to additional units can also be one of the ways to saving cost. Accrording to the main concept of the sharing economy is to utilize idle resources, which means that idle resources are costs already incurred, rather than costs that require additional expenditures. After sharing idle resources with others, those incurred costs can be shared among more units, thereby reducing personal costs. In addition, the sharing economy usually brings greater competition. For business, more competition means more opportunities. Nowadays, the shipping industry has gradually moved towards a stable industry. Almost all industries have companies involved in various fields, with businesses located at every end of the supply chain. Each unit performs its own duties, thus forming a relatively closed-loop stable industry. However, after the sharing economy enters the shipping industry, it will bring new opportunities to the shipping industry, accelerate its efficiency, and thus increase competition within the industry to achieve overall development.

Second, sharing economy also can bring with a conceptual shift in business. Nowadays, more and more customers prefer personalized services, and the sharing economy model can provide personalized services for different users because resource sharing is easier to meet the needs of different people, meet the personalized and diverse needs of users, and increase the depth and breadth of services. In addition, the sharing economy has brought more opportunities for innovation and entrepreneurship. Especially for some companies specializing in data and technology, such as SAP and Yitong Technology (more detailed analysis will be provided in subsequent sections of this chapter), with the promotion of the sharing economy, there are opportunities to collaborate with more industries. For example, when people talk about the specific example about sharing economy, most of them will think about DiDi Taxi. The common sense of DiDi Taxi is based on public usage. However, for the shipping industry, which is not the public business, is also not well known by the public. When

the sharing economy brings more opportunities and technologies into this industry, it also brings a kind of new phenomenon. A lot of shipping companies can break the barriers when they cooperate with other businesses in different industries. The impact of sharing economy is similar to the ashesive for different industries in China.

As a result, it is imperative for China's shipping industry to develop into a sharing economy model. Because in today's China, both economy and technology are growing rapidly, especially in the field of internet technology. Faced with the concept of "sharing rather than owning" emphasized by the sharing economy, data itself carries the same concept. Nowadays, more and more industries are reforming towards digitization. Although shipping is a relatively non mass industry, it has certain trade similarities with industries such as retail and industry. At a time when all industries are transitioning towards digital reform, changes in the shipping industry are also imperative. The essence of the sharing economy is an economic model achieved through online platforms and mobile applications, which enables users to share their own resources without having to purchase the resources they need.

4.2.2 Sharing Economy Enables in The Shipping Industry

Returning to the concept of CSP, as one of the carriers of the sharing economy, containers have also brought new changes to the shipping industry. Compared to the traditional logistics model in the shipping industry, CSP can bring more convenient and efficient transportation. CSP can achieve information sharing and collaboration across different enterprises, different departments, and even among different geographic locations. However, traditional shipping logistics model involves a large number of personnel and units, resulting in low information exchange efficiency and information distortion. And then, CSP can bring more flexible container transportation into the shipping industry. As mentioned before in this article, the problem of empty container stacking in ports in the Yangtze River Delta is becoming increasingly

serious problem. And then, using CSP can optimize the container transportation network, improve container utilization, and reduce empty container stacking. After optimizing the CSP system, the Yangtze River Delta ports, as one of China's main container ports, will inevitably benefit from such a platform. For instance, CSP can achieve information management and sharing of containers, improve the visibility and schedulability of containers, and solve scheduling problems more quickly, thereby reducing the detention time of empty containers. At the same time, CSP also has the ability to divide container resources at different ports, shipping companies, and cargo owners in the Yangtze River Delta, improving container utilization and reducing empty container waste. Under the calculation of CSP, various ports are no longer scattered within the Yangtze River Delta region, but are completely transformed into a coherent large port group that integrates transportation, storage, and scheduling. Besides, CSP can make empty container recycling more efficient. It can enable ports and shipping companies to quickly find empty containers that need to return and return them to their appropriate owners, reducing the difficulty and cost of empty container recycling.

The sharing economy model can be implemented in CSP through three aspects: purchasing sharing, leasing sharing, and operation sharing. First, purchasing sharing is like cost sharing. Nowadays, many shipping companies have excessive accumulation of empty containers. After entering CSP, the stacked empty boxes can be shared as costs with other users. In other words, multiple users share the costs of the original shipping company, for example, container holders, to achieve shared purchases. Second, leasing sharing represents the increasing utilization rate of containers. In CSP, containers can be rented to different users, thereby improving container utilization. Recycle containers throughout the entire industry to avoid container overcapacity. This article mentioned in the Chapter one, which is in the part of introduction of CSP, regarding IKEA's incorrect container operation. When the demand of containers was tight in 2020, IKEA created a batch of its own containers, but soon after the completion of the construction, the demand for containers gradually decreased. Due to

cost considerations, IKEA ultimately decided to demolish this batch of containers. However, there were many companies that make the same decisions as IKEA, but with CSP calculations, these empty boxes will not become excessive resources wasted. Third, CSP can complete the operation sharing of containers. It's common sense that the daily maintenance of containers is also a significant expense. According to Clarkson's January 2023 container cost report, the daily maintenance fee for a regular 20TEU container at a New Jersey port is $3- $5. However, according to data released by the Shanghai Port and Channel Administration, the daily storage fee for an ordinary 20TEU container at the Shanghai Port Empty Container Center from April 1, 2021 is ¥ 25. The high daily maintenance costs of containers have also put many shipping companies in a dilemma of sharply increasing costs. Under the operation of CSP, this high daily operating cost will be borne by multiple users, which will also reduce costs for shipping companies and ports.

While CSP can save costs for large shipping companies and ports, it can also bring new opportunities for small shipping enterprises. Small shipping companies typically operate only in local areas or specific fields, while CSP can connect them to a larger range of customers and cargo sources. Through the platform, small shipping companies can expand their market and obtain more orders and business. Nowadays, an important issue in the shipping industry is the increase in the number of idle containers, which leads to reduced logistics efficiency and increased costs. CSP can share containers between different companies, maximize the utilization of idle containers, and improve logistics efficiency and efficiency. Under such optimized resource utilization, small shipping companies also have the opportunity to participate in resource sharing and obtain resources that they previously had to spend a lot of costs to obtain. Besides, most small shipping companies spend their costs on operations. After entering CSP, these enterprises can save a significant amount, including but not limited to personnel costs, equipment costs, and logistics network costs. Thus, these enterprises can invest their funds in other construction projects.

Nowadays, many shipping companies and ports have started to try to build CSP. But they also do not establish their own CSP interchangeably, just like when they manufactured containers separately before. Although such methods are not desirable, they still achieve sharing within the region and within shipping alliances.

