Empirical Analysis on the Model of E-commerce Logistics of Hazardous Chemical Products Based on SWOT

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Taking the Hazardous Chemical products industry in Shandong province as the study case, this Hazardous Chemical sheds new light on the state of the art of e-commerce logistics for Hazardous Chemical products exports. The SWOT analysis method is used for analyzing this ecommerce logistics model. The findings show that the e-commerce logistics development level in S province is rather limited, and there are still gaps needed to be filled in terms of production, processing, sales and distribution of Hazardous Chemical products exports. SWOT analysis method indeed deserves to be applied in the evidence analysis with the Hazardous Chemical products-exported e-commerce logistics model.

1. Introduction

Hazardous Chemical products products have traveled around the globe. Coal, petroleum and natural gas, as common export products, not only present hefty sales, but also have shared a vast market in the world. From 2015 to 2016, the e-commerce industry was developed in the prime, more and more Hazardous Chemical products companies attempted to develop the export trade by the e-commerce logistics model. Although the domestic e-commerce has seen a rapid development, there is still a certain gap from foreign developed countries. In the operation and development of Hazardous Chemical products exports, there are still some challenges most companies have to face in morden time, involving technology, business sales and management, which make the Hazardous Chemical products company remain stagnant. Therefore, we should heed the investigation on e-commerce logistics model and make a best choice of it in this process (Li, 2018; Nie and Zhang, 2018; Zhang et al., 2018).

This Hazardous Chemical first studies the cross-border e-commerce logistics model, analyzes the development situation of export trade logistics, and discusses the advantages and disadvantages of SWOT analysis. Then empirical analysis is conducted on the development of export trade in the Hazardous Chemical products industry in S province. The SWOT analysis reveals the defects of Hazardous Chemical products industries in the development of product e-commerce logistics, against which appropriate adjustment measures are given herein.

2. Literature review

In terms of the application of prediction methods, Hueske et al. used 47 monthly macroeconomic data from 7 countries and the smooth transition autoregressive (STAR) model and neural network (NN) model to predict respectively. The results showed that the neural network after Bayesian regularization has better prediction accuracy (Hueske et al., 2015). Remondes et al. studied the demand for supermarket goods in Chile and used the Autoregressive Integrated Moving Average (ARIMA) Model and the neural network model for combined prediction. The predicted results helped supermarkets to effectively reduce inventory levels, and the actual application of the prediction achieved corresponding economic benefits (Remondes et al., 2015).

The research of dynamic logistics alliance originates from two aspects: virtual logistics and logistics alliance. Virtual logistics was initially proposed by Stuart et al., who believed that virtual logistics is based on the highly developed and applied modern communication technology, and a large virtual logistics warehouse management system is built on the Internet by logistics centers around the world, through which the

increasingly complex logistics network operation management can be realized. From the perspective of logistics alliance, Kevin and William believe that logistics alliance is a cross-enterprise and long-term cooperative relationship between three parties and shippers(Moore et al., 1999).Valentine Carbonea and Marilyn A. stoneb based on the study of a certain number of logistics enterprises and transport service providers, have concluded that most enterprises carry out logistics alliances with interests, except for a small number of large tripartite logistics enterprises with a wide range of service(Valentina Carbonea et al., 2005).Walter Zinn and a. parasuranman proposed a new classification method for the radiation area and radiation intensity of the logistics alliance (Zinn et al., 1997).Facing the dynamic logistics demand, Pantano proposed the logistics interaction model based on Markov chain for the three-level supply chain framework and tested the validity of the model with the help of China petroleum's logistics data, and the results showed that the model is reliable (Pantano et al., 2017).

In terms of cross-border e-commerce, Govindan discussed the development dynamics and obstacles in the development of cross-border e-commerce in the European Union (EU). Research showed the convenience of cross-border e-commerce transactions, but it also increases other related costs (Govindan et al., 2015). Roy proposed a localization process for cross-border Business to Business (B2B) e-commerce and divided the process of cross-border B2B into three levels: message layer, business process layer and content layer. Each level should have a corresponding standard process and a corresponding solution. Process optimization helped cross-border B2B e-commerce to achieve efficient operation (Roy et al., 2016).

