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# Analysis of Xi'an silk road cross-border fresh e-commerce operation strategy based on export logistics model

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## Abstract

In recent years, with the rapid development of cross-border e-commerce, it plays a more and more important role in the strategic layout of the enterprises, especially the cross-border business of fruit and vegetable. On the basis of the export logistics mode of cross-border fruit and vegetable and the current situation of Xi'an's cross-border fruit and vegetable development, this paper analyzes the main influencing factors and the related factors affecting the operation of cross-border fruit and vegetable business enterprises by using the ISM model, and gives the operation strategy according to the development of various cross-border fresh e-commerce in Xi'an.

## Keywords

Cross-border fresh e-commerce; Export logistics; Explanatory structural model.

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## 1. Introduction

Thousands of years ago, the city of Chang'an, a world famous international metropolis at that time, was the starting point of the ancient silk road. Since president Xi Jinping initiated the joint construction of the belt and road initiative strategy in 2013, Shaanxi province has become a strong link between trade and economic ties in Eurasia, strengthening economic and trade ties between Xi'an and Kazakhstan, Uzbekistan and other countries along the economic belt, and effectively promoting the development of cross-border e-commerce in Shaanxi[1]. In recent years, with the sustained and rapid economic growth in central Asian countries, residents' society and increased purchasing power, import demand is strong, and the market consumption structure is upgraded. However, industrial and agricultural development is a weak area of basic materials and the supply of agricultural products is insufficient. Except for a few agricultural products that can meet domestic demand, most agricultural products, especially fresh fruits and vegetables, rely mainly on import supply and have huge potential space. This provides a good platform for the development of Xi'an cross-border fresh e-commerce exports, plays a pivotal role in promoting the convenient development of Xi'an's fruit and vegetable export logistics trade and accelerates the further development and optimization of the cross-border fresh e-commerce.

Typical continental climate, natural green agricultural product production base and unique natural environment have created distinctive features and excellent quality of Shaanxi agricultural products. They are popular with customers at home and abroad, including Luochuan apple, Dali winter jujube, Baoji pepper, Dali watermelon, Meixian kiwi fruit, Zhouzhi kiwi fruit, northern Shaanxi doghead jujube, Lintong cherry and other agricultural product brands. According to the statistics provided by Xi'an customs, the export volume of agricultural products in Shaanxi province in 2015 was 3.08 billion RMB, and the export volume to some countries and regions still showed a high-speed growth trend, of which 500 million RMB was exported to ASEAN, up 56%. Exports to Myanmar, Vietnam and other ASEAN countries increased by more than 200%; Exports to the EU totaled 280 million yuan, up 16.4%. Fruit and vegetable exports performed well, with the export of fruits such as apples

and kiwi fruits reaching 460 million yuan, up 35.6 % year-on-year. Vegetable exports totaled 64.27 million yuan, up 82.3 % year on year[2]. Shaanxi provincial government has given full recognition and attention to the development of cross-border fresh e-commerce from a macro level. However, at the operational level, the operation of cross-border fresh e-commerce encountered many difficulties and risks, which restricted the development of cross-border fresh e-commerce in Xi'an.

Vigorously developing cross-border fresh e-commerce industry is an important way to ensure the smooth flow of fruits and vegetables in Xi'an to domestic and international markets. Based on the cross-border e-commerce and the current situation of Xi'an cross-border e-commerce enterprises, this paper uses ISM model to study the influencing factors of cross-border e-commerce of fruits and vegetables and the relationship between the various factors, and gives the operation strategy of cross-border e-commerce of fruits and vegetables, hoping to have practical guiding significance for the development of cross-border e-commerce of fresh in Xi'an in the future.

## **2. Research on Export Logistics of Cross - Border Fresh E-Commerce**

### **2.1 Export Logistics Mode of Cross-Border Fresh E-Commerce**

Cross-border fresh e-commerce refers to trading entities in different customs, which directly sell fruits and vegetables products imported and exported from home and abroad on the internet through e-commerce trading platforms, and deliver them to commodities through cross-border logistics to complete the transaction[3]. Judging from the current development of cross-border fresh e-commerce, the mainstream e-commerce method is B2C mode.