4.3 Shareable Technology: Shipping Companies

4.3.1 2M: Maersk's iBox System

Maersk invented its own CSP, the iBox system, in 2017. IBox is a digital platform that integrates multiple functions such as logistics tracking, ship booking, and ship operation. The iBox system mainly includes the following three components: iBooking, iShip, and iTrack. First, iBooking is an online ship booking platform that allows customers to quickly find suitable shipping services anytime and anywhere. Second, iShip is a digital tool for ship operations, providing a more efficient way to manage ship navigation, refueling, loading and unloading, and other aspects. Maersk collaborates with shipowners around the world to achieve container ship exchange and sharing, thereby optimizing route utilization and freight efficiency. This technology can not only reduce costs for ship owners and logistics companies, improve profit margins, but also avoid container idle waste, reduce carbon emissions, and protect the environment. Third, iTrack is a logistics tracking and analysis tool that provides customers with real-time freight logistics tracking information, and can conduct data analysis on the corresponding basis to improve logistics visibility and control. The three main ideas of the iBox system built by Maersk are also the application of data sharing in the shipping industry. According to information disclosed on Maersk's official website, iBox integrates digital technology to improve Maersk's container shipping and logistics solutions, making them more powerful, flexible, and transparent. In the process of digital transformation, it will also help Maersk accelerate its service speed, improve customer satisfaction, and inject

confidence into the recovery of global trade.

Through the iBox system, Maersk can provide more efficient, transparent, and convenient services, while also meeting customers' needs for digital logistics. In the field of shared containers, the iBox system has provided Maersk with many positive impacts. For example, achieving container ship exchange and sharing through the iBox system can optimize route utilization and freight efficiency, reduce empty transportation and carbon emissions; By integrating the Internet of blockchain technology, end-to-end visibility and real-time data sharing can be achieved, which can improve cargo tracking and security performance, reduce logistics costs, and enhance customer satisfaction. In the construction of CSP, Maersk attaches great importance to data sharing and utilization. Compared to other companies' substantive shared resources, Maersk is more inclined to share its own shipping data. Maersk has established partnerships with numerous companies in the field of shared containers, including online freight platform——Freightos, digital logistics service provider——TradeLens, and container leasing enterprise——Traxens. These companies all have strong technological and resource advantages in the field of digital logistics. Collaborating with Maersk can promote technological innovation and common development, while also jointly addressing industry market competition and challenges. From Maersk's selection of partners, it can be seen that Maersk has chosen platforms and companies that can expand its business landscape. In other words, Maersk is more inclined to create more personalized services for its customers through the sharing of data in CSP.

At the same time, Maersk's iBox system has attracted many other shipping companies to join, and currently more than 20 shipping companies have entered this system, including Hapag Lloyd, CMA CGM, MSC, COSCO, OOCL, etc. These shipping companies entered the iBox system through signing cooperation agreements and conducting technical connections. Specifically, Maersk has conducted in-depth cooperation with the information technology departments of these shipping

companies on issues such as interface integration, data auditing, and business processes, ultimately achieving data sharing and business collaboration between the two platforms. It is worth to mention that even though the dissolution of Maersk and MSC's 2M shipping alliance is imminent, there is currently no publicly available information indicating any changes in MSC's rights and interests on iBox after their dissolution. In addition, Maersk's iBox system aims to provide Digital transformation solutions for the global shipping industry, rather than just serving the 2M alliance. Therefore, even if the 2M alliance disintegrates, other shipping companies can still continue to use the iBox system.

Maersk's iBox system is a good case study for the construction of CSP in the Yangtze River Delta region, which can provide us with some reference for building CSP. First, iBox system is a transparent, open, and multi-agent platform that allows users to rent and trade shared containers online, and can call relevant business data through iBox API technology. This openness and sharing allow different operators to utilize the resources on the platform to achieve more efficient cargo distribution and less empty transportation, thereby reducing costs and improving the efficiency of the entire industry. Second, iBox system ensures the credibility and security of transactions. The distributed ledger of blockchain can record the rental history and transaction records of each container, ensuring that all data is authentic and trustworthy, and protecting user privacy and data security.

However, there are also some weakness links in the iBox system, such as member management and risk control. Member management needs to review and authenticate user identities and qualifications to ensure that they meet the platform's standards and have sufficient leasing and trading capabilities to avoid the occurrence of malicious users and operations. Risk control requires establishing effective mechanisms to manage market and operational risks, ensuring the interests of users and the stable operation of the platform. Although these measures provide protection for the iBox system for longer-term development considerations, they set a threshold for

companies joining CSP. Maersk is one of the world's largest shipping companies, so iBox's partners are also competitors and teammates who are on par with Maersk. This is not friendly for some small and emerging shipping companies and requires improvement. Therefore, if we want to build a shared container platform, in addition to drawing on the advantages of the iBox system, we also need to think independently and innovate, so that the platform can better meet user needs, improve user experience, and achieve higher levels of risk control and management.

According to Marsek's CSP Project, it's easy to find that although many ship companies have their own CSPs, they will still choose to join others. This is also a disguised form of alliance. This alliance is different from a simple shipping alliance. Compared with normal shipping alliances, CSPs will make it easier for shipping companies to establish their presence in the CSPS, and their partnerships will become broader and simpler.

4.3.2 CSP of shipping companies: alliance rather than competition

Apart from Maersk's iBox system, many shipping companies have actually built their own CSPs. Currently, CMA CGM, one of the largest container shipping companies in Europe, launched its digital platform ZEBOX in the global shipping industry in 2018. OOCL, a subsidiary of Oriental Overseas International Group, has also developed their digital platform - CargoSmart. MSC provides comprehensive services to customers through the TELEX logistics platform and MediMerchant system, and expands its digital services to help customers meet various transportation needs. These shipping companies have established digital platforms to provide customers with better and more convenient services and help them better manage their supply chain.

It is not difficult to find that these shipping companies that build their own CSPs are

partners and users of Maersk iBox. At the same time, these shipping companies are also using each other's CSP functions. Inevitably, it is like before when shipping companies kept manufacturing containers separately during the sharp increase in container demand, and building CSPs separately would bring about certain data duplication and resource waste. However, from a long-term strategic perspective, it is very beneficial for various shipping companies to have their own CSPs and communicate with other shipping companies. The main reason is that these companies are building their own shared container platforms to address the problems of traditional container sharing models, such as information asymmetry and low resource utilization efficiency. Their respective platforms have different responsibilities or characteristics, such as user interface, settlement method, service scope, etc. However, their overall responsibility is to provide information and management services for shared containers. Besides, these shipping companies all have their own flagship boutique routes and services. It is also correct for them to build different platforms to respond to different services.

The construction of shared container platforms can meet the diverse needs of the market, allowing different companies to choose suitable platforms for sharing, which can also promote industry competition and innovation. At the same time, companies entering each other's platforms can also expand the sharing scope of the entire industry, thereby improving the resource utilization efficiency of the entire industry. The shared container platforms of various shipping companies can vary, as different shipping companies have different business needs and strategic goals. However, the ultimate goal is to share container resources and reduce empty transportation. Shipping companies can gain practical benefits by building a shared container platform, as this can reduce the cost of using private containers and improve the utilization of goods. In addition, shared container platforms can also bring better services and improve customer loyalty and reputation.

