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Research on marketing channel of container lines

Bai Ge

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WORLD MARITIME UNIVERSITY

Shanghai, China

Research on Marketing Channel of Container lines



By

Bai Ge

China

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

MASTER OF SCIENCE

In

INTERNATIONAL TRANSPORT AND LOGISTIC

2019

Declaration

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

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

Bai Ge

2019-06-11

Supervised by

Professor Zhao Gang

Shanghai Maritime University

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Abstract

The international shipping market is enormous. With the development of international trade and the promotion of economic globalization, shipping industry has become the basic industry of international trade globalization and the bearing platform of international market development. The marketing of international shipping is an important link in the operation of shipping market. With regards to the understanding of the current situation of marketing channels of container liner company, the existing problems of marketing channels are found out, and the strategies of optimizing shipping marketing channels are put forward, so that container liner companies can exert their initiative and give full play to the best effect of marketing activities.

The basic situation of shipping industry are mainly introduced in the first two chapters, and then the current situation of marketing channel in COSCO container lines (abbreviated COSCO SHIPPING) has been analyzed. The marketing channel mode of COSCO container liner transportation is introduced, followed by the advantages and disadvantages of various marketing channel models, the influencing factors of which are summarized into four aspects: customer value, financial performance, channel operation status, and channel value (i.e. the performance factors of marketing channel). Then using AHP and fuzzy comprehensive evaluation to evaluate its overall marketing channel performance. In view of the evaluation results, the conclusion is put forward in the paper that COSCO SHIPPING has better marketing channel performance of container liner transportation products, and the problems existing in the existing marketing channels according to the influence factors is found out. In addition, the measures and suggestions to perfect and improve the marketing channels are proposed.

Key words: Container liner company; Marketing Channels; Marketing Channel Performance; AHP; Fuzzy Comprehensive Evaluation Method

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I Introduction

(I) Background

The international shipping market is enormous. With the development of international trade and the promotion of global economic globalization, shipping industry has become a basic industry of international trade globalization. The marketing competition among liner transportation channels is becoming increasingly fierce, and the concept of marketing channel development in container liner transportation products is rarely systematically applied to liner marketing industry. Liner transportation companies have been maintaining the development stage of the traditional marketing concept, and it's often caught in the whirlpool of price war. It is the forward-looking marketing strategy of liner operators, targeted marketing ideas and comprehensive and effective marketing strategies, and extensive marketing channels that makes liner operators profitable and survive in turbulent environment. As a result, it is necessary to improve the efficiency of marketing channels, open up new markets, open up the transportation channels of container liner, and formulate corresponding marketing plans.

(II) Research significance

(1) Theoretical significance

Marketing channel is the way for enterprises to transfer products to consumer terminals, which plays a very important role in the marketing mix of enterprises. For products, the marketing channel does not add value to the product itself, while increases the added value of the product by professional services provided within the channel. The success of the marketing channel will lay a solid foundation for the overall marketing work of the product. Otherwise, it will create one obstacle after another.

(2) Practical significance

With regards to container liner companies, a great number of marketing channels can help customers understand the route and intermediary of goods transferring from manufacturing enterprises to customers, so that the convenience, rationality and economy of products can be judged. Developing innovative sales models could help

customers develop an optimal marketing channel plan, and as a result, achieving shorter circulation routes, with fewer links, faster time, lower costs, as well as stable goods.

(III) Research objectives

(1) It's hoped to clarify the problems existing in the marketing channels of container liner transportation products in COSCO SHIPPING, make COSCO SHIPPING and similar container liner companies recognize the importance of strengthening the construction and innovation of shipping marketing channels, and then strengthen the management in shipping marketing channels.

(2) By means of the evaluation of the performance of COSCO SHIPPING marketing channels, the suggestions on improvement and management of COSCO SHIPPING marketing channels are put forward.

It's to strengthen industry integration and cooperation, strengthen shipping cooperation, reduce costs, disperse the risks brought by the world economy, and adjust the capacity input of routes through cooperation, and enhance the competitiveness; carry out diversified management to avoid market risk; while ensuring the development of transportation core business, it's to expand the marketing channels and consolidate the main position of shipping industry by means of many ways such as acquisition, merger, stock participation and so on. upgrade the port., to enhance the interaction between the shipping industry and the port, the linkage between the port and the district to achieve the common development and to establish a complete logistics system, improve transport services, establish a modern logistics service system in order to meet the development needs of shipping enterprises themselves, and meet the needs of customers at the same time.

(IV) Research framework

In the first chapter, the research background, the research problems and the significance of the paper are expounded, the research problems are put forward, and the purpose of the thesis is explained.

In the second chapter, the literature related to shipping marketing channels is made a summary. In this chapter, the definition and related theory of marketing channel is

mainly discussed, the characteristics of marketing channel of container liner transportation products are made an analysis, and the historical evolution and development trend of marketing channel of container liner transportation industry are made a explanation.

In the third chapter, the current situation of COSCO SHIPPING marketing channel is mainly analyzed. It makes an analysis of COSCO SHIPPING's profile, channel model and channel performance. In this paper, the descriptive language is mainly used to make a simple qualitative analysis of the channel.

In the fourth chapter, the performance of COSCO SHIPPING marketing channel is mainly evaluated. The systematic engineering method (AHP and fuzzy method) is used to evaluate the performance of COSCO SHIPPING marketing channel systematically, taking the method of expert scoring as the standard, using AHP to determine the weight of each index of influencing factors. Fuzzy evaluation is carried out to each index , and then the result of evaluation is obtained.

In the fifth chapter, the main conclusions are drawn and the countermeasures and suggestions to the existing problems of the channel are put forward on the basis of the systematic analysis and evaluation of the marketing channel of COSCO SHIPPING (container liner)

The framework of the paper is shown in figure 1/ 1

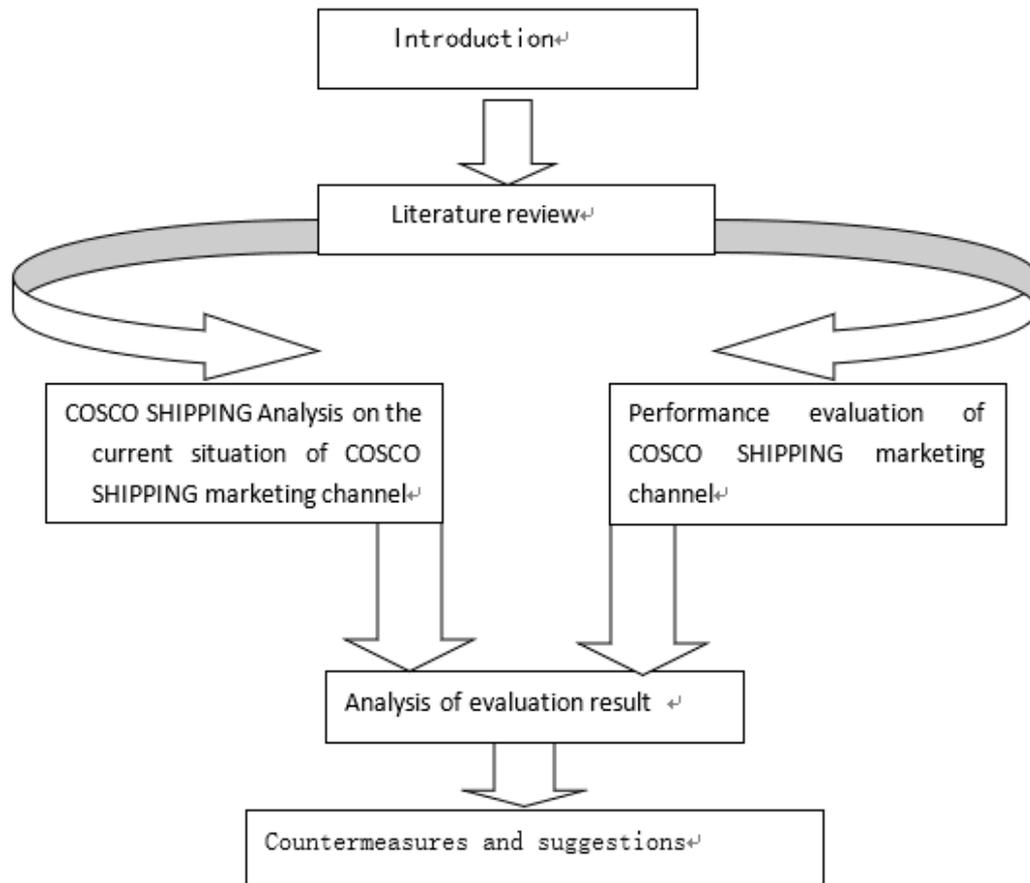


Chart 1.1 The overall frame diagram of the paper

II literature review

(I) Overview of marketing channel

Marketing channels are also known as distribution channels or sales channels. As for the definition of marketing channels, there are a great number of excellent insights among marketing experts.

Marketing scientist Philip Kotler, Crmstrong believes that marketing channel refers to enterprises and individuals who acquire ownership of goods or services when they move from producer to consumer.¹

Kotler believed that Marketing Channels and distribution channel Distribution Channels are two different concepts. A marketing channel refers to all enterprises and individuals working together to produce, sell and consume certain goods or services of producers, that's to say, a marketing channel includes all enterprises and individuals in the production and sales process of a certain product, such as resource Supplier, Producer, Merchant Middleman, Agent Middleman, Facilitator (also translated as "facilitating exchange and physical distributors"), such as transport enterprises, public goods stacks, advertising agencies, market research agencies, as well as Ultimate Customer or User. At present, the two concepts of marketing channel and distribution channel are interchangeable.

Marketers Stern and Al. Anceli defined marketing channels as a set of interdependent organizations that facilitate the smooth use or consumption of products or services.²

The AMA defines marketing channels as organizations of agents and distributors (wholesale and retail), both within and outside the enterprise, through which goods (products and services) can only be marketed on the market.

Lu E. Pelton, David Stratton and James R. Rumlkin defined marketing channels as the exchange relationships established to create customer value in the acquisition, consumption and disposal of products and services.³

¹ Philip Kotler, Crmstrong. Philip Kotler, Crmstrong. translated by Mei Qinghao. Marketing Principles [M]. Beijing: Chinese People's Publishing House, 2001: 9.

² Stern Louis. Marketing Channel [M]. Prentice-Hall Inc, 2004: 207.

³ Lu E. Pelton, David Stratton, James R. Lumpkin, Translated by Zhang Yongqiang and Peng Jingqiao. Marketing

Wang Fanghua, a scholar from Shanghai Jiao Tong University believed that taking the actual operation of the market in China into account, the manufacturers should pay enough attention to the channel construction when making the decision of the enterprise. He defined marketing channels as external affiliated organizations managed by the company in order to achieve its distribution objectives.⁴

The discussed marketing channel in this paper refers to all enterprises and individuals involved in the process of transfer of ownership in a product or service, which mainly includes two aspects: on one hand, it is the way to sell the product, that is, the channel through which the product is sold to realize the transfer of the ownership of the product. On the other hand, how to overcome the contradiction between producers and consumers is based on the physical transfer of products.

1.The function of marketing channel

A fast and effective marketing channel will greatly improve the marketing performance of the enterprise. The choice and decision-making of marketing channel is an important problem faced by enterprises, because the correctness of marketing channel will have a very important impact on the production and management of enterprises. From the point of view of economic system, the basic function of marketing channels is to convert the different raw materials provided by nature into meaningful collocation of goods based on the needs of human beings. Marketing channels organize the work that must be done to move products from producer to consumer with the aim of closing the gap between the product (or service) and the user. The main functions of marketing channels are as follows:

A To promote sales

By using the marketing channel, the enterprise can do well before the sale, on sales and the after-sales service, to satisfy the customer demand, and promote the sale to the maximum extent.

B To regulate the contradiction between production and consumption

Channels [M]. Beijing: Mechanical Industry Press, 2004: 3-4 .

⁴ Wang Fanghua, Xi Junfang. Marketing Channels [M]. Shanghai: Shanghai Jiaotong University Press, 2005: 4.

Marketing channels can regulate contradiction between production and consumption in terms of quantity, color, variety and grade.

C To achieve win-win strategies for channel members

Smooth marketing channels can improve the level of profits and achieve a win-win situation among producers, middlemen, users or consumers.

D To reduce marketing cost and marketing risk

Marketing channels can greatly reduce storage and transportation costs, and channel members will maximize their expertise and advantages to reduce marketing expenditure and reduce costs through a variety of correct marketing strategies. Specialization and division of work will also greatly reduce marketing risk

E To feedback the demand information of consumers

To feedback a large number of consumer demand information so as to make product development of enterprise closer to the market and consumers.

2. Marketing channel structure

Channel structure refers to the composition and status of the members in the channel system, as well as the relationship among the members. In general, a distribution channel is made up of two major components, such as the commercial subsystem and the end consumer. The commercial subsystem mainly includes manufacturers, wholesalers and retailers. These members are independent of each other in their interests and pursue their own goals. The completion of one member's goal in the system depends on the completion of the other member's goals. The completion quality of one member in goal will have effect on the quality of other member's goal completion, and the channel members are the matters needed when jointly building consumers in the course of interdependence.