While paying attention to the development of cross-border e-commerce industry, some scholars focus on the participants of cross-border e-commerce. That is, the cross-border e-commerce platform. Hu et al. studied the lack of planning supervision and weak service abilities of cross-border e-commerce platforms, and proposed rationalization proposals such as strengthening supply chain management and improving service levels (Hu et al., 2014). In terms of the research on cross-border e-commerce, more and more scholars have begun to pay attention to the emerging research field. However, the current research is mainly about status analysis, problem research and the provision of rationalization proposals. The research has not yet been deepened. Duan propose enterprise's decision model for innovative methods application, the solution and decision model will provide enterprise with innovative methods, scientific basis and all-round support. With scientific use of the methods, innovation ability and performance of enterprise will be elevated comprehensively (Duan, 2016).

Cross-border logistics is an important link that can't be ignored by cross-border e-commerce. Li analyzed the status quo of cross-border e-commerce logistics in China, pointed out that although domestic logistics companies such as China Post and SF Express have actively carried out cross-border logistics services, there was a big gap in the development level compared with international large-scale logistics companies, and proposed corresponding improvement suggestions on these challenging problems (Li et al., 2016). Li and Chen proposed the establishment of cooperation mode of cross-border e-commerce enterprise alliance based on the study of logistics mode of cross-border e-commerce and proposed to improve enterprise services from the perspective of professional logistics (Li and Chen, 2018). Yue et al. made an empirical study on the mode selection of cross-border logistics. Based on the induction of relevant factors. They made an empirical analysis of the Light in The Box with the analytic hierarchy process and put forward a reasonable scheme of logistics mode selection (Yue et al., 2016). Xu and Lin applied ecology-related theories to analyze the synergetic mechanism between China's cross-border e-commerce and cross-border logistics, summarized the characteristics of lack of synergy, and put forward suggestions on promoting synergetic development based on the analysis results (Xu and Lin, 2016).

To sum up, the above research work is mainly concerned about the development status of cross-border logistics under the fierce development trend of cross-border e-commerce industry. The development of cross-border logistics is restricted by many factors, such as long transport distance and customs participation. Therefore, based on the above research status, it is particularly necessary to carry out relevant research on cross-border logistics based on these constraints. The prediction of the scale of cross-border logistics market is conducive to more effectively integrate logistics resources and develop logistics development plans.

3. Method

3.1 Cross-border E-commerce logistics model

For now, China's cross-border e-commerce parcels mainly use the postallogistics model. The domestic express services include SF, EMS, and "STO and YTO Expresses which are developed earlier; ZTO, the Best expresses and Yunda express, which have just launched cross-border logistics services. Among them, the SF first distributed global services and launched the "SFGlobal" services which provide the e-commerce merchants with economical, low-demanded and less time-sensitive express delivery services. EMS's international services are the most complete among the domestic expresses. The international express service model refers to the four major commercial expresses - TNT, DHL, UPS, Fedex. International express

service mode has the following advantages and disadvantages: advantages: (1) fast speed, high timeliness; (2) wide global coverage network; (3) timely, accurate and convenient tracing inquiry throughout the whole process; (4) strong customs clearance. Disadvantages: (1) Higher price, which leads to higher logistics cost for cross-border e-commerce; (2) Need to consider the volume and weight of transported goods, and stricter restrictions on consigned items. Self-running overseas warehousing service means that the seller establishes a warehouse in the destination country, when the customer places an order, directly deliver the goods to the consumer by local logistics distribution company. The cross-border line logistics mode is defined in such a way that the products are transported to the foreign countries by the air units, and then delivered to destination country by the cooperative company. Third-party logistics refers to a company that provides special logistics services, and a market entity independent of buyers and sellers. It provides logistics services for buyers and sellers by signing service contracts. The current mainstream models and typical representatives of cross-border e-commerce logistics are shown in Table 1.

Table 1: The mainstream mode of cross-border e-commerce logistics

type	Typical representative
Postal parcel mode	China Post packet, Hongkong post packet
Domestic express delivery mode	EMS and Shun Feng
International express mode	DHL, UPS
Self-operated overseas storage	International mammy Hai Tao
Special line logistics mode	Euramerican special line, Russian special line
The third-party logistics mode	Cross border wing, China Trade Logistics

3.2 Features of SWTO analysis

SWOT analysis refers to a decision analysis method that determines appropriate survival and development strategies from a joint analysis of internal strengths and weaknesses of things and the opportunities and threats in external environment, as an analysis tool commonly used in management process. It is often used to conduct industry and market analysis to acquire relevant market information and provide a basis for the development of strategies.