Shipping companies building shared container platforms on their own are more driven

by their business strategy and business needs. For example, they can expand their international logistics network by establishing cross-border shared container platforms. Different platforms can bring benefits to shipping companies in different regions, as shared container platforms can reduce logistics costs by providing more efficient services and reducing empty transportation, thereby improving the overall level of the industry. It is not only individual shipping companies that benefit from this, but the entire industry. Although using multiple shared container platforms may lead to data duplication and resource waste, these issues can be addressed through some technical means. For example, application program interfaces (APIs) can be developed to achieve data sharing and management, so that data can be shared between different platforms without causing data conflicts. In addition, intelligent container scheduling systems can be developed to efficiently schedule and manage resources, thereby reducing resource waste and costs.

However, with so many CSPs already in existence, is it no longer necessary to build one's own CSP? In fact, from my perspective, establishing CSP in the Yangtze River Delta has unique advantages. In Chapter 3, we focused on how CSP optimizes empty box stacking. And the CSPs of various shipping companies are more inclined to provide services to customers. There are still many business areas that CSPs need to expand by subdividing in different fields. And then, establishing CSP within ports in the Yangtze River Delta has certain geographical advantages. Internally, CSP can collaborate with different ports and shipping companies located in the Yangtze River Delta region. The CSPs mentioned earlier and Maersk's iBox system face the same problem - there is a huge threshold for small shipping companies. Establishing a CSP in the Yangtze River Delta means a smaller scope of regulation and review, which can provide opportunities for small shipping companies to participate. Externally, CSPs in the Yangtze River Delta can also be connected to CSPs of other shipping companies, and data sharing of the global shipping industry can be achieved by connecting databases and route maps of other CSPs. In summary, there is a fundamental difference between building CSPs and building containers. The essence of CSP is data,

even though there is more and more data, there is still available space for data. However, there are still many areas of Digital transformation that need people to explore. As a result, even though most shipping companies now have their own CSPs, it is necessary to establish their own CSPs in the Yangtze River Delta.

Based on the background of China's sharing economy, many ports have early tried digital operations. The Port of Shanghai, for example, started its digital transformation about one decade ago. Although the concept of shared container was not obvious at that time, and it was never formally studied as a topic, it cannot be denied that Shanghai Port made remarkable contributions and breakthroughs in CSP technology. In constant trials and updates, Shanghai Port has many advanced technologies that can be applied to CSPs, which will be introduced in detail in the next paragraph.

4.4 Shareable Technology: Shanghai Ports

Nowadays, multiple ports in China are actively trying to develop their own sharing container technology. For example, Shanghai Port collaborates with container transportation companies, freight forwarders, and shipping companies to achieve goals such as reducing the number of empty containers, improving container usage, and reducing logistics costs through sharing container technology.

Shanghai Port is one of the busiest ports in the world, with a huge annual transportation volume and a large number of containers involved. Therefore, Shanghai Port has been trying to share container technology for a long time, with the goal of improving efficiency, reducing waste, and saving costs in the construction of CSP. Specifically, Shanghai Port has adopted a sharing economy model based on blockchain technology. In this mode, all containers are marked and recorded in a distributed database, and all carriers (i.e. logistics companies) can use them fairly through this platform. This means that there is no need to repurchase or rent containers every time, but rather to directly share existing resources. On this platform,

logistics companies can easily find the required containers and use them within a specified time. At the same time, they can provide services for their own containers and earn additional income. This platform also provides users with automated tracking and update functions, allowing them to keep track of the location and status of containers at any time and better grasp the transportation progress. Overall, Shanghai Port has improved port efficiency by sharing container technology, while promoting higher levels of resource utilization and promoting innovation and development in the logistics industry.

4.4.1 SIPG Attempt: Data Interchange

Over those several years, Shanghai Port has made a lot of efforts to enter the sharing container model. One digital project after another has brought Shanghai, such a huge port, into the digital era. However, during those time, Shanghai Port pursued advanced technology to build a digital port, without linking it with the shared container model. Nowadays, when we bring the concept of sharing economy into the shipping industry, Shanghai Port will be a very excellent carrier. Because in the past few years, many different technology platforms have been constructed, implemented, and applied, and these data can also be added to CSP to complete container transportation.

Before the concept of sharing economy brought significant changes to Shanghai Port, SIPG first invested in building a digital port. As early as 2003, SIPG and COSCO established the Shanghai Port Joint Container Exchange Center (SPJCEC). The main function of SPJCEC is to provide container information exchange services for shipowners, shipowners, terminals, logistics enterprises, etc., achieving seamless integration of logistics information. SPJCEC connects 41 ports, 68 large logistics enterprises, and hundreds of loading and unloading operations enterprises both inside and outside the Shanghai Port, enabling real-time transmission of information on tens of millions of containers annually. Through SPJCEC, all parties can quickly confirm

key information such as cargo location, progress, and quality, improve logistics efficiency, and reduce transportation costs.

In addition, SIPG has also developed the Shanghai Port Container Sharing Management System (CSMS), an intelligent container sharing platform based on Internet of Things technology. This system treats containers as independent items and achieves global container information query, allocation, and savings through network technology, achieving optimal utilization of containers. CSMS mainly consists of three modules: container information module, container allocation module, and container electronic banking module. In the container information module, the system collects and manages the location, status, and attribute information of all containers through IoT technology; in the container allocation module, the system intelligently matches all available container information based on user needs and recommends the optimal solution; in the container electronic banking module, funds and credit management are achieved through blockchain technology and smart contracts.

SPJCEC and CSMS were both developed by SIPG for the construction of digital ports. Nowadays, these technologies and concepts can be incorporated into the construction of CSP. Firstl, both of these systems are based on large databases and target customer groups. SPJCEC and CSMS are platforms mainly built for container information, which can more efficiently utilize container resources. There are many situations of waste and idle resources in the traditional container logistics transportation mode, and through the construction of these systems. Through those technologies, containers can be better shared; resources can be maximized; and logistics costs can be reduced. By incorporating these technologies, CSP can reduce transportation, maintenance, and other costs in the logistics process, decrease the operational burden on enterprises, and improve product competitiveness. Second, CSP can establish a more efficient information management system through CSMS to achieve real-time sharing of container information, ensuring data consistency and reliability in all stages. Such technical means can improve the efficiency of information processing. Third, CSP can

learn regulatory and operational management experience from SPJCEC. SPJCEC can effectively ensure accounting accuracy and data security through regulatory functions. As a result, in the construction of CSP, supervision and management should also be strengthened to ensure the normal operation of the business through standardized and standardized operating procedures. Fourth, CSP can optimize customer service experience based on SPJCEC's existing technology. CSP can provide users with a higher quality service experience through technical means such as online self-service tools.