The channel structure is composed of different channel roles, and different channel roles undertake different channel functions. The most important purpose of the channel is to serve the needs of consumers and end users. Each channel member must perform a task that is appropriate for his or her particular role to reach this goal, such as, providing value-added services, market / innovation, flexibility, timely delivery of products and services.

The elements of marketing channel are mainly distinguished and defined by the length of channel, the width of channel and the breadth of channel, that is, channel series, the number of each level of middleman and the type of each level of middleman. The channel length mainly has zero-level channel, first-level channel, second-level channel and third-level channel.

A level-zero channel refers to a marketing channel where the product flows directly from the manufacturer to the end-consumer without any contact with middleman, which is used for high technical requirements, custom-made industrial products in accordance with customer's special requirements and the manufacturer is required to send experts to guide users to install, operate and maintain equipment, etc.

The channel structure of the first-level channel includes only the first-level sales intermediary. Generally speaking, it's the sales agents and retailers act to be as the sales middlemen.

The channel structure of the second-level channel consists of two-level sales intermediary, which is usually a sales representative and an industrial distributor in the industrial product market, and generally a wholesaler and retailer in the consumer market.

The channel structure of third-level channel consists of third-level intermediate mechanism.

Generally, under the condition that the distance between goods, users and market is the same, it is more economical to choose short marketing channel than long marketing channel.

The width of the channel includes dense distribution, selective distribution and exclusive distribution channels. Dense distribution channel means that manufacturers choose as many middlemen as possible at the same channel level to distribute their products so that their products can cover a certain target market in a large area so that consumers can purchase the brand products everywhere. Selective distribution refers to the marketing channels to make the selection of a small number of middlemen resell goods at a certain channel level.

The channel breadth includes the unitary channel and the diversified channel.

Unitary refers to select multiple channel models or multiple reseller types at each channel level when companies carry on channel design.

3. Marketing channel performance

The concept of marketing channel performance (or overall marketing channel performance) will be covered in many literature on marketing channels, however, no one has yet given a clear and systematic definition of the system. Xiao Liang coming from Business School of Xihua Normal University gives the definition of marketing channel performance from the point of view of production and manufacturer's management decision. The so-called marketing channel performance refers to the sum of value added and created that manufacturer occupies the dominant position in the channel system, members coordinate and share information, and it's under supported by internal and external resources such as channel infrastructure, human resources and technology development, and with the logistics management, production operations, marketing, customer service, and information development.⁵In order to achieve the above objectives, manufacturers in the channel system implement various decisions, namely process performance.

The "sum of values" in the definition consists of four parts, that is, customer value, financial performance, operational status and channel value, in which customer value is the value acquired by external consumers by purchasing products or accepting services; financial performance is the certain economic benefits obtained by marketing main body while the target customers are satisfied; the state of channel operation refers to the synthesis of the function coordination, cohesion and enthusiasm of channel members; in the process of merger, reorganization and acquisition, more and more companies take the channel value evaluation as an important part of the overall company value evaluation and it takes into account the value-added objectives of the channel system in the design that make the channel system stable, long-term and loyal. The performance of marketing channel is the embodiment of the comprehensive value

⁵ Xiao Liang. Enterprise Marketing Channel Performance Evaluation based on AHP and Fuzzy Method[J]. Journal of Technology Entrepreneurship, 2009, 20(3): 85-86.

in marketing channel and the balance between the current financial index and the future channel strategic target value.

(II) Introduction to Distribution channels in Shipping Market

1. The concept of shipping Distribution Channel

1.1 Shipping distribution channel

Distribution channel refers to all enterprises and individuals who acquire ownership of or help transfer ownership of a product and service from producer to consumer in the process of transfer from producer to consumer.

The transportation of shipping enterprise is the displacement of product entity space which is accompanied by commercial flow, that is, "logistics", which is a link in the sale of physical products. The products of shipping enterprises are invisible, their distribution channels depend on the sales activities of transport capacity, and the ownership of the products has not been transferred, and the product of the shipping enterprise is usually sold to the shipper by means of the link of the shipping middleman.

Shipping product is a displacement service provided by shipping enterprises, which is a special commodity with the characteristics of invisibility and randomness, etc. Distribution channels of shipping products include shipping enterprises, passengers and cargo owners, shipping middlemen, freight or shipping agents, wharves and ports, etc where the starting point is the shipping enterprise, the end point is the passenger or cargo owner who needs to transport, the middle point refers to a variety of middlemen organized by the sources of goods and passengers for the purpose of carrying out transport activities.

The distribution channel pattern for shipping products is shown in figure 2-1.

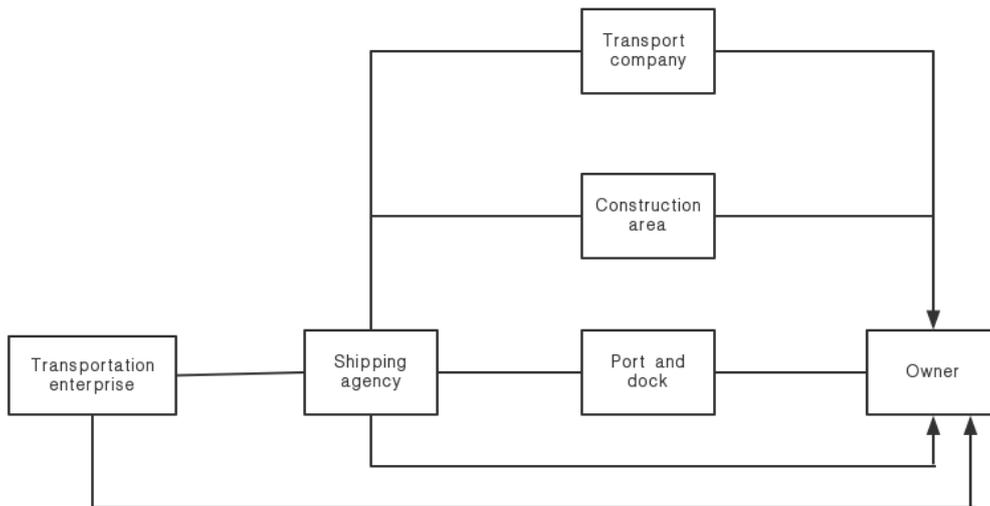


Chart 2.1 Distribution channel model of shipping product

1.2 The characteristics of distribution channel for shipping

1.2.1 Preposition

The premise of shipping service is that the shipping enterprise or middleman organizes the passenger flow and the source of goods based on various forms, and organizes the transportation according to the organization of the passenger flow source or the pre-agreed service mode, in order to realize the transfer of goods or passengers. Shipping enterprises should adopt different strategies in the form of organization in accordance with the distribution of passenger flow, source of goods and their own characteristics, so as to ensure the smooth progress of shipping.

1.2.2 Stability

Shipping enterprises adopt distribution channels that use shipping middlemen, and often determine long-term cooperative relations with middlemen by the signing of contracts. This stable partnership allows both parties to co-manage distribution channels on the basis of mutual benefit, which will not be easily changed even if the shipping market changes

1.2.3 Variety

There are many kinds of demand for shipping transportation between passengers

and shippers, which determines the diversity of distribution channels of shipping products. Long-term stable large passenger flow, the source of goods requires transport enterprises to complete displacement activities in a fixed mode of transport, while fragmentary passenger flow, the source of goods are mostly organized with the help of middlemen, and the flexible mode of transportation is used to complete displacement activities. From the composition of the channel, the shipping channel of consumer goods is often longer than the shipping channel of industrial supplies.

1.2.4 Relevance

The distribution channels of shipping products are related not only to the channel members involved, but also to the other marketing strategies of the products and the channel strategies used by competitors.

1.3 Types of shipping middlemen

The characteristics of the shipping industry determine that there are no wholesalers and retailers in the shipping industry, and the shipping intermediary is the agent. An agent is a medium between the shipping business and the shipper (user) by providing services to facilitate a transaction to earn a commission. There are many types of shipping middlemen, however, they are broadly classified based on their role and nature in transport operations:

1.3.1 Ship Broker-It refers to the middleman who matches the owner and the charterer in the shipping enterprise's chartering and transportation business.

- (1) Owner's Broker
- (2) Chartering Agent or Charterer's Broker

1.3.2 Freight Forwarder-It refers to a freight forwarder acting between the consignor and consignee and the carrier as the other.

- (1) Booking for consignment agent
- (2) Cargo handling agent
- (3) Cargo declaration agent
- (4) Loan agent
- (5) Storage agent

- (6) Container agent
- (7) Forwarding agent
- (8) Non-vessel Operating Common Carrier

1.3.3 Ship Agent It means that he accepts the commission of the carrier and acts by entrusted by carrier.

1.3.4 Consulting agent refers to persons and organizations that receive a certain amount of remuneration for the provision of information, intelligence, information, data and information services based on he needs of the client.

2 Types of shipping distribution channels

2.1 Direct and indirect channels

Direct channel, also known as zero-level channel, refers to the direct sale of shipping enterprise products to shippers (users) without the participation of shipping middlemen. That is, shipping enterprises directly sign agreements with shippers and indirect channel refers to the type of channel through which shipping products are sold to the shippers (users) through one or more intermediate links, which refers to the involvement of middlemen (i.e. freight forwarders and ship brokers). Shipping enterprises are generally unable to adopt direct channels. On the contrary, direct channels and indirect channels are coexistent. For example, freight forwarding business not only directly signs agreements with the relevant shippers, but also entrusts one or more agents to represent their ship transportation business.

2.2 Long and short channels

The length of the distribution channel refers to the number of intermediate links or levels through which the product of the shipping enterprise is distributed to the shipper (user). The less the middle link is, the shorter the channel will be, and the one-layer channel is called the segment channel; the more the middle link is, the longer the channel will be, and the more multi-layer channel is called the long channel. General shipping enterprises, especially freight forwarding, should use short channels business.

2.3 Wide and narrow channels

The width of the distribution channel refers to the number of the same type of intermediary used in each level of the channel;the more horizontal links is, the wider

the channels is. The fewer horizontal links is, the shorter the channels will be, in which the narrowest channel is exclusive distribution.

3 Comparison of marketing channels of liner companies

Shipping marketing refers to marketing activities that take place in the maritime industry. People who own ships and provide maritime transport services are called carriers. People who pay money to carriers to ship their cargoes to destinations are shippers. In the maritime industry, carriers are the suppliers and marketers while shippers are the buyers and potential customers. Shipping marketing in shipping companies is oriented by the demand and desire of cargo owners. Shipping companies generate profits through systematically operating businesses and satisfying cargo owners' demand. As a link between the shipping company and the carrier, the marketing channel directly affects the quantity and quality of orders and businesses of the shipping company. The form of marketing channels is complex and the classification of marketing channels of shipping companies is also diverse. In this paper, all marketing channels are formed into three types of relationships based on the relationship reflected by the marketing channel.

The first one is trading relationship, which refers to the channel trading relationship established by an independent organization or individual through the market. According to the analysis of transaction cost analysis, the trading functions of marketing channels in different stages are shown in different operational processes, from manufacturing to distribution. These trading functions are distributed or realized in a short-term or long-term market and contract between independent organizations, which are also called market transactions. The relationship between the independent channel members established by this is called trading relationship.

Non-market relationship is the second relationship. If two stages of distribution can only be undertaken by one independent organization, for example the manufacturer, in the channel from manufacturing to distribution, this transaction occurs within the system of the organization. Both parties of this transaction are subject to the control of a management center or by some form of bureaucracy, which is called an intra-market transaction. Since the external market does not attribute to this kind of transaction

relationship, the channel relationship based on this system is called integration channel relationship of the company.

At last, quasi-market relationship is another classification of channel relationship. A theoretical hypothesis arising from quasi-market transactions is that the transaction costs of the entire channel will be reduced and management efficiency will be improved by several methods. For example, reducing frequency of transactions, reducing risks of external uncertainty and improving the scale of the economy are strategies to reduce costs. Under the conditions of quasi-market transactions, the relationship between channel members in a channel flow is neither a complete market transaction relationship nor a standard internal organization relationship, but a quasi-market relationship positioned between these two relationships.

3.1 Current situation of marketing channels of liner companies

Based on the above classification of channel relationship, the channel form of shipping products can be divided into three forms: regular marketing channels, integrated vertical channels and relationship marketing channels.

3.1.1 regular marketing channels.

Regular channel form is also known as indirect channel form. Consists of one or one group of independent producers, wholesalers and retailers. The regular marketing channel is a transaction-oriented marketing channel. The transactions between channel members are discontinuous and independent. The price determines whether business exchanges should occur. The relationship between the two parties is short-term and loose. It is easy to convert to other partners because there are no specialized assets for certain relationships. The agency for shipping containers and transportation of liner shipping products falls into this form of regular marketing channels. Container liner companies sell their products to carriers through agents all over the world. In this case, agents are shipping agents and brokers. Through shipping intermediaries and middlemen, companies have the possibility to provide higher-quality services to cargo owners. With professional agents, companies can reduce trading operations and reduce costs, thereby obtaining higher profits. For example, in some routes, cargo sources are concentrated and the number of cargo owners is large and widely distributed. For other

companies, the scale of existing development is small and do not have enough investment to establish a branch structure. Adopting indirect channels can be a good choice. Companies could utilize the rich experience and extensive network of middlemen to quickly organize the supply and quickly open the market. In terms of indirect channels, most container liner companies will choose selective distribution methods to select more powerful shipping agents to sell capacity.