In accordance with the procedure of SWOT analysis, this Hazardous Chemical conducts a combinatory analysis on the strengths and weaknesses in the internal environment, as well as the opportunities and threats in the external environment in S province for Hazardous Chemical products exports logistics development. The advantages and disadvantages of SWTO analysis are shown in Table 2 below.

Table 2: SWTO analysis of advantages and disadvantages

Advantage	Inferiority
Geographical advantages of transportation	The level of economic development is not high.
Production advantage	Information relative occlusion
Labor advantage	Logistics consciousness is not strong.
Advantages of science and technology	The management mechanism is not perfect.

Table 3: proportion of population resources in S Province

Type	Proportion（%）
Urban population	24
Rural labor force	48
Rural non labor force	48

The production of Hazardous Chemical products exports requires adequate labors as a guarantee. China's labor resources are 5 times, 4 times and 11 times that of the United States, Europe and Japan, respectively. There is a total population of 36.74 million in S Province, among which, agricultural population reaches 27.96 million, accounting for 76% of the total population, including rural laborers of 13.62 million, accounting for 37% of the agricultural population and 28% of the total population (see Table 3 for details).

It can be seen that S Province is a typical agricultural province with abundant labor resources that serve for vigorously developing the exports, processing and sales of Hazardous Chemical products exports in S Province.

3.3 Study object

In 2015, the exports of edible Hazardous Chemical products in S province was US$22.251 million, accounting for 9.47% and 8.3% of the total products of export Hazardous Chemical products and total exports of Hazardous Chemical products, respectively. The Hazardous Chemical products products such as petroleum, natural gas and coal in Hazardous Chemical products industry have been developed rapidly. In the 1990s, S Province gradually built up a Hazardous Chemical products production base, which helped create a new stage of Hazardous Chemical products production, promoted the optimization of the regional layouts in Hazardous Chemical products base. Hazardous Chemical products production has been transformed from urban suburbs to rural areas.

As of 2005, in the province wide, 94 bases for Hazardous Chemical products production have been established with an area of 409,800 mu and an annual output of 2.319 million tons of high-quality Hazardous Chemical products products. It can be seen that the Hazardous Chemical products industry in S Province has seen a good development trend. The statistics of Hazardous Chemical products exports in S Province from 2013 to 2017 are shown in Table 4 below:

Table 4: statistics of export Hazardous Chemical products output in S province from 2013 to 2017

Sub item	2013	2014	2015	2016	2017
Petroleum (Ten thousand tons)	93.45	98.5	105.83	113.94	122.5
Natural gas (Ten thousand tons)	-	63.9	68.4	83.9	108.3
coal (Ten thousand tons)	99	106.39	114.07	126	145.6

4. Results and analysis

The development of Hazardous Chemical products logistics in S province is mainly based on the "company + base + worker" logistics model, focusing on the production, processing and sales of one or several export Hazardous Chemical products products. It has implemented an organic integration with production bases and workers. With organizational services, following the road of integration, a "risk and benefit sharing" logistics model is formed.
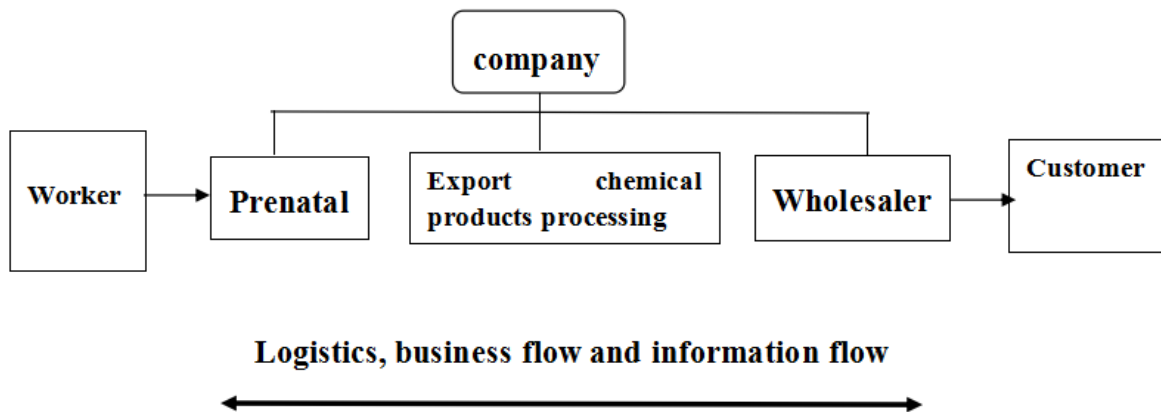