In addition, from the existing operations of SPJCEC and CSMS, CSP can also obtain improvements in terms of weaknesses. For example, CSP can optimize the logistics network. Nowadays, Shanghai Port has strong technical and resource support for the entire shipping logistics network, and can further leverage these advantages in CSP to build a more efficient and intelligent logistics network. Meanwhile, CSP should focus on meeting the needs of small and medium-sized logistics enterprises. Shanghai Port has a relatively complete logistics service system, but there is still room for improvement in considering the needs of small and medium-sized logistics enterprises. CSP can provide more practical and convenient services for it. Finally, CSP can also introduce blockchain technology. As is well known, blockchain technology has the characteristics of immutability and decentralization, and can be applied in new shared container platforms to ensure data security and reliability.

In addition to data sharing, Shanghai Port also has some attempts to share containers, such as storage and transportation. Meanwhile, in order to achieve the original intention of reducing the number of empty containers and reducing cost consumption, Shanghai Port has also developed two other systems for operation.

4.4.2 SIPG Attempt: Sharing Containers

Shanghai Port Container Rental Platform (SPCRP) is currently one of the largest

container rental platforms in the world, widely used in China. SPCRP is jointly funded and constructed by China Shipping (Group) Company (CSGC) and SIPG. SPCRP's logistics network covers a wide range of areas and provides customers with professional logistics solutions. Users can book and rent containers of various specifications and models through the platform. At the same time, the platform can also provide various customized logistics services, such as warehousing, packaging, transportation, etc. SPCRP also offers a variety of leasing modes, such as long lease, short lease, flexible lease, and leaseback. This platform provides online transaction functions and delivery services to ensure that containers arrive at designated locations on time and in quantity. In addition, SPCRP has a rich service system. It not only provides container leasing services, but also provides customers with a complete set of logistics supporting services including loading and unloading, customs declaration, insurance, quality inspection, etc.

In addition, as mentioned in Chapter 1, the Container Freight Station (CFS) of Shanghai Port refers to a public container distribution center constructed and operated by Shanghai International Port (Group) Co., Ltd., aiming to provide comprehensive and efficient logistics services. At present, Shanghai Port CFS has become one of the largest container public pools in the world. The services provided by CFS include: import and export goods agency, warehousing, etc. Among them, the biggest feature is the public container pool service. The core concept of this service is "sharing, and mutual entry and exit", which simplifies the process of container logistics operation, reduces the waste of manpower, time, and material resources, and improves efficiency and safety. This type of service is more suitable for the needs of small and medium-sized enterprises, reduces their operating costs, and improves their market competitiveness. Besides, CFS has established close network cooperation relationships with other ports, freight forwarding companies, and other related enterprises, forming efficient logistics channels, achieving rapid container dynamic management, and providing comprehensive services covering logistics, trade, supply chain, and other fields worldwide.

For the CSP to be established in the Yangtze River Delta, it can learn from the successful experience of SPCRP and CFS in Shanghai Port, and optimize and improve some areas according to its own situation. First, SPCRP lies in providing comprehensive services, including standard container leasing, non-standard container leasing, additional services, etc. At the same time, it provides online and offline one-stop services, facilitating customers to quickly obtain the information they need. Therefore, CSP can learn and optimize from SPCRP in this aspect. For example, CSP can continue to collect and provide diversified container types based on SPCRP data to meet the different needs of customers, while conducting online marketing to enhance platform awareness and brand influence. Second, CSP can further optimize the intelligent management and tracking of containers based on the successful experience of CFS. In order to cultivate users' reasonable usage habits, Shanghai Port has carried out standardized management and regular inspections of CFS to ensure the efficiency of container management. Therefore, CSP can share such data with CFS, integrate logistics and supply chain information data, accurately allocate the use of containers, and reduce costs; Strengthen standardized management and monitoring of container usage, optimize collaborative operations and processes; Simultaneously introducing IoT technology to improve container utilization and safety protection capabilities.

In conclusion, there are a lot of real technologies about CSP in Shanghai Port, such as data interchange, logistics tracking, the application of chartering ships, and storage sharing. These technologies can be used in the construction of CSP, and will become better if certain improvement can be achieved. However, the construction of CSP requires not only technology, but also certain support and institutions. As a platform, the customer experience will become a very important reference. Therefore, in the next chapter, we will focus on how to build a CSP and the characteristics needed for its application in the Yangtze River Delta region.

4.5 Summary

In conclusion, it is inevitable for China's shipping industry to develop into a sharing economy model, especially in the context of rapid development of science, technology and economy. In the shipping industry, users can share resources without buying what they need.

The sharing economy model can be realized in CSP from three aspects: purchasing sharing, leasing sharing and operation sharing. Nowadays, many shipping companies have excessive accumulation of empty containers. After entering the CSP, the stacked empty boxes can be shared with other users as a cost. In CSPs, containers can be rented out to different users, thus improving container utilization. Recycle containers throughout the industry to avoid container overcapacity. While saving costs for large shipping companies and ports, CSPs also bring new opportunities for small shipping companies. While small boat companies typically operate locally or in specific areas, CSPs can connect them to a wider range of customers and sources of goods. According to the analysis of Maersk's iBox system, the iBox system is a good case study for the CSP construction in the Yangtze River Delta region, which can provide some references for our CSP construction. In addition to Maersk's iBox system, many shipping companies have actually built their own CSPs. Their own construction of shared container platform is more driven by their own business strategy and business needs. Because CSPs can reduce logistics costs by providing more efficient services and reducing empty loads, thus improving the overall level of the industry.

In addition, many domestic ports are actively trying to develop their own shared container technology. For example, Shanghai Port cooperates with container transportation companies, freight forwarders and shipping companies to achieve the goals of reducing the number of empty containers, improving the utilization rate of containers and reducing logistics costs through sharing container technology. Chapter 4 gives examples of various projects of SIPG, such as SPJCEC, CSMS, SPCRP, etc.

These projects have established mature logistics networks, formed efficient logistics channels, realized rapid and dynamic container management, and provided comprehensive services covering logistics, trade, supply chain and other fields on a global scale.

For the CSP planned to be established in the Yangtze River Delta region, we can learn from the successful experience of SPCRP and CFS of Shanghai Port, and optimize and improve the operation and container utilization rate according to our own conditions.