3.1.2 integrated vertical channels

The form of integrated vertical channels is also known as direct channels, which is correspond to non-market trading relationships. Products that produced by shipping enterprises are directly sold to shippers by the shipping company. Shipping companies directly sign the agreements with shippers. There are several advantages of integrated vertical channels. For instance, companies could collect latest market information about market demand and have a better control of market risks.⁶ For special and important customers, special staff are responsible for tracking services. Large-scale, well-funded large shipping companies often have their own sales networks, but integrated vertical channels are not suitable for small or middle size companies because of high costs. Therefore, most shipping companies implement both direct channels and indirect channels. For customers with special goods, the method of joint marketing with freight forwarders and shipping companies is adopted. The shipping company provides preferential freight rates and sufficient space. The freight forwarder provides “one-stop” service to jointly run businesses.

3.1.3 relationship marketing channels

The relationship marketing channel refers to the channel relationship formed by independent channel members based on long-term relationship. This channel is based on the value identification between channel members. Members usually have mutual dependence and mutual commitment with each other. They aim to achieve win-win relationship by joint efforts to create value for consumers. Due to the increasing competition in shipping, companies are actively exploring diversified marketing.

⁶ "Shipping Marketing", 215 (Direct and Indirect Channels) Li Lianshou, 1999.3 Fudan University Press

Developing online marketing is one of the important ways. As international routes, its target market is production companies and distributors in various industries around the world. Compared with the traditional marketing methods, online marketing greatly expands the targeted market and provides global marketing services 24 hours a day. Customers can log in to the website to query the routes information, shipping schedule information, hot routes and cargo tracking information. Customers can also learn about relevant operational information through the network, such as emergency announcements, the number of installed containers and the number of days of free use in the port, which facilitates customers to arrange the freight plan.

3.2 pros and cons

3.2.1 regular marketing channels

Advantages:

(1) Freight forwarders and brokers are able to cover greater market through customer purchase synergies;

(2) Excellent agents regard themselves as the purchasing agent of the customer rather than the sales agent of the manufacturer. So, they not only create the time, place and quantity efficiency for the consumer but also satisfy the shipping company's need for regulation requirements;

(3) In addition, independent distributors have a stronger ability to share customers' contact costs than manufacturers. Usually, they have a stronger power in the market. In today's world shipping industry, almost all companies have established their own sales organization to sell products directly to shippers and have established a strong distribution network to increase sales. However, regular marketing channels remain to be a major channel in the industry due to the differences in consumer demand, the geographical extent and the limited size of channel members. Therefore, any attempt to exclude agents from the sales market is unrealistic.

Disadvantages

(1) Regular marketing channels have several issues in transaction costs, for example, special fund security, environmental adaptability and performance assessment. At the same time, there are more links in the formation of the channel trading

relationship, such as search, screening, signing, supervision, performance and so on. These processes will generate high transaction costs.

(2) It is difficult for shipping companies to control and encourage channel members when managing marketing channels. For agents, if they do not effectively sell the capacity, there will be only a small amount of commission loss for them. However, for container liner companies, a huge amount of capacity will be wasted.

3.2.2 integrated vertical channels

Direct channels have the advantages of fast, direct and no commission, which can greatly reduce operating costs. However, direct channels require strong financial and human support. In addition, companies must bear all risks themselves. Therefore, most container liner companies cannot completely adopt direct sales. With the increasingly fierce international competition and the increasing demands of shareholders for benefits and income, companies must focus on their core business and core competitiveness. If small or middle size companies lack significant scale and competitive advantage, distribution process should be undertaken independent distribution companies. Therefore, in order to get rid of excessive reliance on agents, airlines should expand direct sales in a modest extent.

3.2.3 relationship marketing channels

Through the relationship governance mechanism, the relationship channel enables channel members to achieve mutual trust through effective communication and long-term cooperation through mutual trust. The advantage is that the search, screening, supervision, and performance transaction costs generated by changing trading partners under short-term market relationships are reduced to a minimum. At the same time, effective communication and mutual trust can effectively improve the security of dedicated assets. In addition, independent channel members in the relationship marketing channel focus on their own ability and advantages on the basis of specialization. The shortcomings arising from factors such as economies of scale, core competencies and bureaucratic behaviors of bureaucratic systems, which require higher channel management and higher costs.

III Analysis of marketing channel of COSCO SHIPPING

1 The company outline of COSCO SHIPPING

1.1 Company profile

COSCO SHIPPING is a company specializing in international and domestic container liner shipping and related business services, affiliated with COSCO SHIPPING. On Dec. 31st, 2011, COSCO SHIPPING's fleet consisted of 157 container ships with a capacity of 667970 TEUs. It operates 76 international routes, 10 international regional routes, 21 Chinese coastal routes, 67 Pearl River Delta and Yangtze River tributaries in 159 ports in more than 48 countries and regions around the world. The annual container volume reached 6910041 TEUs, an increase of about 11.2% over the previous year and ranked among the world's leading carriers. With regards to the need of operation, COSCO SHIPPING has 9 port branches in China, such as Dalian, Tianjin, Qingdao, Shanghai, Ningbo, Xiamen, South China, Hainan, Wuhan, etc. There are 9 overseas branches in Europe, North America, Southeast Asia, West Asia, South America, Australia, Japan, Korea and Africa. In China and overseas, there are more than 400 marketing service outlets.

1.2 Brief introduction to the present situation of enterprise marketing

COSCO SHIPPING takes advantage of the network channels to give it an opportunity, and COSCO SHIPPING has completed the construction of the EDI center and the EDI network. In electronic equipment, it has been at the forefront of the domestic transport industry, and the company also brings convenience and benefits to its customers through these electronic document processing ways to flatten COSCO SHIPPING logistics sales channels. The products of COSCO SHIPPING logistics are service products. COSCO SHIPPING logistics adopts competitive pricing strategy on the basis of logistics cost, pays attention to competitors' price policies and strategies, and also adds its own brand effect price. In addition, the dynamic pricing strategy can be adopted in the customer understanding value, and pricing is based on the customer's understanding and acceptance of the value of logistics products.

1.3 The current situation of marketing

With regards to various annual reports of COSCO SHIPPING, the following statistical tables can be established (3 -1)

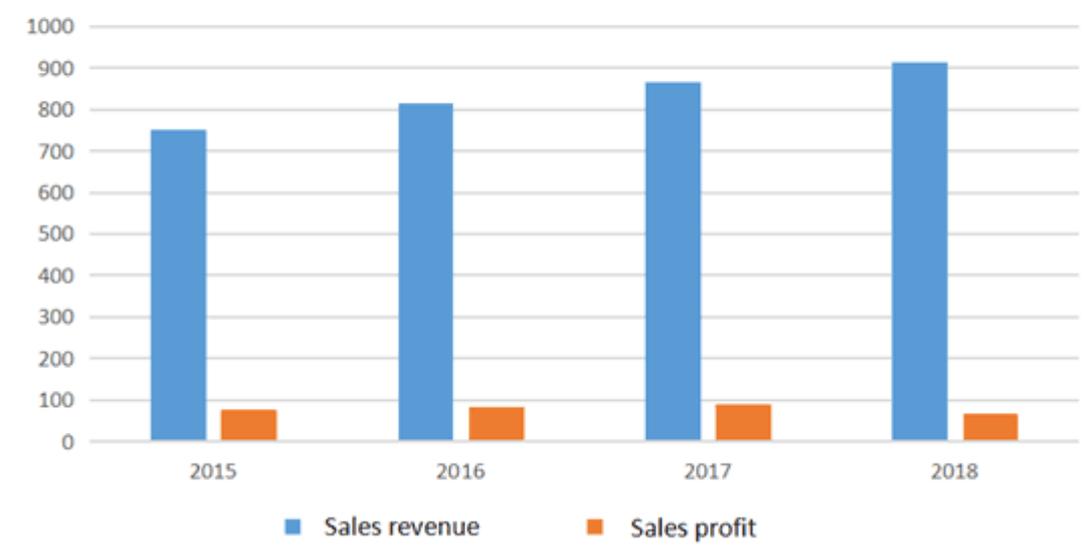
Tables 3-1. Sales revenue statistics for COSCO SHIPPING

Unit: 10,000 yuan

year \ Sales status	2015	2016	2017	2018
Sales revenue	750.26	815.49	867.55	913.66
sales profit	77.76	84.53	88.98	66.51

For a more intuitive understanding of the current marketing situation in the enterprise, the data in the above table is converted into a column diagram (3 -2)

Figure 3-2 Sales chart of COSCO SHIPPING



Unit: 100 million yuan

Chart 3.1 Sales chart for COSCO SHIPPING

From the above, it can be seen that the sales revenue and sales profits of COSCO SHIPPING steadily increased year by year from 2015 to 2018.

2 Analysis on the current situation of marketing channel of COSCO SHIPPING

(1) Direct distribution channel system: advertising, telephone direct sales, TV direct sales, mail order direct sales, network direct sales, conference direct sales, exhibition and so on

(2) Vertical distribution channel system: mainly corporate vertical distribution channel, managed vertical distribution channel and contract distribution channel

(3) Horizontal distribution channel system

(4) Multi-channel distribution system

2.1 Shipping giants step up direct sales channels

In the past three years, COSCO SHIPPING has focused on soliciting FOB goods in the main target markets, setting up a global bidding section to participate in the global bidding of global multinational companies, setting up its own offices all over the world, vigorously expanding direct sales channels, and expanding the proportion of direct sales to more than 50 percent.

In the face of the target market and combined with the characteristics of the container transport industry, COSCO SHIPPING Group takes into account the following factors:

1) Due to the oversupply of container market, the use of middlemen will cause the supply of goods to be unstable.

2) It's easy to control freight rates in order to use price means to carry out competition

3) To make a direct contact with the owner, visit customers, understand customer needs, which is conducive to better customer service.

As a result, COSCO SHIPPING Group has set up its own offices around the world, vigorously expanding direct sales channels and strengthening direct contact with customers. The proportion of direct sales channels has expanded from 5% in 1997 to 50% in 2000, and the ability to order goods has been greatly enhanced, besides, the market competitiveness has been strengthened. It's the leader in the market, in the container shipping giant MAERSK distribution channel, the proportion of direct sales has reached more than 70%.

2.2 Channel combination

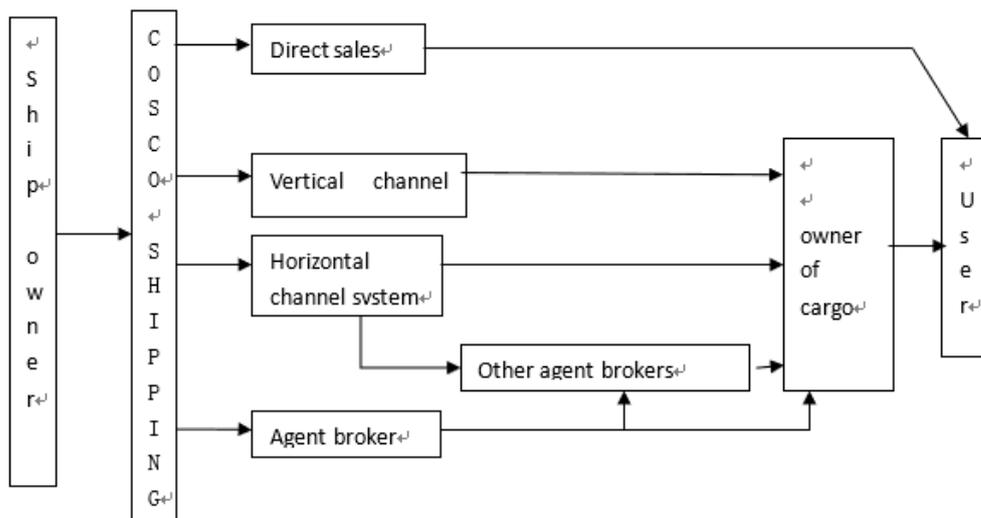


Chart 3.2 composition of existing channels for COSCO SHIPPING

2.2.1 Channel 1: Ship owner - COSCO SHIPPING - Advertising, Direct selling by telephone, Direct Marketing by TV, Direct Sale by Mail order, Direct Sale by Network, Direct -Marketing by Conference, Convention and Exhibition, etc.- User

The first channel is that COSCO SHIPPING has opened up a new channel in recent years. At present, it has not yet reached a large scale, only in some large cities and mature commodity industries to set up a direct sales system. At present, with the gradual maturity of the transport industry, the competition is particularly fierce. The channel is too long to restrict the enterprise information feedback, the marketing flattening gradually receives the attention. This channel can feedback the relevant information of the product in time, so that the enterprise can adjust the marketing strategy in time and cope with the changing market environment, which will also become an important part of the channel construction in the future. However, the construction cost of this channel is higher than that of other channels, and the product popularity is needed to open up the market. Therefore, the promotion cost is therefore higher. It will increase greatly.

2.2.2 Channel 2: Ship owner—COSCO SHIPPING—Vertical channel system— Owner of cargo—User

COSCO SHIPPING has set up its own office in the world, vigorously expanding direct marketing channels, strengthening direct contact with consignors, greatly enhancing the ability to collect goods, strengthening the competitiveness of the market, maximizing the distribution level, and improving distribution efficiency. Reduced distribution costs and risks. The shortcomings of this channel are also very obvious, such as COSCO SHIPPING can not fully control the distribution channel.