The cross-border fresh e-commerce platform and the logistics system are an inseparable whole. The development mode of the e-commerce platform's business activities will directly affect the operation of the logistics system. At present, the main modes of cross-border e-commerce export logistics are international small bags, international express delivery, overseas warehouses and cross-border dedicated line logistics [4]. Because fruit and vegetable products cannot be preserved for a long time at normal temperature, are easy to deteriorate and rot, and are large and heavy in volume, the logistics modes of cross-border fresh e-commerce mainly involve two modes, namely, overseas warehouses and cross-border logistics dedicated lines.

#### **2.1.1 Overseas Warehouse**

Overseas warehouse refers to the cross-border logistics mode of bulk delivery of fruit and vegetable products to foreign warehouses for local sale and distribution[5]. Overseas warehouse delivery time is short, receiving speed is fast, sales category can break through the big and heavy restriction, can avoid logistics explosion, and at the same time improve the competitiveness of goods and commodity prices. By establishing overseas warehouses in the main target countries, cross-border e-commerce exporters can alleviate the problems of long logistics distribution time, high logistics distribution cost and the like. At present, there has been a whole-process logistics service provider in cross-border electronic commerce with overseas warehousing as its core, such as the logistics service provider focusing on overseas warehousing and distribution services, which is easy to export. The current cross-border e-commerce export logistics cycle usually takes one week to one month, seriously affecting the consumer experience. This delivery time has been greatly shortened by the combination of different modes of delivery for different sellers' needs to be delivered to overseas warehouses. Overseas warehouses can not only solve the above problems, but also cross-border export e-commerce merchants can remotely manage overseas warehouses online, update overseas warehousing goods in real time, and strictly store, sort, package, and distribute goods according to customer requirements. moreover, after the delivery is completed, the overseas warehousing system will be updated in time to show the current inventory situation and take the initiative to control the logistics management chain. Now overseas warehousing has entered a phase of accelerating profit development, diversified logistics solutions and overseas warehousing make it possible to expand sales categories. At the same time, overseas warehouses have increased the categories of commodities

that cross-border e-commerce retailers export, thus further expanding the scope of merchants' commodity sales.

Promoting the construction of overseas warehouses will help shorten the logistics cycle of cross-border e-commerce exports and improve the quality of online shopping services for cross-border e-commerce exports, thus bringing economic benefits to cross-border e-commerce exporters. The future strength of cross-border e-commerce must be faster logistics, more localized operation and better after-sales service.

### 2.1.2 Cross-border Dedicated Logistics

The cross-border special line logistics is transported to foreign countries by air bag and then dispatched to the destination country through the cooperation company[6]. Its advantage is that it can concentrate large quantities of goods to target countries and reduce costs through scale effect. The most common special line logistics products on the market are the American special line, the European special line, the Australian special line, the Russian special line, etc. Many logistics companies have also launched the middle east special line, the south American special line, the south African special line, etc. Then some logistics companies have developed their subsidiary sinotrans e-commerce website to launch a dedicated logistics group buying service from Chinese cities to foreign cities.

The special line for cross-border logistics used to refer to agencies and organizations specifically responsible for international transportation. At present, cross-border e-commerce needs to extend dedicated services to both ends: import and export aspects[7]. On the import side, some freight forwarders or logistics enterprises with aviation and customs clearance resources have become transportation and distribution providers of designated routes on overseas online shopping platforms, providing direct transportation to China for online shopping platforms and taking charge of domestic distribution after entering the customs. As for exports, it collects goods for domestic sellers and puts them through customs. through international transportation, it selects distributors or post offices in the opposite countries to complete the distribution of buyers. Special line companies do not rely on resource investment, and their operation is often integrated and changed hands. they need to have specific channel resources, foreign trade qualifications, customs clearance and risk control capabilities.

## 2.2 Current Situation of Cross-Border Fresh E-Commerce Export Logistics in Xi' an

In 2015, although the growth rate of global trade slowed down, cross-border e-commerce in China was growing in the opposite direction, and the penetration rate of e-commerce in import and export trade continued to increase. Cross-border e-commerce retailing is emerging as a new form of trade in the internet era, and its share in China's cross-border e-commerce market is greatly increasing[8]. According to the report released by Ali research institute, the scale of cross-border e-commerce transactions in China reached 4.8 trillion yuan in 2015, up 28 % year - on - year. It is estimated that the cross-border e-commerce market will reach 12 trillion yuan in 2020, with an average annual growth rate of 20.1 %. In 2015, cross-border e-commerce transactions accounted for 19.5 % of China's total import and export volume, which is expected to reach 37.6 % by 2020.