Chapter 5 Analysis and Findings

5.1 Introduction

In Chapter 5, we will mainly discuss the business model of CSP. In the previous analysis of Chapter 1 and Chapter 2, membership is one of the earliest business models of CSP. In this chapter, we will discuss the benefits that membership can bring to CSP and why CSP should choose membership. Chapter 5 will also analyze the case studies of some membership public platforms, indicating that membership is also a good choice for CSP. Second, Chapter 5 will discuss CSP's customer base, operational entities, and government support issues. Previously, in Chapter 4, many container public platforms located in Shanghai Port were used for technical discussions. In Chapter 5, the subjects of these platforms will also become one of the objects of discussion. In addition, the Chinese government conducts a series of support policies for ports in the Yangtze River Delta every year. Therefore, this chapter will also discuss the feasibility of support policies in the CSP field. Finally, Chapter 5 will also discuss the platform responsibilities that CSP needs to fulfill, such as regulatory responsibilities.

5.2 Container Sharing Platform: Business Model

5.2.1 Extract A Business Model Which Is Suitable for CSP

By comparing many existing running CSPs, their business models are not the same. According to these different business models, we first need to analyze the strengths and weaknesses of these models.

First, some platforms use a subscription model, where users pay a certain fee monthly

or annually and can freely use containers on the platform. Currently, well-known shared container platforms include Flexport, CargoX, xChange, and others, all of which adopt a subscription model. Among them, Flexport and CargoX mainly provide logistics solutions, and users can choose different service plans. Each plan includes a certain number of container usage rights, and the plan can be changed at any time. XChange is a specialized shared container platform that provides users with different types and specifications of container usage rights through a subscription mode. In addition, some emerging sharing economy enterprises are also trying to share container services and may adopt subscription models. In this mode, users usually need to pay a certain subscription fee to obtain the usage rights specified in the selected plan. Users can flexibly choose different subscription plans based on their own needs and change the plans at any time when needed. At the same time, this mode can also provide some value-added services, such as online container booking, logistics tracking, and other functions.

There are many advantages to using subscription mode for CSP. It can effectively reduce empty transportation, as the subscription mode allows users to book the required containers in advance, effectively avoiding empty transportation and reducing logistics costs. At the same time, this kind of CSP has high flexibility, allowing for flexible pricing and subscription cycle settings based on the needs of different users. However, CSP with subscription mode also has some drawbacks. This kind of CSP requires an estimate of future customer demand, as sudden changes in demand may result in resource waste and increased costs. Due to the fact that the core operational power of CSPs adopting subscription models comes from a large customer base, such CSPs need to actively carry out publicity and promotion to attract users, requiring a certain amount of time and cost. In addition, in the face of significant differences in user needs, this kind of CSP may appear somewhat weak. Platforms often need to meet the specific needs of different users, such as lease terms, prices, and service types. While meeting user needs, they also need to invest more resources and effort.

Second, some CSPs use a time sharing lease mode. This model is more similar to the business model used by traditional container rental companies, and it is also one of the very common sharing economy models. The platform provides flexible lease cycle options, where users only need to pay for the actual usage time and amount. However, some platforms may require users to pay a certain deposit before they can use the containers on the platform.

According to the survey, most CSPs that typically use this model are Chinese companies, such as ChinaCXL, Container100, etc. The advantage of the time sharing lease model is that users can book containers as needed, with higher flexibility in using time, especially suitable for short-term logistics needs. This model is relatively easier to attract mass users, allowing tenants to choose more usage frequencies and rental cycles, and also better meeting the needs of transporting goods. As the number of users increases, it can promote economies of scale and reduce costs. At the same time, this model requires relatively small investment and low risk for the platform. However, the time sharing lease model also has significant drawbacks. There may be usage conflicts between users, especially when booking the same container within the same time period, which may lead to issues such as inability to deliver items on time and delays in logistics. Moreover, in this mode, the lease period is fixed, and if a longer period of use is required, a new reservation is required. The time-sharing leasing model requires a large number of shared containers, and the platform needs to invest a large amount of funds to purchase, maintain, and insurance containers, which leads to very high operating costs for the platform. However, in the high cost time sharing leasing model, the time for users to rent containers is uncertain, so the platform may face unstable rental rates, leading to unstable revenue.

Third, many well-known CSPs use profit sharing models as their business models, among which the representative ones are Boxbee and Maersk Spot. This type of platform provides containers and follow-up services, with users providing the source

and destination of goods, and both parties sharing transportation profits. The profit sharing model can motivate both the sharing platform and customers to improve business efficiency for shared container platforms. Because the increase in profits is directly related to the contribution of the platform and customers, in order to obtain more share, the platform and customers will actively promote business development and improve efficiency. Through the profit sharing model, CSP directly binds operational interests with customer interests, avoiding the neglect of customer interests due to the platform's excessive emphasis on its own interests. At the same time, such a model can reduce the risk of the platform. CSP requires a significant investment in construction and maintenance, as well as undertaking related risks. Through profit sharing, the platform can share transportation and market risks with customers, reducing its own operational risks. But the drawbacks of this type of CSP are also quite obvious. For example, it is difficult to balance the sharing ratio and avoid high operating costs. This type of CSP can easily lead to transparency issues in profit sharing, and it is difficult to calculate and provide more reasonable distribution methods.

5.2.2 The Importance of Membership

When discussing which business model is suitable for CSP in the Yangtze River Delta, the port situation in the Yangtze River Delta should also be included in the preliminary assessment. First, most ports in the Yangtze River Delta are accessible and have a solid foundation for land and sea transportation. This is very convenient for container transportation within the region. Second, despite the rapid increase in container demand over the past three years, many shipping companies have built new containers. Nowadays, with a cliff like reduction in demand, the stacking of containers has become a serious problem. Therefore, there are many emerging warehouses and yards in the Yangtze River Delta. Third, the CSP in the Yangtze River Delta needs to complete internal transportation while also being interconnected with global CSPs. Therefore, based on the previous comparison, a new CSP requires a

certain amount of start-up funding, but not much. Because there are already mature technologies and resources that can be applied to CSP in the Yangtze River Delta today. Compared to the subscription model discussed earlier, membership membership is a good choice for CSP.

Membership system refers to the platform charging users a certain membership fee, and users can enjoy specific services or discounts provided by the platform after becoming members. In CSP, members can enjoy more services and discounts, such as higher priority when booking containers, more favorable rental prices, and so on. Due to the fact that the Yangtze River Delta is not a geographically vast region, most of the cost and effort can be invested in user needs. The internal transportation cost in the Yangtze River Delta region is not high, and a considerable number of shipping companies have already attempted daily maintenance. Therefore, the membership system cannot obtain a large amount of start-up funds in the early stage, but it is more than enough for the operation of CSP. At the same time, membership can also increase the stability and sustainability of the platform, as membership fees can help the platform reduce operating costs, increase revenue sources, and ensure better service to users.