2.2.3 Channel 3: Shipowner -COSCO SHIPPING—COSCO SHIPPING Regional Company—Other agent breakers - Owner of cargo-User.

This channel is a wide horizontal structure, and it is the main channel of shipping product distribution in COSCO SHIPPING at present. So far, COSCO SHIPPING has established a variety of regional companies, regions, and sales offices in the global market region to develop a collection terminal network. At the same time, the regional branch also assumed the role of shipping product logistics company.

The distribution process is that the sales office in the major cities around the world is responsible for the development of the local and adjacent shipping product market, and establishes a container-based sales network. It is characterized by reducing the intermediate links, ensuring the economic profits of shippers and users, enhancing the competitive ability of shipping products, and helping the goods to enter the local market quickly and be familiar to the majority of users in a short period of time. The deficiency of this channel is that the cost of channel construction is higher than that of other channels, and the management is not easy. It greatly increases the difficulty of COSCO SHIPPING using this channel to sell shipping products and the speed of market development.

2.2 Channel 4: Ship owner—COSCO SHIPPING—Agent brokers—Other agent brokers—Owner of cargo—User

COSCO SHIPPING establishes distribution relations with a number of agents, while the general agent makes use of his own shipping marketing channels to provide shipping services directly to shippers and users, as well as to other agent distributors. This channel is now an important marketing channel for COSCO SHIPPING. COSCO SHIPPING uses its rich shipping marketing experience and business means to find regional shipping dealers or agents in major markets around the world. They complete the distribution process of shipping products in their own marketing channels. This channel is characterized by the fact that COSCO includes most of the marketing process of medicine, including marketing channels. Expansion, market entry and so on completely handed over to the dealer to complete. It can be seen that the advantages of this channel are more prominent. COSCO SHIPPING can concentrate on the development of new routes and research on new shipping products, and its distribution cost has also been reduced to the lowest. However, most of COSCO SHIPPING has lost the right to control and coordinate marketing channels, so it can not restrain agents and dealers and other agents and dealers.

3 Performance of marketing channel for COSCO SHIPPING

The performance of marketing channels is of great significance to both producers and re-sellers, which can reveal the past governance errors in the channel and provide guidance for the effective allocation of resources in the channel system. At the same time, the measurement of performance directly has effect on the relationship between channel members, and then on the overall function of the channel. Channel performance is a structure that is multidimensional and deep, which includes both macro and micro aspects; it includes both macro and micro aspects; it includes both the performance of the channel system, the performance of individual channel members, and even the performance of individual channel members. From the macro point of view, channel performance refers to the contribution of channel system to the society, which is

examined from the height of the whole society. From the microcosmic perspective, channel performance refers to the value or service value added by channel system or channel members to the manufacturer, which is examined from the perspective of the manufacturer itself.

By the introduction to COSCO SHIPPING's existing marketing channel model in the previous section, it can be seen that there are still many defects in the marketing channel combination of COSCO SHIPPING. However, it can not intuitively see which aspect of its channel has problems, and it takes a lot of money and manpower to build a new channel, therefore, we should not blindly believe that the channel performance is not high enough and it needs to be rebuilt. At this time, we need to evaluate the performance of the whole channel, start from all aspects, find out where the problem lies, and then solve the problem.

Next chapter, will focus on the marketing channel performance evaluation of COSCO SHIPPING, an evaluation index system in accordance with the characteristics of shipping industry for COSCO SHIPPING ⁷, evaluate its overall channel performance in a comprehensive way, and make an analysis of its evaluation results.

⁷ "The 19th International Conference on Industrial Engineering and Engineering Management" , Springer Nature, 2013

IV Performance evaluation of marketing channel for COSCO SHIPPING

1 Purpose of evaluating COSCO SHIPPING performance

The performance evaluation of marketing channel, referred to as channel performance evaluation, refers to the process in which the carrier objectively assesses and evaluates the efficiency and effectiveness of its marketing channel system by systematic means or measures.

The target of channel performance evaluation can be not only the channel member at a certain level in the channel system, but also the whole channel system. In marketing practice, there are lots of carriers who evaluate a level of channel members and the entire channel system at the same time. Especially under the development trend of channel flatness, manufacturers have strengthened the performance evaluation of channel members in channel system, so as to facilitate carriers to decide whether to flatten channel members at certain levels.

As a matter of fact, carriers and channel members are generally organized as independent economic entities to form a marketing channel system. Therefore, in the marketing practice, the micro-level channel performance evaluation includes the performance evaluation of the channel system by the manufacturer and the performance evaluation of the channel system by the channel members.

The purpose of evaluating marketing channel performance is to adjust channel or not, and how to adjust channel decision. After evaluating the marketing channel performance, it is necessary to make an analysis of the causes of the marketing channel performance and find out the methods and ways to solve the problem.

In the paper, it makes an analysis of the current situation of COSCO SHIPPING marketing channels and introduces the modes of various channels.⁸ Taking the whole channel as the evaluation object, the performance state of the whole channel can be accurately obtained, which provides an important basis for adjusting the channel system or improving the channel efficiency.

⁸ Proceedings of 20th International Conference on Industrial Engineering and Engineering Management, 2013.

2 Evaluation principles and methods

2.1 Evaluation principles

With regards to Philip. Kotler's marketing management theory, there are three main principles to evaluate principles of marketing channel: economic principle, control principle and applicability principle.

2.2 Evaluation methods

Under complex systems, many factors need to be considered, which can be divided into different levels and categories. In order to more comprehensively distinguish the role and impact of the final evaluation of different factors, and more fully absorb the information provided by all factors, the set of factors can be divided into several categories according to certain attributes. In order to distinguish the function and influence of final evaluation of different factors, the set of factors can be divided into several categories according to certain attributes when making a comprehensive evaluation of such an object. One kind of factors is less, which first makes the comprehensive evaluation of each category, and then carry on the evaluation results of the high-level synthesis among the classes, therefore, a multi-level comprehensive evaluation model is formed.

2.3 Factors having effect on COSCO SHIPPING distribution channel

1. Logistics product factor——

In the process of channel selection in logistics enterprises, it should not only consider the logistics service capability such as transportation line, storage capacity and so on, but also consider the nature of the goods transported in order to formulate the logistics service solution. These items should be taken into account:

- 1) The size and weight of the article;
- 2) Corrosion resistance of articles ;
- 3) Level of standardization of logistics services;
- 4) Technology of service solution.

2. market factors——

- 1) Distribution of target markets;
- 2) The habit of a customer (consignor);
- 3) Sales season;
- 4) The situation of market competition.

3.Characteristics of middlemen——

All kinds of middlemen have different strength and characteristics, such as advertisement, transportation, storage, credit, training personnel and delivery frequency, which has effect on the choice of distribution channels of logistics enterprises.

4.Enterprise's own factors——

It includes corporate image and reputation, enterprise strength, desire to control distribution channels, marketing capabilities and promotion strategies, etc.

2.2.2 The methods of AHP and fuzzy comprehensive evaluation are mainly used in the paper.

A. The Analytic Hierarchy Process (hereafter referred to as “AHP”) is an effective method to determine the weight vector, which is a decision analysis method combining qualitative analysis with quantitative analysis. When dealing with complex decision-making problems, it is necessary to establish a mathematical model to abstract and simplify the actual problems, and make a systematic analysis of the practical problems. AHP divides complex problems into several ordered levels, and makes judgments based on certain objective facts, and gives quantitative expression to the relative importance of each level. In addition, the mathematical method is used to calculate the value of the relative importance order of all the elements in each level, and then the whole problem is analyzed and the solution to the problem is put forward.

AHP is used to make an analysis of the system. The general steps are:

- (1) define the problem and establish the AHP model;
- (2) construct the judgment matrix;
- (3) determine the weights.

AHP models generally include several levels. Based on the preliminary analysis of the problem, the factors included in the problem are grouped according to whether they share some characteristics or not. Each group is composed of the highest layer-the

target layer, which is the AHP for the arrangement of several Intermediate and lowest layers.

When judging the relative importance of each level, the appropriate scale should be used to express these judgments by numerical value. These numerically expressed judgment results are written in the form of a matrix to form a judgment matrix such as Table 4-1:

Table 4-1:

u_k	u_1	u_2	\cdots	u_n
u_1	u_{11}	u_{12}	\cdots	u_{1n}
u_2	u_{21}	u_{22}	\cdots	u_{2n}
\vdots	\vdots	\vdots	\vdots	\vdots
u_n	u_{n1}	u_{n2}	\cdots	u_{nn}

By judging the representation in the matrix u_{ij} , for upper-level element u_k , it's the ratio of relative importance of elements u_i to element u_j , a scale of 1~9 is used here, which is as shown in Table 4- 2:

Table 4-2 1~9 Judgment matrix scale definition

Scale	Definition
1	When the two elements are compared, it's equally important.
3	When two elements are compared, the former is slightly more important than the latter
5	When the two elements are compared, the former is obviously more important than the latter
7	When the two elements are compared, the former is more important than the latter
9	When the two elements are compared, the former is extremely important than the latter
2, 4, 6, 8	The intermediate value of the above adjacent judgment
Count backwards	When the two elements are compared, important index between the latter and the former.

In the judgment matrix, the element u_{ij} has the following relationship:

$$u_{ij} > 0; \tag{4-1}$$

$$u_{ii} = 1; \quad (4-2)$$

$$u_{ij} = \frac{1}{u_{ji}} (i, j = 1, 2, \dots, n) \quad (4-3)$$

Then the weights are determined. After the judgment matrix is obtained, the relative weights of each index need to be further calculated. In theory, the exact value of the weights of each index is the eigenvalue of the matrix A . However, in general, the weight value is an approximate estimate of matrix A . In practice, a simple summation method is usually used to calculate the approximate value of the eigenvalues of the matrix A .

① Normalize matrix A by column

$$b_{ij} = \frac{u_{ij}}{\sum_{i=1}^n u_{ij}} (i, j = 1, 2, \dots, n) \quad (4-4)$$

② To sum by line

$$v_i = \sum_j b_{ij} \quad (4-5)$$

③ Normalization

$$w_i = \frac{v_i}{\sum_{i=1}^n v_i} \quad (4-6)$$

The approximation of eigenvectors of A , $w_i (i, j = 1, 2, \dots, n)$, is obtained. It is necessary to test the accuracy and consistency of the judgment matrix after obtaining w_i . According to the principle of analytic hierarchy process (AHP), the difference between λ_{\max} and n can be used to check the consistency.

④ To solve λ_{\max}

$$\lambda_{\max} = \frac{1}{n} \sum_i \frac{(AW)_i}{W_i} \quad (4-7)$$

When the judgment is completely consistent, it should be $\lambda_{\max} = n$. The check index of define consistency is as follows:

$$CI = \frac{\lambda_{\max} - n}{n - 1} \quad (4-8)$$

When it's consistent, $CI = 0$; when it's inconsistent, there is generally $\lambda_{\max} > 0$, therefore, $CI > 0$, in general, the error of judgment increases with the increase of judgment n , as a result, the influence n that should be taken into account when judging consistency is used, the ratio of random consistency is used.,

$$CR = \frac{CI}{RI} \quad (4-9)$$

The mean consistency index is in the equation RI . The smaller the CR is, the better the consistency of the judgment matrix is. In general, when $CR \leq 0$, it can be considered that the judgment matrix basically conforms to the consistency condition and can be accepted. The average random consistency index of the judgment matrix of order 1-12 is shown in Table 4-3 below:

Table 4. Average random consistency Indexes of 1-12-order judgement Matrices

Order	1	2	3	4	5	6	7	8	9	10	11	12
<i>R.I.</i>	0.00	0.00	0.52	0.89	1.12	1.26	1.36	1.41	1.46	1.49	1.52	1.54

B The fuzzy comprehensive evaluation method is to determine the weight value of the index system after determining the weight of the index system, according to the characteristics of the index system to determine the composition method of each index, that is, the calculation method of combining the weights of the indexes at all levels into the index value of the upper layer. Fuzzy evaluation is a comprehensive evaluation method based on the principle of fuzzy relation composition, which is used to evaluate the degree of membership of things judged from many factors. Fuzzy comprehensive evaluation consists of six basic elements:

① Judgment factor domain U . U represents a set of factors in comprehensive evaluation.

② Comment rating domain V . It represents a set of comments in comprehensive evaluation. In essence, it is a division of the changing range of things under review, such as excellent, good, medium, bad, extremely bad, etc.

③ Fuzzy relation matrix R . R is the result of single factor evaluation, that is,

single factor evaluation matrix. The object of fuzzy comprehensive evaluation is exactly R ;

④ Judge factor weight vector. A It represents the relative importance of the evaluation factors in the subject, and it is used in the comprehensive evaluation for the weighted treatment;

⑤ Fuzzy operator. The fuzzy operator refers to the calculation method used by the composition and A and R , that is, the composition method;

⑥ Judge the result vector B .

As a mapping relationship from factor set U to comment set V , fuzzy relation matrix R can get a set of evaluation results B for each factor weight vector input A , as shown in figure 4 / 1:

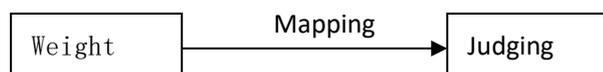


Chart 4.1 the basic model of fuzzy evaluation

The mathematical model of fuzzy comprehensive evaluation can be divided into the first-order fuzzy evaluation model and the multi-level fuzzy evaluation model. The fuzzy evaluation in this paper belongs to the multi-level fuzzy comprehensive evaluation.⁹

The mathematical model of multi-level fuzzy evaluation is illustrated by establishing the second-level evaluation model as an example.