The rapid development of cross-border e-commerce in China has driven the development of cross-border fresh e-commerce in Xi'an. Xi'an city has not only a wide variety of fruits and vegetables, but also an extremely rich output and a large planting area. The annual output of fruits and vegetables in Xi'an is increasing year by year, which can fully meet the demand of domestic and export. According to statistics, the annual output of fruits and vegetables in Xi'an is from 4.397 million tons in 2000 to 15.539 million tons in 2014, and the annual output of vegetables is from 5.555 million tons in 2000 to 17.426 million tons in 2014. the growth rate of fruits and vegetables is about three times, which shows the rapid development and growth of fruits and vegetables industry in Xi'an[9]. This has laid a solid foundation for the development of cross-border fresh e-commerce in Xi'an.

Faced with the growing cross-border fresh e-commerce market and the support of the national the belt and road initiative policy, Xi'an city is making every effort to seize the opportunity, which is the

best time to develop itself. Xi'an city's cross-border fresh e-commerce export logistics mode is the biggest challenge for domestic cross-border e-commerce exports and restricts the development of the entire cross-border fresh e-commerce industry. However, there are also various problems in the rapid development of cross-border fresh e-commerce logistics in Xi'an. The high cost of e-commerce logistics, the long transportation and distribution cycle, the difficulty in realizing the return and exchange procedures, the difficulty in ensuring the quality of fruits and vegetables, and the cumbersome and difficult customs clearance procedures have all caused the cross-border logistics to lag behind the development of cross-border e-commerce. With the rapid development of cross-border fresh business transactions, the important factors affecting foreign buyers' purchasing experience have evolved into the timeliness and safety of logistics distribution. These factors are also directly related to the reputation of cross-border fresh e-commerce merchants, thus directly related to their sales performance. The cross-border fresh business export logistics industry is undergoing a new transformation. At the same time, logistics services with cost, speed, safety and even more after-sales contents are urgently needed. On the whole, high distribution cost, long distribution time and low efficiency, inability to track the whole package and uncertainty of fruit and vegetable quality are urgent problems to be solved in cross-border e-commerce export logistics.

### 3. Analysis of Cross-Border Fresh E-Commerce Export Logistics Operation Strategy based on ISM Model

#### 3.1 Determination of Operational Evaluation Index

Through the analysis and research on the evaluation documents of cross-border fresh e-commerce export logistics operation, combining with the fruit and vegetable export logistics mode, the operation strategy is studied from the four strategic objectives of profit, customer, process and market, paying attention to customer demand, ensuring product safety, complying with the development trend of cross-border fresh e-commerce, deleting secondary evaluation indexes according to Delphi method and combining with the measurability of indexes, and finally forming an evaluation index framework, as shown in table 1.

Table 1. Evaluation index and explanation for export logistics operation of cross border fresh business

Frame	Index number	Index content	Index Interpretation
Profit goal	$S_1$	Sales volume	Sales of fresh products exported from cross-border E-commerce
	$S_2$	Profit	Cross border e-commerce profit after deducting costs
Customer goal	$S_3$	Customer satisfaction	The whole process of customer purchasing and its satisfaction with after sales service
	$S_4$	Quality of fruit and vegetable products	The safety and health, sensory properties and shelf life of fresh products, reliability and convenience of products
Process goal	$S_5$	Delivery efficiency	The timeliness and accuracy of cross-border electricity supplier delivery and shipment. When the inventory ratio is insufficient, the loss of products will affect the timeliness of delivery. Impact on fresh quality and customer experience
	$S_6$	Simplicity of customs clearance	The complexity of customs clearance process, cargo inspection and so on

			will affect the time and cost of product export
Market goal	$S_7$	Improvement of product and brand awareness	Brand awareness affects the choice of customers, and is an important competitiveness of enterprises
	$S_8$	Market share growth rate	It reflects the degree of control of the market and the share of the consumer market

**3.2 Introduction and Construction the ISM Model**

The inter-structural modeling method (ISM method) is a method developed by professor J. Watson in 1973 to analyze problems related to complex socio-economic systems. It can decompose the complex relationships among various elements in the system into clear multi-level hierarchical structural forms [10]. The basic principle of ISM: through the logical operation of adjacent matrices of directed graphs, reachability matrix is obtained, and then reachability matrix is decomposed, finally complex systems are decomposed into multi-level hierarchical forms with clear levels.