In addition, the main purpose of CSP in the Yangtze River Delta structure is still to reduce the number of empty containers and reduce costs. The use of membership based CSP can effectively improve container usage, as membership based shared platforms can gather multiple shippers and logistics companies, increasing container usage, reducing idle resources, and reducing container usage costs. Membership based CSP can also achieve seamless docking between cargo ships and trucks, thereby shortening the transportation time of goods. Shippers can view the freight situation in real-time on the booking platform, facilitating timely adjustment of plans and reducing the delay time of goods. This can also improve logistics efficiency, provide logistics companies with more choices and resources, and eliminate the need to spend energy and time searching for container transportation resources, reducing logistics

costs.

Finally, the Yangtze River Delta region is very suitable for the forward conditions of using membership production as a CSP business model. The Yangtze River Delta region is rich in resources, and the platform can easily and inexpensively possess a large number of container resources, providing different specifications and types of containers for different types of goods to meet various needs. In the past few years, various ports have built a wide coverage service network that can meet the logistics needs of users nationwide and even globally, and can provide a complete set of logistics services. Nowadays, many world-renowned shipping companies have established more than one subsidiary in the Yangtze River Delta region, and close partnerships can ensure timely supply of goods and return of empty containers, ensuring the resource utilization and efficiency of the platform. In Chapter 4, we discussed that building a new CSP can now have very reliable technical system support to achieve functions such as goods tracking, reservation, settlement, etc., ensuring the security and smooth progress of transactions.

In addition, since CSPS practice the concept of sharing economy, they need some support. Both external and internal support should be idle resources and complete the original intention of CSP construction in the Yangtze River Delta.

5.3 External Support for CSP

5.3.1 Support for CSP

Before considering who support CSP needs, we should first analyze what kind of support CSP needs. According to the characteristics of CSPs from other shipping companies mentioned in Chapter 4, a CSP requires at least five types of support: technical support, financial support, legal support, partner support, and talent support.

First, establishing a CSP requires the development of corresponding platform websites or applications, and requires a professional technical team to complete the design, development, testing, and maintenance of the platform. In the shipping industry, there has already been a shipping company deeply involved in this field —— Yitong International. Yitong International is a company that provides global logistics services such as sea freight, air freight, road transportation, warehousing, and customs clearance. Its partners include many well-known shipping companies, airlines, freight forwarders, etc., such as Maersk, UPS, DHL, etc. Through close cooperation with these partners, Yitong International has the ability to provide global logistics services and provide customers with integrated one-stop logistics solutions.

Second, establishing a CSP requires a significant investment in technology development, human resources, market promotion, and other related expenses. CSP needs sufficient funds to support the operation and development of the platform. Nowadays, many large state-owned enterprises in China have attempted to create digital platforms that can join CSP, such as the CFS, CSMS, and other systems developed by SIPG in collaboration with other companies mentioned in Chapter 4. These developed finished product platforms can be further integrated to launch a more complete and efficient CSP. At the same time, this massive platform also requires human sustained maintenance and technological updates. This is also a significant capital expenditure.

Third, establishing a CSP requires compliance with relevant laws and regulations, including commercial contracts, logistics insurance, intellectual property, and other legal provisions. We need a professional legal team to provide legal support. Establishing a CSP requires many contracts, such as leasing contracts, insurance contracts, etc. Legal support can ensure that these contracts are legal and valid, and both the platform and the user can fulfill their contractual obligations. Meanwhile, CSP may involve some new technologies and business models that require patent, trademark, and copyright protection. As is well known, CSP in the Yangtze River

Delta needs to comply with national regulations and policies, such as tax policies, commodity quality and safety standards, etc. Legal support can ensure that the platform management team is aware of these regulations and complies with them during operation. Besides, legal support can also help CSP resolve disputes and safeguard user rights.

Fourth, establishing a CSP requires establishing partnerships with relevant enterprises in the industry such as container transportation companies, port management departments, customs, and freight forwarding companies to jointly promote the development of the platform. Partners can provide a wider range of resources, including containers, logistics resources, etc., to help the platform expand its coverage and service scope. By sharing resources with partners, CSP can reduce procurement and logistics costs for both parties and improve operational efficiency. If CSP can establish cooperative relationships with well-known enterprises, it can win the trust and praise of users for the platform, attract more new users to join, thereby expanding market share and increasing market competitiveness.

Fifth, establishing a CSP requires excellent talent support, including technical personnel, marketing personnel, customer service personnel, etc. The platform needs to recruit and cultivate high-quality talents to ensure the smooth operation and development of the platform. The technical support and legal support mentioned earlier in this chapter are all based on talent. In addition, the daily operation and maintenance of CSP also require certain high-quality talents to complete, responsible for collaborating with various shipping companies and logistics enterprises, developing operational strategies and arranging scheduling plans, and increasing the stability and reliability of the platform.

In conclusion, I believe that the operating entity of CSP in the Yangtze River Delta should be a large state-owned enterprise with a huge commercial scale, such as SIPG. Previously, in Chapter 4, many digital platforms were developed by SIPG. If the CSP

in the Yangtze River Delta is operated by SIPG, then this CSP has rich experience and advanced technology from its inception. As one of the largest comprehensive port service providers in China, SIPG also has rich experience in port logistics management and can provide strong technical support for this shared container platform. And SIPG has always been committed to providing high-quality port logistics services, continuously optimizing service models and processes, improving logistics efficiency and customer satisfaction. If SIPG is the operating entity, it can leverage its high-quality service concept to provide users with better shared container services. In addition, SIPG has strong port resources and an excellent partner network, which can integrate various resources and advantages to provide more support and high-quality services for shared container platforms. As one of the largest comprehensive port service providers in China, SIPG has strong market competitiveness in the field of port logistics. If the CSP in the Yangtze River Delta is operated by SIPG, it will bring higher brand awareness and market influence, which is conducive to the development and expansion of the platform. At last but not the least, as a state-owned enterprise in Shanghai, SIPG can enjoy certain policy support and preferential policies, which are conducive to the operation and development of shared container platforms.

5.3.2 CSP Support from the Government

According to the research, building a CSP does not necessarily require government support. Some CSPs are independently built and operated by private enterprises or investors, and in many countries, governments do not have specific laws and regulations to support the sharing economy.

For examples, Flexport, an American company founded in 2013, and Freightos, an Israeli company that has established the world's largest container booking network, are both CSPs built and operated independently by private individuals or investors, without direct government support. These container platforms without government

support often encounter some difficulties and challenges. For instance, they may need to bear the cost of infrastructure construction and maintenance on their own, such as the construction, maintenance, and upgrading of parking lots, warehouses, and other facilities, as well as considering safety and insurance issues. However, these CSPs also have some advantages. They can operate and develop more flexibly, without being restricted by policies and regulations. In addition, they can customize pricing based on market demand and conduct more precise marketing and promotion.