①To determine the level of the factor. It's supposed that the set of factors to be evaluated is

$$U = \{u_1, u_2, \dots, u_i, \dots, u_m\} (i = 1, 2, \dots, m) \quad (4-10)$$

u_i is the i factor in the first level, among the highest level, and it is determined by n factor in the second level, that is,

$$U_i = \{u_{i1}, u_{i2}, \dots, u_{ij}, \dots, u_{im}\} (j = 1, 2, \dots, m) \quad (4-11)$$

②Establish weight set. According to the importance of each factor at each level, each factor is given a corresponding number of weights, and each set of weights is as follows:

The first level

$$A = \{a_1, a_2, \dots, a_i, \dots, a_m\} (i = 1, 2, \dots, n) \quad (4-12)$$

The second level

$$A_i = \{a_{i1}, a_{i2}, \dots, a_{ij}, \dots, a_{im}\} (j = 1, 2, \dots, n) \quad (4-13)$$

③ Determine alternative set V. The alternative set is a set of all kinds of evaluation results that the judge may make on the object of judgment. ¹⁰No matter what the level of judgment is, there is only one alternative set. Evaluating the description of the state of the system and its factors is an objective existence of fuzziness, which not only expresses the degree of existence of the state of the system, but also accords with people's acceptance habits and ways of understanding.

$$V = \{v_1, v_2, \dots, v_p\} (p = 1, 2, \dots) \quad (4-14)$$

From a technical point of view, the number of rating levels p is usually greater than 4 and no more than 9. On the one hand, it is difficult to judge the classification of objects because the value is too large to exceed the ability of semantic distinction, and on the other hand, too little p does not meet the quality requirements of fuzzy comprehensive evaluation. Therefore, the value of P is suitable to be moderate.

This paper adopts four levels of fuzzy expression: good, better, general and poor. It is precisely because of the definition of this domain that the fuzzy comprehensive evaluation can get a fuzzy evaluation vector. The information of the evaluated object to the degree of membership of each evaluation level is expressed through this fuzzy vector, which reflects the fuzzy characteristics of the evaluation.

④ First-level fuzzy comprehensive evaluation. Since each factor of the first level is determined by several factors of the second level (that is, the bottom level), the single factor evaluation of each factor of the first level should be the result of the multi-factor comprehensive evaluation of the bottom level to make the single factor judgment matrix R_i of the second level be:

$$R_i = \begin{bmatrix} r_{i11} & r_{i12} & \cdots & r_{i1p} \\ r_{i21} & r_{i22} & \cdots & r_{i2p} \\ \vdots & \vdots & \ddots & \vdots \\ r_{in1} & r_{in2} & \cdots & r_{inp} \end{bmatrix} \quad (4-15)$$

It is J in U_{ij} (i.e. n) that determines the number of rows in the matrix R_i . The number of columns of matrix R_i is determined by the alternative sets p . After considering the weight, the second fuzzy evaluation set, that is, the first-order fuzzy comprehensive evaluation set B_i is obtained.

$$\begin{aligned} B_i &= A_i \bullet R_i \\ &= [a_{i1}, a_{i2}, \dots, a_{in}] \bullet \begin{bmatrix} r_{i11} & r_{i12} & \cdots & r_{i1p} \\ r_{i21} & r_{i22} & \cdots & r_{i2p} \\ \vdots & \vdots & \ddots & \vdots \\ r_{in1} & r_{in2} & \cdots & r_{inp} \end{bmatrix} \\ &= [b_{i1}, b_{i2}, \dots, b_{ip}] \end{aligned} \quad (4-16)$$

⑤ Multi-level fuzzy comprehensive evaluation. No matter how many levels, it is always required to obtain the highest level, that is, the first level of comprehensive evaluation results. The first-level fuzzy comprehensive evaluation is only the result of the lowest-level comprehensive evaluation, and it is only the single-factor evaluation of the previous level. In order to continue to find out the comprehensive evaluation of the previous level, two-level fuzzy comprehensive evaluation must be carried out. Here, the first level of single-factor judgment, the matrix R_i is:

$$R_i = \begin{bmatrix} B_1 \\ B_2 \\ \vdots \\ B_m \end{bmatrix} = \begin{bmatrix} A_1 \bullet R_1 \\ A_2 \bullet R_2 \\ \vdots \\ A_m \bullet R_m \end{bmatrix} \quad (4-17)$$

Then the two-level fuzzy comprehensive evaluation set, that is, the first level fuzzy evaluation set B , is:

$$B = A \bullet R_i = A \bullet \begin{bmatrix} A_1 \bullet R_1 \\ A_2 \bullet R_2 \\ \vdots \\ A_m \bullet R_m \end{bmatrix} = (b_1, b_2, \dots, b_p) \quad (4-18)$$

In the same way, we can get three or more level judgment sets.

3 Establishment of evaluation Index system of marketing channel

Marketing channel performance determines customer value, financial performance, operation status and channel value. This paper defines the performance level of the channel from the external, internal and overall aspects, therefore, it is necessary to evaluate the overall performance of the channel from these four aspects. The performance evaluation index system of marketing channel is as shown in Table 4-4.

Table 4. 4 Performance evaluation index system of marketing channel

The first-level index	The second-level index	The third-level index
Customer value	Flexibility	Product flexibility, time flexibility, quantity flexibility
	reliability	Loss of sales percentage, on-time delivery rate, customer complaint rate
Financial Performance	price	Year-on-year average price advantage, average unit sales rate
	quality	Return ratio, customer complaint time
Channel operation status	Sales	Sales, market penetration, sales trend
	market share	Total market share, up to market share, relative market share
Channel value	Channel cost	Direct personnel costs, circulation costs, administrative costs
	Profitability	Profit margin on sales, profit margin on expenses, return on net assets
Channel operation status	Asset	Capital turnover rate, stock turnover
	management	Shipping turnover speed, payment recovery rate
Channel value	efficiency	Market coverage
	Channel accessibility	Average delivery volume, average delivery interval, average daily retail volume, average merchandise circulation time
Channel operation status	Channel coverage	Consistency of roles, consistency of views, no differences in decision-making power, consistency of members' goals, effective communication, and rational allocation of resources
	Channel circulation	Physical facilities, equipment, staff and transportation facilities
Channel operation status	capacity and utilization rate	Reputation, competitiveness, capacity to develop
	Channel conflict	

4 Construction of marketing channel evaluation model

(1) To determine factor set

As shown in Table 4 / 3, the COSCO SHIPPING marketing channel evaluation system is a completely independent structure, the upper level of the indexes have independent, completely different lower-level indexes.

With regards to the criterion of hierarchy theory, the channel performance is

regarded as the target layer, the first index as the criterion layer, the second level as the index layer, and the third grade as the refinement index layer. It's to set the performance of marketing channel as U , and establish the weight structure diagram of marketing channel evaluation. Because the number of three-level indexes is so large that the representation in the graph is difficult to achieve, I draw only the target layer, criterion layer, and index layer in the diagram.

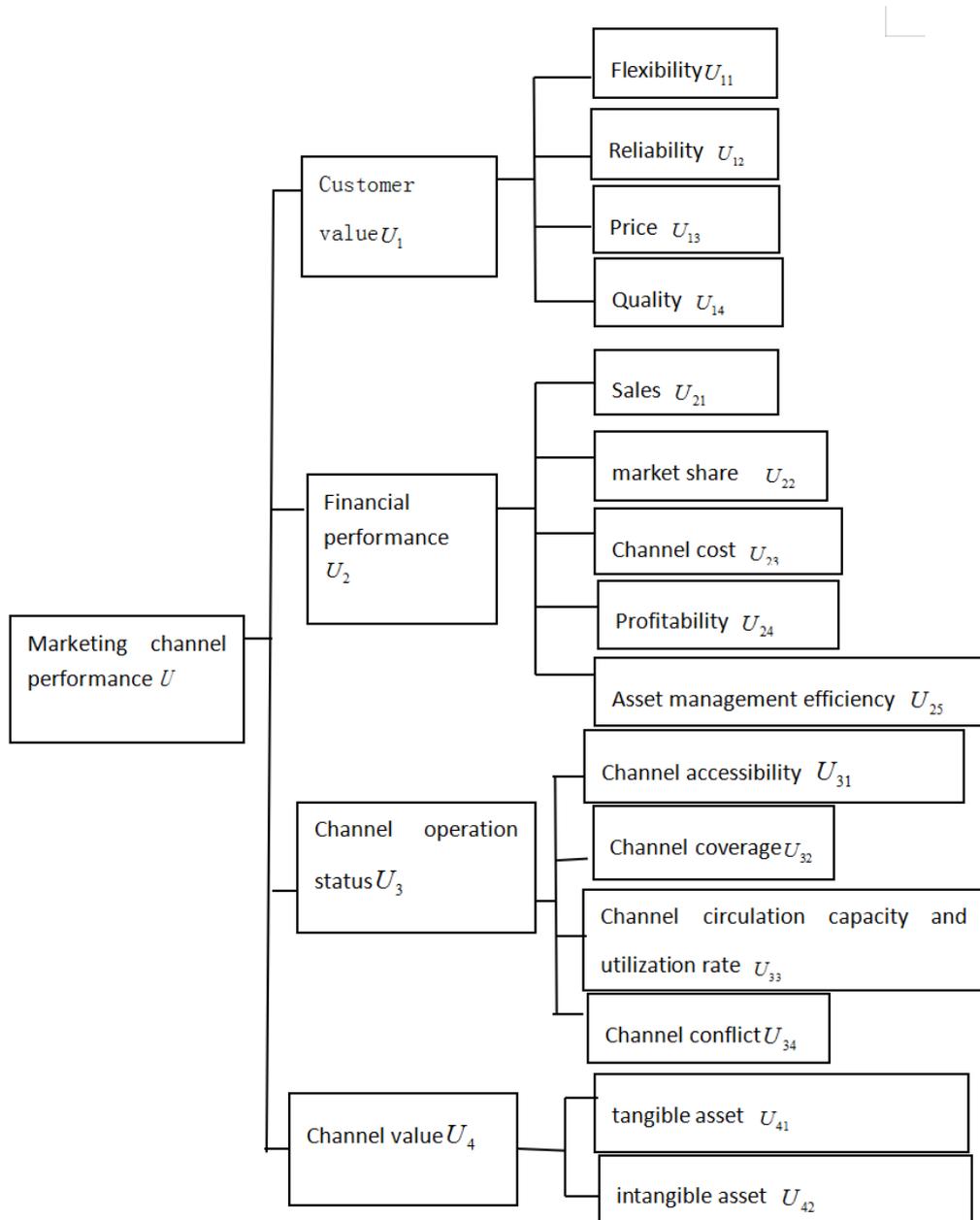


Chart 4.2 Evaluation hierarchy of marketing channel

To divide factor domain U into four disjoint subsets (customer value, financial performance, channel situation and channel value), that is, $U = \bigcup_{i=1}^n U_i$, and $U_i \cap U_j = \Phi (i \neq j)$, called $U = U_i, (i=1,2,3,4)$ as the first-level index set; Each first-level index is reclassified, to make $U_j = (U_{ij})$, $(i; j = (j_1, j_2, j_3, j_4)^T)$ called the second-level index set;

In which $j_1 = (1,2,3,4), j_2 = (1,2,3,4,5), j_3 = (1,2,3,4), j_4 = (1,2)$; And then divide each second-level index. $U_i = \bigcup_{j=1}^m U_j$, and $U_j \cap U_h = \Phi (j \neq h)$, make $U_h = (U_{ijh}), (i; j; h)$ call a three-level index set.