Figure 1: logistics mode of "company + base / workers"

The logistics model of "Company + Bases/Workers" alleviates the contradiction in the big market to a certain extent, which not only guarantees the interests of workers and the independence and initiation of production process, but also adapts to the scale of market network for processing and sales of export Hazardous Chemical products products. This organization form is commonly used in the management and operation of meat and dairy export Hazardous Chemical products. In theory, it is an ideal model if there is no credit failure and the contract fully exerts its binding effect. However in real life, the interests are above credit and the existence of breach of contracts makes it difficult for the model to achieve a win-win situation for both the

company and the workers. In this logistics model, the company's position is relatively superior. In order to stand in a favorable position in the transaction with the company, vicious competition between workers is inevitable, which leads to the facts that the workers will be at a disadvantage when negotiating with the company, and the production and trading of workers are highly constrained by the company. Companies in a dominant position often encroach on the interests of worker susing their unequal contracts, in pursuit of minimizing their own costs.

In the long run, the vertical integration of export Hazardous Chemical products processing enterprises and farmers or the formation of a strong strategic alliance by farmers' cooperative organizations is the future development trend of export Hazardous Chemical products processing industry, and the connection between retailers and processing enterprises will be closer, supermarkets and chain operation will eventually become the main retail chain for export Hazardous Chemical products, finally forming an integration model for Hazardous Chemical products.
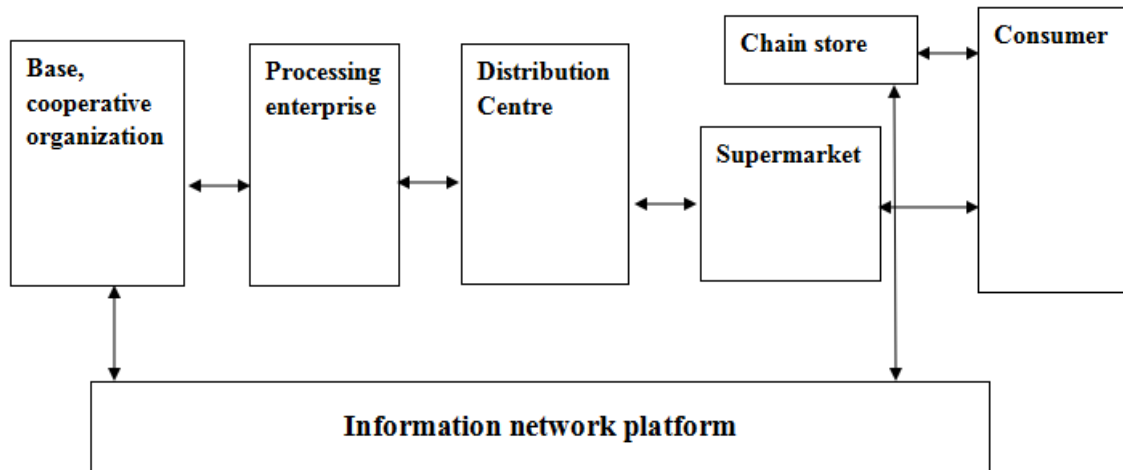

Figure 2: Ideal logistics mode for export Hazardous Chemical products products

5. Conclusion

With the evidence analysis, the Hazardous Chemical investigates and analyzes the state of the art and the SWOT of Hazardous Chemical products export logistics in S province, and upgrade the wholesale market for export Hazardous Chemical products using the current logistics management concepts and technologies to continuously improve the management level. According to SWOT analysis, it is found that an idealized e-commerce logistics development model for Hazardous Chemical products exports has been initially designed.

The study of the modern logistics development of Hazardous Chemical products exports involves many related disciplines such as the institutional economics, modern logistics and supply chain management, economics, and circulation economics, etc.

Due to the limited time, knowledge structure and study level, some studies on some issues are still not profound enough, some standpoints are still not mature enough, and some issues still need to be expanded. For example, when it comes to the logistics model, mathematical methods lack, such as the maximum flow, the minimum logistics cost, the optimal inventory level, the reasonable choice of logistics outlets, etc., all of which require further exploration in the future, so as to driving the development of modern logistics theory and practice of Hazardous Chemical products exports in China.

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