Overall, CSPs without government support may face some challenges and risks in operation, but they can also operate and develop more flexibly and autonomously, thus possessing their unique advantages. However, in some cases, government support may have a positive impact on the development and operation of CSPs. The government can introduce relevant regulations and policies to promote the development of the sharing economy and encourage more people to participate in the CSP. The government can also provide support for infrastructure construction and maintenance, such as roads, parking lots, etc. In addition, the government can also provide credit endorsement and supervision for CSPs to ensure their safety and reliability, making more users willing to use the platform. Therefore, in some aspects, government support plays a role in promoting the development of CSPs.

Nonetheless, based on the situation in the Yangtze River Delta, for my perspective, if the government is willing to support the creation of CSP in policy, it will definitely bring benefits to CSP. In recent years, the Chinese government has been encouraging the development of the sharing economy, including CSPs. There are also many supportive policies in the Yangtze River Delta region to promote the development of CSP, including fiscal policies, land policies, etc.

The Chinese government provides a lot of financial policies such as tax exemptions or financial subsidies for enterprises investing in CSP construction, encouraging them to continue developing the latest technologies in the construction and operation of CSP.

At the same time, the government will also provide land resources for CSP and prioritize allocation to eligible container platform enterprises. For example, SIPG's EDEC project at Yangshan Port has received support from the government's land policy, in order to help SIPG build their own EDEC. In addition, the government of the Yangtze River Delta invests a large amount of money and manpower every year to build infrastructure such as ports, docks, and logistics parks. It's common sense that the Yangtze River Delta region includes parts of Shanghai, Jiangsu, and Zhejiang provinces. According to relevant data from the national government data network, in 2019, Jiangsu Province Government invested over CNY 40 billion in infrastructure construction such as ports and docks. In the same year, Zhejiang Province Government announced that it would invest CNY 130 billion in the construction of ports and logistics parks in the Yangtze River estuary region. The Shanghai Municipal Government plans to invest CNY 45 billion by 2020 in infrastructure construction such as urban transportation and water conservancy. These constructions provide convenient conditions for CSP.

All in all, if CSP can receive government support, the government can promote and promote the shared container platform through various channels, improving social awareness and usage rate. In summary, the government has adopted various support policies in promoting the development of shared container platforms, aiming to create more convenient and efficient logistics platforms and promote the economic development of the Yangtze River Delta region. As a result, although CSP does not necessarily require government support, in terms of the port situation in the Yangtze River Delta, if CSP can be built, the government must be willing to support it, and CSP can also benefit greatly from it.

5.4 Platform Control

5.4.1 The Quality of Containers

If a good CSP is to be established, it must fulfill its regulatory responsibilities. First, CSP should supervise user qualifications and conduct qualification audits to ensure that users comply with relevant regulatory requirements. Second, CSP needs to manage, monitor, and audit cargo information to ensure that all goods are legal and secure. Third, CSP also needs to supervise the transportation process to ensure that transportation is legal, safe, and orderly. Finally, CSP also needs to handle disputes between users, take corresponding measures to solve the problem, and ensure that user rights are not violated.

CSP needs to ensure that user behavior and transportation of goods comply with relevant regulations and policy requirements, avoid illegal activities, and maintain the legitimacy and fairness of the industry. For example, in March 2023, a scandal involving MSC executives involved in drug trafficking was exposed, and the case has already been heard in court. This incident also demonstrates the importance of platform supervision of cargo transportation. CSP also needs to supervise containers, goods, and transportation processes to ensure the safety and reliability of all links. This is not only a guarantee for users, but also a regulation for the entire industry to avoid accidents and other risks. During container transportation, cargo damage and container damage accidents often occur. Especially when some special chemicals or hazardous materials leak, CSP needs to bear the main responsibility. Therefore, CSP needs to also supervise the quality of containers to some extent.

During the use of the platform, there will inevitably be disputes and contradictions between the platform and users, or between users. The platform needs to assume certain regulatory responsibilities, promptly handle and solve problems, safeguard the interests and rights of users, and maintain the platform's credibility and reputation. In my opinion, a CSP with good development prospects needs to actively fulfill its regulatory responsibilities in order to attract more users and customers. This can increase the platform's visibility and influence, and support its continuous development and growth.

5.4.2 The Cost of Routine Maintenance and Operation

In addition to market regulation and container regulation, CSP should bear some responsibility for the planning of shipping routes. Because shipping route planning is an extremely important part of CSP's operations, it directly affects container transportation efficiency, time cost, and cargo safety. The main purpose of constructing CSP in the Yangtze River Delta is to increase the utilization rate of containers and reduce the accumulation of empty containers. If CSP fails to properly regulate route planning in terms of routes, which increases transportation efficiency and costs, it deviates from the original intention of building this CSP. At the same time, CSP is responsible for shipping route planning, which can improve the reliability and safety of container transportation, reduce freight transportation costs, and improve logistics service levels.

If CSP is not responsible for shipping route planning, there may be issues such as route redundancy, cargo detention, and order delays, seriously affecting customer experience and platform reputation. Therefore, CSP needs to develop reasonable shipping route planning based on factors such as customer needs and route operations, and track and evaluate its execution to ensure the effectiveness and timeliness of the planning. In order to be responsible for good shipping route planning, CSP should establish a professional planning team, integrate resources from all parties, strengthen cooperation with major shipping companies, enhance the ability and level of shipping route planning, and provide customers with better logistics services.

5.5 Summary

In conclusion, I think CSPs in the Yangtze River Delta should adopt membership as a business model. Because a new CSP requires a certain amount of start-up capital, but

not much. Because now the Yangtze River Delta already has mature technology and resources that can be applied to CSP. Membership is a good alternative to the subscription model discussed earlier. In addition, the main purpose of CSPs in the structure of the Yangtze River Delta is still to reduce the number of empty containers and reduce costs. Membership CSPs can effectively improve container utilization.

Besides, I think CSPs should be owned by large state-owned enterprises such as SIPG. Because of the need to develop the corresponding platform website or application, and the need for professional technical team to complete the design, development, testing and maintenance of the platform, SIPG has completed this part, and continue to improve in this part. According to the study, building CSPs does not necessarily require government support. Some CSPs are independently built and operated by private companies or investors, but, based on the situation in the Yangtze River Delta, in my opinion, it will certainly benefit CSPs if the government is willing to support the creation of CSPs in policy.

To complete a complete CSP, it must fulfill its regulatory responsibilities, such as user qualification supervision, cargo information supervision, container quality supervision and so on. Therefore, CSP should establish a professional planning team, integrate various resources, strengthen the cooperation with all shipping companies, improve the capacity and level of route planning, and provide customers with better logistics services.

Chapter 6 Discussion and Recommendation

6.1 Discussion

In my point of view, it is very necessary to create a CSP for the Yangtze River Delta region. It helps to improve logistics efficiency, reduce logistics costs, and promote regional economic development. This platform can effectively solve a series of problems faced by the current logistics industry, such as low container utilization rate and low efficiency of container logistics. By promoting and applying this new logistics model, it will bring higher social and economic benefits.