(2 To establish the weights of each index layer

1 To determine the weights of the first-level index layer

In accordance with the comparison of each index of U_i layer according to the U layer, the judgment matrix is constructed according to the scale of Table 4-2, and the judgment matrix is obtained.

$$\begin{array}{c|cccc}
 U \rightarrow U_i & U_1 & U_2 & U_3 & U_4 \\
 \hline
 U_1 & 1 & 3 & 2 & 4 \\
 U_2 & 1/3 & 1 & 1/2 & 2 \\
 U_3 & 1/2 & 2 & 1 & 3 \\
 U_4 & 1/4 & 1/2 & 1/3 & 1
 \end{array} \quad (4-19)$$

By using the sum method to calculate the weights, the elements of U_i are normalized by columns, and the following results are obtained:

$$U_i \rightarrow \begin{bmatrix} 0.48 & 0.46 & 0.52 & 0.40 \\ 0.16 & 0.15 & 0.13 & 0.20 \\ 0.24 & 0.31 & 0.26 & 0.30 \\ 0.12 & 0.08 & 0.09 & 0.10 \end{bmatrix} \quad (4-20)$$

To add up the normalized columns, it can be obtained:

$$U_i \rightarrow \begin{bmatrix} 1.86 \\ 0.64 \\ 1.11 \\ 0.39 \end{bmatrix} \quad (4-21)$$

Then normalize the resulting vector to obtain the weight:

$$W_i = (0.46 \ 0.16 \ 0.28 \ 0.10)^T \quad (4-22)$$

By the formula $\lambda_{\max} = \frac{1}{n} \sum_i \frac{(AW)_i}{W_i}$ to calculate eigenvalues, it's obtained:

$$UW = \begin{bmatrix} 1 & 3 & 2 & 4 \\ 1/3 & 1 & 1/2 & 2 \\ 1/2 & 2 & 1 & 3 \\ 1/4 & 1/2 & 1/3 & 1 \end{bmatrix} \begin{bmatrix} 0.46 \\ 0.16 \\ 0.28 \\ 0.10 \end{bmatrix} = \begin{bmatrix} 1.90 \\ 0.71 \\ 1.13 \\ 0.39 \end{bmatrix} \quad (4-23)$$

$$\lambda_{\max} = \frac{1}{4} \left(\frac{1.9}{0.46} + \frac{0.71}{0.16} + \frac{1.13}{0.28} + \frac{0.39}{0.10} \right) = 4.13 \quad (4-24)$$

By the formula, $C.I. = \frac{\lambda_{\max} - n}{n-1}$, it can obtain :

$$C.I. = \frac{4.13 - 4}{4 - 1} = 0.043 \quad (4-25)$$

By checking the table, when $n=4, RI=0.89$ then:

$$C.R. = \frac{C.I.}{R.I.} = \frac{0.043}{0.89} = 0.048 < 0.1 \quad (4-26)$$

That is, consistency check passed, the weights of the first layer of indexes is Table 4-5.

Table 4 - 5 Index weights of the first layer

Index	U_1	U_2	U_3	U_4
Weight	0.46	0.16	0.28	0.10

2 To determine the weight of the second-level index layer

Customer value index set calculation. Customer value includes flexibility U_{11} , reliability U_{12} , price U_{13} , quality U_{14} .

Table 4- 6 Index layer weights for customer value

$U_1 \rightarrow U_{1j}$	U_{11}	U_{12}	U_{13}	U_{14}	W_{1j}	λ_{\max}	$C.R.$
U_{11}	1	1/2	1/2	1/3	0.12		
U_{12}	2	1	1/3	1/5	0.14	4.18	0.069
U_{13}	2	3	1	1/2	0.27		
U_{14}	3	5	2	1	0.48		

Financial performance index set calculation. Financial performance includes sales

(U_{21}) , market share (U_{22}) , channel cost (U_{23}) , profitability (U_{24}) , asset management efficiency (U_{25}) .

Table 4 - 7 index layer weights for financial performance

$U_2 \rightarrow U_{2j}$	U_{21}	U_{22}	U_{23}	U_{24}	U_{25}	W_{2j}	λ_{\max}	$C.R.$
U_{21}	1	1/2	2	1/3	3	0.17		
U_{22}	2	1	3	1/2	2	0.24		
U_{23}	1/2	1/3	1	1/3	1	0.09	5.13	0.03
U_{24}	3	2	3	1	5	0.41		
U_{25}	1/3	1/2	1	1/5	1	0.09		

Calculation of channel running status Index set. Channel operational status includes channel availability (U_{31}) 、channel coverage (U_{32}) 、capacity and utilization rate of channel circulation (U_{33}) 、channel conflict (U_{34}) 。

Table 4 -8 index layer weights for channel operation status

$U_3 \rightarrow U_{3j}$	U_{31}	U_{32}	U_{33}	U_{34}	W_{3j}	λ_{\max}	$C.R.$
U_{31}	1	3	1	1/2	0.24		
U_{32}	1/3	1	1/3	1/3	0.10	4.06	0.023
U_{33}	1	3	1	1/2	0.24		
U_{34}	2	3	2	1	0.41		

Calculation of channel value index set. Channel value includes tangible assets (U_{41}) 、Intangible assets (U_{42}) 。

Table 4 -9 Index layer weights for channel value

$U_4 \rightarrow U_{4j}$	U_{41}	U_{42}	W_{4j}	λ_{\max}	$C.R.$
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U_{41}	1	1/2	0.34	none	none
U_{42}	2	1	0.66		

3 To determine the weight of three-level index layer

Calculation of flexible index set .Flexibility includes product flexibility (U_{111}) 、
time flexibility (U_{112}) 、 quantity flexibility (U_{113}) 。

Table 4 - 10 flexible index layer weights

$U_{11} \rightarrow U_{11h}$	U_{111}	U_{112}	U_{113}	W_{11h}	λ_{\max}	CR
U_{111}	1	3	2	0.55		
U_{112}	1/3	1	1	0.21	3.02	0.02
U_{113}	1/2	1	1	0.24		

Calculation of reliability index set. Reliability includes loss of sales percentage (U_{121}) 、 on-time delivery rate (U_{122}) 、 customer complaint rate (U_{123}) 。

Table 4 -11 index layer weights for reliability

$U_{12} \rightarrow U_{12h}$	U_{121}	U_{122}	U_{123}	W_{12h}	λ_{\max}	CR
U_{121}	1	5	3	0.65		
U_{122}	1/5	1	1/2	0.12	3.0037	0.004
U_{123}	1/3	2	1	0.23		

Calculation of price Index set. The price includes year-on-year average price advantage (U_{131}) 、 promotion rate of average individual product (U_{132}) 。

Table 4 -12 Weight of price Index layer

$U_{13} \rightarrow U_{13h}$	U_{131}	U_{132}	W_{13h}	λ_{\max}	CR
U_{131}	1	1/3	0.25	none	none

U_{132}	3	1	0.75
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Calculation of quality Index set. Quality including return ratio (U_{141})、customer complaining time (U_{142})。

Table 4 -13 weight of the quality index layer

$U_{14} \rightarrow U_{14h}$	U_{141}	U_{142}	W_{14h}	λ_{\max}	CR
U_{141}	1	2	0.66	none	none
U_{142}	1/2	1	0.34		

Calculation of sales index set. Sales include sales volume (U_{211})、market permeability (U_{212})、sales trend (W_{21h})。

Table 4- 14 weights for the sales metrics layer

$U_{21} \rightarrow U_{21h}$	U_{211}	U_{212}	U_{213}	W_{21h}	λ_{\max}	CR
U_{211}	1	4	3	0.63		
U_{212}	1/4	1	1	0.17	3.0092	0.01
U_{213}	1/3	1	1	0.20		

Calculation of index set of market share. Market share includes all market share (U_{221})、reachable market share (U_{222})、relative market share (U_{223})。

Table 4-15 weights for the market share index layer

$U_{22} \rightarrow U_{22h}$	U_{221}	U_{222}	U_{223}	W_{22h}	λ_{\max}	CR
U_{221}	1	5	3	0.65		
U_{222}	1/5	1	1/2	0.12	3.0037	0.0036
U_{223}	1/3	2	1	0.23		

The calculation of channel cost index set. Channel costs include direct personnel costs (U_{231})、circulation cost (U_{232})、management costs (U_{233})。

Table 4 - 16 weights at the channel cost index layer

$U_{23} \rightarrow U_{23h}$	U_{231}	U_{232}	U_{233}	W_{23h}	λ_{\max}	CR
U_{231}	1	1/2	1/3	0.16		
U_{232}	2	1	1/2	0.30	3.0092	0.01
U_{233}	3	2	1	0.54		

Calculation of profitability index set. Profitability includes sales expense (U_{241})、expense profit margin (U_{242})、net worth (U_{243})。

Table 4 -17 weight of profitability index layer

$U_{24} \rightarrow U_{24h}$	U_{241}	U_{242}	U_{243}	W_{23h}	λ_{\max}	CR
U_{241}	1	3	1	0.44		
U_{242}	1/3	1	1/2	0.17	3.018	0.02
U_{243}	1	2	1	0.39		

Calculation of asset management efficiency Index set. Asset management efficiency including fund turnover (U_{251})、stock turnover (U_{252})。

Table 4 - 18 weights for the asset management efficiency index layer

$U_{25} \rightarrow U_{25h}$	U_{251}	U_{252}	W_{25h}	λ_{\max}	CR
U_{251}	1	4	0.80	none	none
U_{252}	1/4	1	0.20		

Calculation of channel availability index set. Channel availability includes commodity turnover speed (U_{311})、payment recovery rate (U_{312})。

Table 4 - 19 weights for channel availability metric layer

$U_{31} \rightarrow U_{31h}$	U_{311}	U_{312}	W_{31h}	λ_{\max}	CR
U_{311}	1	1/3	0.25	none	none
U_{312}	3	1	0.75		

Calculation of channel coverage Index set. Channel coverage includes market coverage (U_{321})、market coverage (U_{322})。

Table 4- 20 weight of channel coverage index layer

$U_{32} \rightarrow U_{32h}$	U_{321}	U_{322}	W_{32h}	λ_{\max}	CR
U_{321}	1	2	0.66	none	none
U_{322}	1/2	1	0.34		

Calculation of the Index set of channel circulation capacity and utilization ratio. Channel circulation capacity and utilization rate includes average delivery batch (U_{331}), average delivery interval (U_{332}), average daily retail sales (U_{333}), average commodity circulation time (U_{334}).

Table 4-21 weights of the channel circulation capacity Index layer

$U_{33} \rightarrow U_{33h}$	U_{331}	U_{332}	U_{333}	U_{334}	W_{33h}	λ_{\max}	CR
U_{331}	1	3	1/3	2	0.27		
U_{332}	1/3	1	1/2	1	0.15	4.200	0.075
U_{333}	3	2	1	3	0.45		
U_{334}	1/2	1	1/3	1	0.13		

Calculation of channel conflict Index set. Channel conflicts include role consistency (U_{341}), consistency of point of view (U_{342}), no differences in decision-making power (U_{343}), consistency of member goals (U_{344}), effective communication (U_{345}), rational allocation of resources (U_{346}).

Table 4 - 22 weights for channel conflict index layer

$U_{34} \rightarrow U_{34h}$	U_{341}	U_{342}	U_{343}	U_{344}	U_{345}	U_{346}	W_{34h}	λ_{\max}	CR
U_{341}	1	3	1/3	1/5	1/4	1/2	0.08		
U_{342}	1/3	1	1/4	1/6	1/2	1/3	0.05		
U_{343}	3	4	1	1	2	1	0.24	6.26	0.04
U_{344}	5	6	1	1	2	2	0.30		
U_{345}	4	2	1/2	1/2	1	1	0.16		
U_{346}	2	3	1	1/2	1	1	0.17		

The calculation of the index set of tangible assets. Tangible assets including physical facilities (U_{411}), device (U_{412}), staff and transport facilities (U_{413}).

Table 4 -23 weights for the tangible assets index layer

$U_{41} \rightarrow U_{41h}$	U_{411}	U_{412}	U_{413}	W_{41h}	λ_{\max}	CR
U_{411}	1	2	1/3	0.25	3.054	0.05
U_{412}	1/2	1	1/3	0.16		
U_{413}	3	3	1	0.59		

The calculation of the index set of intangible assets. Intangible assets includes reputation (U_{421})、competitive ability (U_{422})、development ability (U_{423}) .

Table 4 - 24 weights for the intangible assets index layer

$U_{42} \rightarrow U_{42h}$	U_{421}	U_{422}	U_{423}	W_{42h}	λ_{\max}	CR
U_{421}	1	2	3	0.55	3.018	0.02
U_{422}	1/2	1	1	0.24		
U_{423}	1/3	1	1	0.21		

As the number of COSC channel evaluation indexes is numerous, with quantitative indexes and qualitative indexes, it is difficult to establish a unified standard. Moreover, due to the imbalance of the development level of enterprises in the same industry, there is no reference standard for the quantitative index and the evaluation of the progress quantity of its superiority and inferiority. Therefore, this paper adopts the expert scoring method.

The expert scoring method is also a qualitative and quantitative method, which first selects several evaluation items according to the specific requirements of the evaluation object, and then formulates the evaluation criteria according to the evaluation items. Based on their own experience, some representative experts are employed to give the evaluation scores of each item according to the evaluation criteria, and then summarize them. The expert scoring method is simple, intuitive, concise, and has a large choice. Both the evaluation items that can be quantitatively calculated and the evaluation items that cannot be calculated are taken into account.

This paper invites six people who have been engaged in shipping marketing and management in COSCO SHIPPING for more than ten years as representative experts, including 4 regional managers and 2 excellent business representatives. With its

reference to and familiarity with the marketing knowledge of shipping industry, its viewpoint is also very representative and practically significant

In view of the limitation of human judgment, this paper divides the evaluation hierarchy into four levels and assigns values to the corresponding elements, that is, $V = \{\text{good, better, general, difference}\} = (1.0, 0.7, 0.4, 0.1)$. The professor's score results are listed in Table 4-6.