First, we cannot deny the necessity of CSP's existence. Against the backdrop of the Chinese government vigorously promoting the sharing economy model, the creation of CSP is imperative. Although many shipping companies in the world have already built their own CSPs, this does not mean that the Yangtze River Delta region can enjoy it. After completion, CSPs in the Yangtze River Delta can share data with other shipping companies' CSPs. Because in our research and discussion, we believe that the construction of this CSP needs to have the regional characteristics of the Yangtze River Delta and be able to provide certain solutions to problems that specifically belong to this region. Therefore, such CSP has certain limitations, but also has very important characteristics.

Second, various large state-owned enterprises led by SIPG have made significant attempts on digital platforms. Although these platforms were not initially linked to the shared container model. However, after the creation of CSP, in my opinion, the technology and experience of these platforms can be imported into CSP for CSP learning and reference. Similarly, there are currently a large number and diverse types of digital platforms in China. Although it covers most of the needs in the shipping industry, there is no platform that connects them together. This is not a very good

experience for users, so CSP can conduct targeted technical research in combining multiple platforms.

Third, according to research, the best operating entity for CSP is large state-owned enterprises, and SIPG is the best choice among them. Because shipping companies such as SIPG and China Shipping have made many achievements in digital port construction. In addition, for these enterprises, it is also their responsibility and obligation to bring Digital transformation into the shipping industry. Meanwhile, it would be even better if CSP could receive government support. However, research has shown that CSP does not need to blindly pursue government support, as government support is for the entire shipping industry. As long as CSP can be successfully constructed, it can obtain a certain degree of friendly policy.

Last but not the least, CSP must play a regulatory role in the operation process. Nowadays, the regulatory responsibility of many container platforms falls on the enterprises behind them. But this does not mean that the platform can achieve a thorough division of regulatory responsibilities. In fact, supervision is one of the main responsibilities of CSP, including container quality supervision, user information supervision, and route planning.

6.2 Recommendation

I think we can propose some recommendations for CSP in order to help it pursue longer-term development.

First, CSP needs to explore market demand. Before creating a shared container platform, operators need to have a deep understanding of market demand, understand user needs and pain points, in order to determine the design of platform functions and services. Second, CSP should focus on attracting core users. To attract core users, CSP needs to provide services that are different from competitors and optimize user

experience to improve user satisfaction and loyalty. Third, CSP must improve its management mechanism, including logistics management, security management, service management, etc., to ensure the smooth and safe transportation of goods. Fourth, CSP needs to establish a reasonable charging model that can meet user needs while ensuring the sustainable operation of the platform. Fifth, CSP needs to continuously introduce advanced technologies such as big data analysis, artificial intelligence, and the Internet of Things to improve the platform's efficiency and service quality. Finally, CSP should also pay attention to strengthening cooperation and alliances, such as ports, logistics companies, shipping enterprises, etc., to jointly promote industry innovation and development.

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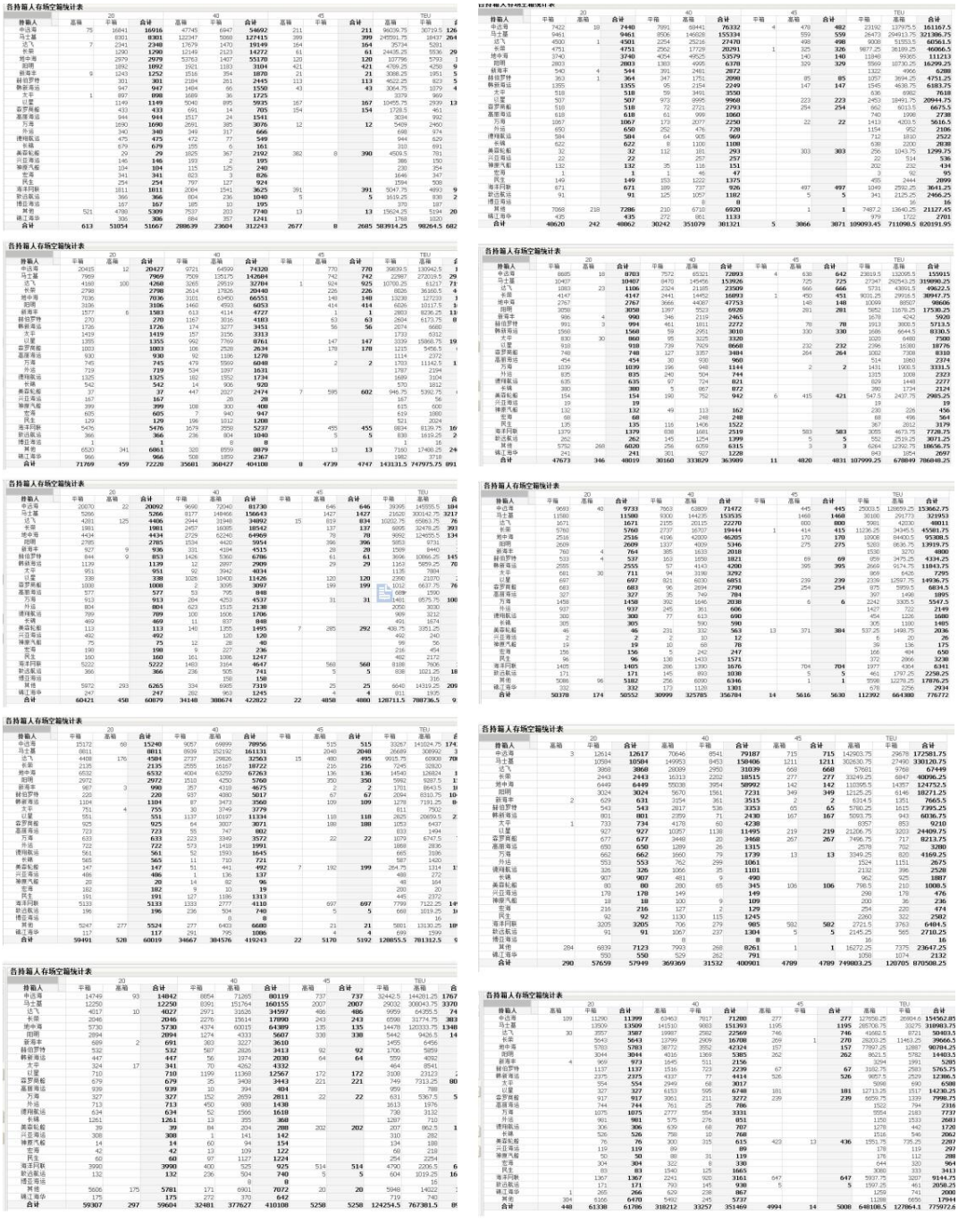
Appendix

TABLE: Number of Empty Containers in Ten Weeks of ECDC



(Resource: SIPG Online Website - EDEC Project)