Table 4 - 25 Statistics of scoring results by experts

Evaluation results Evaluation project	Evaluation grade			
	Good (1.0)	Better (0.7)	General (0.4)	worse (0.1)
CU_{111}	1	4	1	0
Time flexibility U_{112}	3	2	1	0
Quantity flexibility U_{113}	6	0	0	0
Lost of sales percentage U_{121}	4	1	1	0
On-time delivery rate U_{122}	0	3	2	1
Customer complaint rate U_{123}	0	2	3	1
Year-on-year average price advantage U_{131}	2	4	0	0
Average item promotion rate U_{132}	0	5	1	0
Return ratio U_{141}	5	1	0	0
Customer complaining time U_{142}	4	1	1	0
Sales volume U_{211}	5	1	0	0
Market penetration U_{212}	4	2	0	0
Sales trend U_{213}	6	0	0	0
Total market share U_{221}	2	2	1	1
Reachable market share U_{222}	1	3	1	1
Relative market share U_{223}	2	3	1	0
Direct staff cost U_{231}	1	1	3	1

Circulation fee U_{232}	2	2	2	0
Management costs U_{233}	2	2	2	0
sales profit ratio U_{241}	0	2	3	1
Cost profit margin U_{242}	1	3	1	1
Return on net assets U_{243}	1	2	2	1

Continuation Table 4 - 25

Evaluation results Evaluation project	Evaluation grade			
	Good (1.0)	Better (0.7)	General (0.4)	worse (0.1)
Capital turnover rate U_{251}	2	3	1	0
stock turnover U_{252}	3	2	1	0
Commodity turnover speed U_{311}	4	1	1	0
Payment recovery rate U_{312}	1	3	1	1
Market coverage U_{321}	6	0	0	0
Market coverage U_{322}	4	2	0	0
Average delivery batch U_{331}	3	3	0	0
Average delivery interval U_{332}	3	3	0	0
Average daily retail sales U_{333}	2	3	1	0
Average commodity circulation time U_{334}	4	2	0	0
Role consistency U_{341}	2	3	1	0
Consistency of view of point U_{342}	3	1	2	0
no differences in decision-making power U_{343}	5	1	0	0
Consistent membership goals U_{344}	0	0	6	0
effective communication U_{345}	2	3	1	0
Rational allocation of resources U_{346}	0	5	1	0

Tangible facility U_{411}	1	5	0	0
Device U_{412}	1	4	1	0
Staff and transportation U_{413}	1	3	2	0
Reputation U_{421}	5	1	0	0
Competitive ability U_{422}	4	2	0	0
Development ability U_{423}	4	2	0	0

4 Establish membership relation and fuzzy evaluation matrix

The index system is a third-level index, based on which the corresponding fuzzy evaluation matrix of each factor in the second level is constructed. The degree of membership of U_{ijh} to a is evaluated the degree of membership $R_{ie} (i = 1, 2, L, n; e = 1, 2, L, f)$ according to the grade of the evaluation set $V = (V_1, V_2, L, V_e)$ for each factor U_{ijh} of the third grade index to V_e , which forms the evaluation matrix R_{ij} of each factor of the second grade index.

$$R_{ij} = \begin{bmatrix} R_{i1} & L & R_{ie} \\ M & M & M \\ R_{i1} & L & R_{ie} \end{bmatrix} \quad (4-27)$$

R_{ij} is the representation of the fuzzy matrix corresponding to the third level subset factor under the factor of layer 2. i represents the number of factors corresponding to the lower level 3 indexes of the second level indexes and e represents the grade series of performance appraisal, in which $R_{ie} (i = 1, 2, L, n; e = 1, 2, L, f)$. Indicating the degree of subordination of a level f comment on the i evaluation index. That is, after hiring experts to score, the evaluation results are counted, which obtains V_{ie} V_e -level comments on the i evaluation index, and

$$R_{ie} = V_{ie} / H \quad (H \text{ is the number of experts})$$

According to the results of expert scores in Table 4 - 6, the following results can be obtained:

(1)Customer value index set

①Flexible evaluation moment

$$R_{11} = \begin{bmatrix} 0.17 & 0.66 & 0.17 & 0.00 \\ 0.50 & 0.33 & 0.17 & 0.00 \\ 1.00 & 0.00 & 0.00 & 0.00 \end{bmatrix}$$

②Reliability evaluation matrix

$$R_{12} = \begin{bmatrix} 0.66 & 0.17 & 0.17 & 0.00 \\ 0.00 & 0.50 & 0.33 & 0.17 \\ 0.00 & 0.33 & 0.50 & 0.17 \end{bmatrix}$$

③Price evaluation matrix

$$R_{13} = \begin{bmatrix} 0.33 & 0.67 & 0.00 & 0.00 \\ 0.00 & 0.83 & 0.17 & 0.00 \end{bmatrix}$$

④Quality evaluation matrix

$$R_{14} = \begin{bmatrix} 0.83 & 0.17 & 0.00 & 0.00 \\ 0.66 & 0.17 & 0.17 & 0.00 \end{bmatrix}$$

(2)Financial performance index set

①Sales evaluation matrix

$$R_{21} = \begin{bmatrix} 0.83 & 0.17 & 0.00 & 0.00 \\ 0.67 & 0.33 & 0.00 & 0.00 \\ 1.00 & 0.00 & 0.00 & 0.00 \end{bmatrix}$$

②Market share evaluation matrix

$$R_{22} = \begin{bmatrix} 0.33 & 0.33 & 0.17 & 0.17 \\ 0.17 & 0.49 & 0.17 & 0.17 \\ 0.33 & 0.50 & 0.17 & 0.00 \end{bmatrix}$$

③Channel cost evaluation matrix

$$R_{23} = \begin{bmatrix} 0.17 & 0.17 & 0.49 & 0.17 \\ 0.33 & 0.33 & 0.33 & 0.01 \\ 0.33 & 0.33 & 0.33 & 0.01 \end{bmatrix}$$

④Profitability evaluation matrix

$$R_{24} = \begin{bmatrix} 0.00 & 0.33 & 0.50 & 0.17 \\ 0.17 & 0.49 & 0.17 & 0.17 \\ 0.17 & 0.33 & 0.33 & 0.17 \end{bmatrix}$$

⑤ Asset management efficiency evaluation matrix

$$R_{25} = \begin{bmatrix} 0.33 & 0.50 & 0.17 & 0.00 \\ 0.50 & 0.33 & 0.17 & 0.00 \end{bmatrix}$$

Status of channel operation

① Channel availability evaluation matrix

$$R_{31} = \begin{bmatrix} 0.66 & 0.17 & 0.17 & 0.00 \\ 0.17 & 0.49 & 0.17 & 0.17 \end{bmatrix}$$

② Channel coverage evaluation matrix

$$R_{32} = \begin{bmatrix} 1.00 & 0.00 & 0.00 & 0.00 \\ 0.83 & 0.17 & 0.00 & 0.00 \end{bmatrix}$$

③ Evaluation matrix of channel circulation capacity and utilization ratio

$$R_{33} = \begin{bmatrix} 0.50 & 0.50 & 0.00 & 0.00 \\ 0.50 & 0.50 & 0.00 & 0.00 \\ 0.33 & 0.50 & 0.17 & 0.00 \\ 0.67 & 0.33 & 0.00 & 0.00 \end{bmatrix}$$

④ Channel conflict evaluation matrix

$$R_{34} = \begin{bmatrix} 0.33 & 0.50 & 0.17 & 0.00 \\ 0.50 & 0.17 & 0.33 & 0.00 \\ 0.83 & 0.17 & 0.00 & 0.00 \\ 0.00 & 0.00 & 1.00 & 0.00 \\ 0.33 & 0.50 & 0.17 & 0.00 \\ 0.00 & 0.83 & 0.17 & 0.00 \end{bmatrix}$$

Channel value index set

① Tangible assets evaluation matrix

$$R_{42} = \begin{bmatrix} 0.17 & 0.83 & 0.00 & 0.00 \\ 0.17 & 0.66 & 0.17 & 0.00 \\ 0.17 & 0.50 & 0.33 & 0.00 \end{bmatrix}$$

② Intangible assets evaluation matrix

$$R_{42} = \begin{bmatrix} 0.83 & 0.17 & 0.00 & 0.00 \\ 0.67 & 0.33 & 0.00 & 0.00 \\ 0.67 & 0.33 & 0.00 & 0.00 \end{bmatrix}$$

5 To determine fuzzy subset vector

It takes advantage of third-level index set univariate evaluation matrix R_{ij} of and weight vector of $U_{ij} = (U_{ijk})$ to make a fuzzy comprehensive evaluation and the fuzzy comprehensive evaluation vector of the third grade index is obtained, and the normalization processing is carried out, then it's obtained third-level index membership degree by $B_{ij} = A_{ij} \bullet R_{ij}$ and obtain second-level index membership degree by

$$B_i = A_i \bullet \begin{bmatrix} B_{11} \\ \vdots \\ B_{ij} \end{bmatrix}, \text{ The calculations are as follows:}$$

(1) Membership degree of customer value subset

$$(2) B_{11} = A_{11} \bullet R_{11}$$

$$= (0.55, 0.21, 0.24) \bullet \begin{bmatrix} 0.17 & 0.66 & 0.17 & 0.00 \\ 0.50 & 0.33 & 0.17 & 0.00 \\ 1.00 & 0.00 & 0.00 & 0.00 \end{bmatrix} = (0.44, 0.43, 0.13, 0.00) \quad (4-28)$$

In like manner

$$B_{12} = (0.43, 0.25, 0.26, 0.06)$$

$$B_{13} = (0.08, 0.79, 0.13, 0.00)$$

$$B_{14} = (0.77, 0.17, 0.06, 0.00)$$

$$B_1 = A_1 \bullet \begin{bmatrix} B_{11} \\ B_{12} \\ B_{13} \\ B_{14} \end{bmatrix}$$

$$= (0.12, 0.14, 0.27, 0.48) \bullet \begin{bmatrix} 0.44, 0.43, 0.13, 0.00 \\ 0.43, 0.25, 0.26, 0.06 \\ 0.08, 0.79, 0.13, 0.00 \\ 0.77, 0.17, 0.06, 0.00 \end{bmatrix} = (0.50, 0.38, 0.11, 0.01) \quad (4-29)$$

(3) Membership degree of financial performance subset

$$(4) B_{21} = (0.64, 0.36, 0.00, 0.00)$$

$$B_{22} = (0.31, 0.39, 0.17, 0.13)$$

$$B_{23} = (0.30, 0.30, 0.36, 0.04)$$

$$B_{24} = (0.09, 0.36, 0.38, 0.17)$$

$$B_{25} = (0.36, 0.47, 0.17, 0.00)$$

$$B_2 = (0.17, 0.24, 0.09, 0.41, 0.09) \bullet \begin{bmatrix} 0.64, 0.36, 0.00, 0.00 \\ 0.31, 0.39, 0.17, 0.13 \\ 0.30, 0.30, 0.36, 0.04 \\ 0.09, 0.36, 0.38, 0.17 \\ 0.36, 0.47, 0.17, 0.00 \end{bmatrix} = (0.28, 0.34, 0.24, 0.14) \quad (4-30)$$

(3) Membership degree of subset of channel operation state

$$(4) B_{31} = (0.29, 0.41, 0.17, 0.13)$$

$$B_{32} = (0.94, 0.06, 0.00, 0.00)$$

$$B_{33} = (0.45, 0.48, 0.07, 0.00)$$

$$B_3 = (0.24, 0.10, 0.41, 0.34) \begin{bmatrix} 0.29, 0.41, 0.17, 0.13 \\ 0.94, 0.06, 0.00, 0.00 \\ 0.45, 0.48, 0.07, 0.00 \\ 0.30, 0.31, 0.39, 0.00 \end{bmatrix} = (0.45, 0.32, 0.20, 0.03) \quad (4-31)$$

(5) Membership degree of subset of channel value

$$(6) B_{41} = (0.17, 0.61, 0.22, 0.00)$$

$$B_{42} = (0.76, 0.24, 0.00, 0.00)$$

$$B_4 = (0.34, 0.66) \begin{bmatrix} 0.17, 0.61, 0.22, 0.00 \\ 0.76, 0.24, 0.00, 0.00 \end{bmatrix} = (0.56, 0.37, 0.07, 0.00) \quad (4-32)$$

Finally, the single factor evaluation matrix R and weight vector A of the first level index $U = U_i$ are calculated to make fuzzy comprehensive evaluation. The first-level index B is obtained and normalized:

$$B = A \bullet R$$

$$= (0.46, 0.16, 0.28, 0.10) \bullet \begin{bmatrix} 0.50, 0.38, 0.11, 0.01 \\ 0.28, 0.34, 0.24, 0.14 \\ 0.45, 0.32, 0.20, 0.03 \\ 0.56, 0.37, 0.07, 0.00 \end{bmatrix} = (0.46, 0.36, 0.15, 0.03) \quad (4-33)$$

6. Integrated assessment value

To quantize $c_j = \{1.0, 0.7, 0.4, 0.1\}$ the levels in the collection $V = \{\text{good, better, general, bad}\}$ and the overall evaluation value is:

$$C = \sum_{j=1}^4 b_j c_j = 0.46 \times 1.0 + 0.36 \times 0.7 + 0.15 \times 0.4 + 0.03 \times 0.1 = 0.775 \quad (4-34)$$

It can be concluded that the overall performance score of container liner marketing channel of COSCO SHIPPING is 0.775 between "good" and "better".

7 Evaluation result analysis

With regards to the comprehensive evaluation in the previous section, it is worth to conclude that the performance of COSCO SHIPPING marketing channel is between "good" and "better", and tends to be "better", which indicates that the COSCO SHIPPING marketing channel still needs to be further improved.

If the score of each index in the index system is less than 0.775, it is considered that there is a big problem in this respect, which needs to be further improved.

The degree of membership of the first order finger is also reduced to $c_j = \{1.0, 0.7, 0.4, 0.1\}$ according to the equal order of magnitude. Then it can get the score of the first level index, as shown in Table 4-27.

Table 4-27 Score for first-level index

First-level index	Score
Customer value	0.811
Financial Performance	0.628
Channel operation status	0.757
Channel value	0.847

In the first-level index, the financial performance score is 0.628, and the channel operation state score is 0.757, which is lower than the comprehensive evaluation value. Therefore, there are many problems in both the financial performance and the channel operation state.

The degree of membership of the second order finger is also reduced to

$c_j = \{1.0, 0.7, 0.4, 0.1\}$, then it can get the score of the second-level index, as shown in Table 4-28.

Table 4-28 Score for first-level index

Second-level index	Score
Flexibility	0.845
reliability	0.715
price	0.685
quality	0.895
Sales	0.892
market share	0.664
Channel cost	0.658
Profitability	0.508
Asset management efficiency	0.757
Channel accessibility	0.658
Channel coverage	0.982
Channel circulation capacity and utilization rate	0.814
Channel conflict	0.673
tangible asset	0.685
Intangible assets	0.928

In the second level index, the reliability score is 0.715, the price score is 0.685, the market share is 0.664, the channel cost score is 0.658, the profitability score is 0.508, and the asset management efficiency score is 0.757, The channel availability score is 0.658, the channel conflict score is 0.673, and the tangible asset score is 0.68, which is less than the comprehensive evaluation value.

On the basis of the above indexes, it' to identify the influencing factors and find out where the problem lies, which is as shown in Table 4-29.

Table4-29 Analysis on the influencing factors of marketing channel performance and its adjustment content

Factors in channel design	Factors in channel management	
	Process problem	Member problem
Length suitability	Commercial flow problem √	Select a member
Wide and narrow suitability	Logistics problem	Motivating member √
General suitability	Money flow problem √	Evaluating member √
System suitability	Information flow problem √	Adjusting members √
	Promotion flow problem √	

Note: any√ means the factor of the existing problem.

The reasons for the main problems in the table above can be further summarized

into five areas:

- (1)Customer relationship instability;
- (2)Lack of effective communication among channel members;
- (3)The price rebate of shipping products is not scientific;
- (4)The salesperson of shipping enterprise does not give full play to its ability;
- (5)The management mechanism of channel conflict is not perfect.

In view of the above problems, this paper will put forward the countermeasures and suggestions to solve the problems in the next chapter.

V Countermeasure and advice

5.1 Adoption of new technology

To improve the transportation quality and reduce the damage rate of goods, the customers' confidence in service quality and sense of security can be enhanced. The information construction will be strengthened, the logistics information will be reflected to the headquarters quickly and accurately, and the coverage of logistics information network will be wider. To establish an information platform can continuously improve the speed of market changes in order to improve the quality of service.

5.2 Strategic partners

To ensure that old customers add new customers.

For those old customers to establish a long-term cooperative relationship with them, to solve them as soon as possible with the suggestions and questions they put forward, some small gifts can be sent on holidays, which will be more beneficial to the old customers

To actively find new customers, do a lot of publicity for the company, and attract a number of new customers.

5.3 Sino-foreign cooperation

To extend to the major countries, develop greater international logistics, and strive to establish long-term cooperation with large international companies. In terms of transportation, we should ensure the safety of the goods and assure the customers to choose our company

5.4 To improve the quality of information on which financial analysis is based

Raising awareness of the importance of financial analysis

Establishing a scientific financial analysis system

5.5 Channel adjustment

After the assessment, if it is found that there is a gap between the existing channel model and the requirements of the market environment, appropriate adjustments should be made to the channel to adapt to the new changes in the market. For example, when

the purchase mode of consumers changes, the market expands, new competitors emerge and innovative distribution strategies emerge, and products enter the later stage of the product life cycle, which is necessary to improve the channels.

A、 There are three levels of channel improvement

(1) Increase or decrease individual channel members (usually incremental analysis)

(2) Increase or decrease certain specific market channels

(3) It is the most difficult decision to create a new way to sell its products in all markets (that is, to improve the overall channel strategy). These decisions will not only change the channel system, but will also force changes in the marketing mix and marketing policies. Such decisions are complex, and any related quantitative model can only help managers to arrive at the best estimates.

B、 Channel adjustment program

(1) To find out the cause of adjustment;

(2) To determine the target of channel adjustment;

(3) to clarify the magnitude of the adjustment;

(4) To choose how to adjust.

5.6 Strategy development and infiltration.

In the new distribution channel, logistics enterprises open the channel by building their own marketing points or attracting middlemen. If the desired channel has been controlled by the opponent, they can infiltrate the channel and constantly squeeze the channel of the opponent.

5.7 Strategy consolidating.

In order to prevent competitors from infiltrating, logistics enterprises use industrial and commercial companies, franchising and other ways to consolidate existing channels.

5.8 Strategy expanding.

It includes intensive expansion, specialized expansion and comprehensive expansion. Expanding the sales service point from the quantity is the intensive expansion strategy; by increasing the occupation rate of a professional market and

strengthening its control, it is called specialized expansion strategy or monopoly strategy, and the comprehensive expansion strategy is the strategy used by the two aspects.

COSCO SHIPPING Logistics Company is a market leader, committed to providing modern logistics, public freight and other services to both domestic and foreign customers. Our aim is to form a fully functional logistics network company and be the strongest logistics service provider and the best shipping agent.

VI Summary and prospect

The scale and strength of COSCO SHIPPING Logistics Company is in the leading position in the market. It is committed to providing modern logistics and public freight forwarding to ever bright customers at home and abroad, and has formed a fully functional domestic / international logistics network company to "be the strongest logistics service provider." Be the best shipping agent for the goal.

Through the research on the shipping products and services provided by COSCO SHIPPING to customers, as well as the investigation of different marketing methods and channels between container liner companies and general industrial enterprises, we understand the development stage of the marketing of existing container liner companies. Thus, it is concluded that shipping products have particularity, although different from tangible products, they have something in common with tangible products. For the product, the marketing channel does not add value to the product itself, but increases the added value of the product through the professional services provided in the channel. The successful operation of marketing channels will lay a solid foundation for the whole marketing work of products.

With the continuous change of transportation market and the improvement of container technology, the demand for container and liner transportation will become diversified and complicated in the future. At present, the industry will show the following major trends:

Intelligent. Container informatization is a key factor affecting modern logistics. At present, container informatization is mainly through radio frequency identification technology (RFID), micro-electromechanical system (MEMS) and other related information technology, control technology, 2G/3G communication network technology and other related information technologies. To realize the real-time and transparent information of the whole supply chain in the global environment, as well as the remote monitoring, tracking and management of containers under the whole supply chain.

Multimodal transport. At present, container transportation in the world is still dominated by a single transport mode, and the connection between sea, land and air is not close enough. The continuous progress of container technology in the future will provide more convenient conditions for all kinds of transportation routes to connect with each other.

Environmental protection. Under the pressure of environmental protection policy, China's container industry is facing the transformation to waterborne painting. However, at present, the use of waterborne coatings containers in China accounts for only about 3.5% of the total number of containers in the world, cost impact has become a major "difficult problem" for the container industry.

Therefore, according to the future development trend of container and liner companies, we should actively adjust the drawbacks of the existing channel model, combined with the development and changes of the times, establish a new marketing channel model, and promote the development of container liner transportation industry.

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Appendix 1: composition of experts

The performance indexes of TSL pharmaceutical marketing channel were evaluated by expert scoring. The composition of the experts is shown in the table below.

Table1-1composition of experts

surname and personal name	Post	Degree of education	The company to which it belongs
Ms.Hu	Regional manager	Master	COSCO SHIPPING sales Department
Mr.Gu	Branch manager	Master	COSCO SHIPPING Henan Branch
Mr.Zhang	Office manager	Bachelor	COSCO SHIPPING Zhengzhou Branch
Mr.Qiu	Salesman	Bachelor	COSCO SHIPPING Zhengzhou Branch
Mr.Kang	Salesman	Bachelor	COSCO SHIPPING Hainan Branch
Mr.Zhang	Salesman	Bachelor	COSCO SHIPPING Sanya Branch

Appendix 2: composition of experts

Honorable:

First of all, thank you for taking the time to participate in the performance evaluation of TSL Pharmaceutical Marketing Channel in your busy schedule. Please evaluate each of the following four tables objectively according to the scoring criteria and fill in the corresponding values in the scoring column.

Scoring criteria: each index is divided into four grades {good, general, poor}, and the corresponding assignment {1.0, 0.7, 0.4, 0.1}.

Table 1: Channel value score

Indicators at all levels		Index definition	Grade
flexibility	Product flexibility	Product flexibility reflects the ability of introducing new products within a certain period of time, expressed by the ratio of the number of new products to the total amount of products.	
	Time flexibility	Time flexibility reflects the response speed of supply chain to customer demand can be measured by the average response time of customer demand.	
	Quantitative flexibility	Quantitative flexibility reflects the adaptability of supply chain to the change of customer demand, which can be expressed as a percentage of total demand.	
reliability	Loss of percentage of sales	The loss of a percentage of sales reflects the inability of the supply chain to meet established demand and can be expressed as a percentage of sales lost as a percentage of sales.	
	Customer complaint rate	Customer complaint rate reflects the degree of 'unconformity' of products or services provided by the supply chain, which can be expressed as a percentage of the number of customer complaints and the total number of transactions.	
	Punctual delivery rate	The punctual delivery rate reflects the punctual delivery in the supply chain and can be expressed as a percentage of the number of punctual deliveries and the total number of deliveries.	
price	Average price advantage compared with the same period last year	The average price advantage refers to the comparison of the comprehensive average price between the target supply chain and other supply chains in a certain period of time.	

	Average promotion rate of single product	The average promotion rate of a single product refers to the number of promotions per item within a certain period of time.	
Quality	Quality of Cargo loss ratio	The ratio of goods loss reflects the satisfaction of customers with the quality of transportation, which can be expressed by the proportion of the quantity of goods loss to the total sales quantity over a period of time.	
	Customer complaining time	That is, the period of time when the customer complains, from the customer complaining to the satisfactory settlement of the complaint.	

Table 2: financial performance score

Indicators at all levels		Index definition	grade
sell	sales volume	Sales are the total price and extra-price charged by the taxpayer to the buyer for the sale of goods or taxable services, but do not include the amount of sales tax charged.	
	Market permeability	Market penetration refers to the proportion of products used (owned) by a brand (or category, or sub-brand) in the object under investigation (total sample) for tangible goods. It can also be directly understood as user penetration or consumer share, is the sum of the position of a brand in the market, it is the result of many years of formation.	
	Sales trend	Sales trend refers to the development trend of sales.	
market share	Total market share	Total market share refers to the percentage of sales in the industry.	
	Reach market share	Accessible market share refers to the percentage of sales in the accessible market identified by the enterprise as a percentage of the market served by the enterprise.	
	Relative market share	Relative market share refers to the comparison between the sales of enterprises and the sales performance of competitors.	
Channel cost	Direct personnel costs	The enterprise invests in the channel the personnel salary, the welfare and so on expense.	

	circulation cost	Products in circulation process, transportation, warehousing and promotion costs.	
	general expenses	Office, business travel, public relations activities and other expenses.	
profitability	ratio of income as a percentage of sales	Sales profit margin = after-tax profit / sales * 100%	
	Expense profit margin	Cost profit margin = profit amount / total cost * 100%	
	Return on net assets	Return on assets = profit margin / total assets * 100 per cent	
Asset management efficiency	turnover rate of funds	Capital turnover rate = product sales income / asset occupation * 100%	
	inventory turnover ratio	Inventory turnover = Product sales income / average inventory balance * 100%	

Table 3: Channel operational status score

Indicators at all levels		Index definition	grade
Channel availability	Commodity turnover speed	Commodity turnover rate = average inventory / monthly sales	
	Payment recovery rate	Recovery rate = received / receivable * 100%	
Channel coverage	Market coverage	Market coverage = the sum of the area of the terminal business circle of each distribution network-the sum of the areas of the overlapping business circle	
	Market coverage	Market coverage = market coverage / total market area * 100%	
Channel Circulation capacity and Utilization ratio	Average shipment batch	Average monthly shipment within a year	
	Average delivery interval	The average interval between each shipment in a year	
	Average daily	Average daily sales of all products in one year	

	retail volume		
	Average commodity circulation time	The average time it takes for a product to go through a marketing channel to a patient.	
Channel conflict	Role consistency	The tasks that channel members should undertake in the channel, as well as the consistency of codes of conduct acceptable to each channel member	
	Point of view consistency	The consistency of the understanding and reaction of each channel member to things.	
	There are no differences in decision-making power	Channels in the management of clear powers and responsibilities, there are institutional norms, there is no long leadership.	
	Rational allocation of resources	It is a good channel to make good use of resources in the business area, so that the allocation of resources is reasonable.	
	effective communication	Whether the enterprise and other members of the channel in time to exchange important information, information is complete.	
	Members have the same goals.	Whether the objectives set by channel members in their respective business processes are consistent	

Table 4: Channel value score

Indicators at all levels		Index definition	grade
tangible	Physical facilities	omit	
	equip	omit	
	Staff and traffic	omit	
immaterial assets	prestige	omit	
	competitive power	omit	
	Capacity development	omit	

Thank you again, thank you for your help and support in the writing of my paper.

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