**3.2.1 Establishing an Adjacency Matrix**

Using Delphi method, combining with the factors listed in table 1 for cross-border fresh e-commerce export logistics operation, experts in relevant fields and enterprise personnel, etc. Make a comparison of these factors and establish a lead matrix A. When  $A_{ij} = 1$ , it was said that  $S_i$  had a direct impact on  $S_j$ . When  $A_{ij} = 0$ ,  $S_i$  had no direct influence on  $S_j$ . The influence relationships among various factors of cross-border fresh e-commerce operations are shown in table 2.

Table 2. Lead matrix A

i	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	$S_7$	$S_8$
$S_1$	0	1	0	0	0	0	0	0
$S_2$	0	0	0	0	0	0	0	0
$S_3$	1	1	0	0	0	0	1	1
$S_4$	1	1	1	0	0	1	1	0
$S_5$	1	1	1	1	0	0	0	0
$S_6$	1	1	0	1	1	0	0	0
$S_7$	1	0	0	0	0	0	0	1
$S_8$	1	1	0	0	0	0	0	0

**3.2.2 Establishing an Reachable Matrix**

According to table 2, the matrix A is connected and a identity matrix E, added to perform matrix power operation on the matrix according to boolean algebra rules, that is, when  $(A+E)^n = (A+E)^{n+1}$ ,  $L = (A+E)^n$  is an reachable matrix. The Function Mmult in excel software is used to calculate  $(A+E)^3 = (A+E)^4$  and obtain the reachable matrix  $(A+E)^3 = (A+E)^4$ .

$$L = \begin{bmatrix} 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 0 & 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

3.2.3 Decomposition of reachable Matrix

According to the reachability matrix L, we can find out all the element sets  $R(s_i)$  that can be affected by the elements  $s_i$  and find out all the element sets  $Q(s_i)$  that can be affected, that is, the first set. Then we can find out that the set of all the elements  $s_i$  that can be affected and affected is the common set  $C(s_i)$ , the common set  $C(s_i) = R(s_i) \cap Q(s_i)$ . By dividing the reachable matrix L into regions, table 3 can be obtained.

Table 3. Element sets, First set, Common set

$s_i$	$R(s_i)$	$Q(s_i)$	$C(s_i)$
$S_1$	1, 2	1, 3, 4, 5, 6, 7, 8	1
$S_2$	2	1, 2, 3, 4, 5, 6, 7, 8	2
$S_3$	1, 2, 3, 7, 8	3, 4, 5, 6	3
$S_4$	1, 2, 3, 4, 5, 6, 7, 8	4, 5, 6	4, 5, 6
$S_5$	1, 2, 3, 4, 5, 6, 7, 8	4, 5, 6	4, 5, 6
$S_6$	1, 2, 3, 4, 5, 6, 7, 8	4, 5, 6	4, 5, 6
$S_7$	1, 2, 7, 8	3, 4, 5, 6, 7	7
$S_8$	1, 2, 8	3, 4, 5, 6, 7, 8	8

According to  $R(s_i) \cap Q(s_i) = R(s_i)$ , table 3 is hierarchically extracted.  $S_2$  satisfied  $R(s_2) \cap Q(s_2) = R(s_2)$  in table 3. This representation  $S_2$  is the top level of the system and is also the ultimate goal of the system. Then extract the relevant elements  $S_2$  in table 3 to reach table 4.

Table 4. The results after the extraction of  $S_2$

$s_i$	$R(s_i)$	$Q(s_i)$	$C(s_i)$
$S_1$	1,	1, 3, 4, 5, 6, 7, 8	1
$S_3$	1, 3, 7, 8	3, 4, 5, 6	3
$S_4$	1, 3, 4, 5, 6, 7, 8	4, 5, 6	4, 5, 6
$S_5$	1, 3, 4, 5, 6, 7, 8	4, 5, 6	4, 5, 6
$S_6$	1, 3, 4, 5, 6, 7, 8	4, 5, 6	4, 5, 6
$S_7$	1, 7, 8	3, 4, 5, 6, 7	7
$S_8$	1, 8	3, 4, 5, 6, 7, 8	8

By repeating the above steps and decomposing the reachability matrix one by one, the ISM model can be established.

3.2.4 Drawing an Interpretation Structure Model

According to the hierarchy division of the above-mentioned reachable matrix, the elements of the system are arranged step by step, and the relationship is established by directional arc connection, that is, the ism model of cross-border fruit and vegetable e-commerce export logistics operation is established, as shown in figure 4.

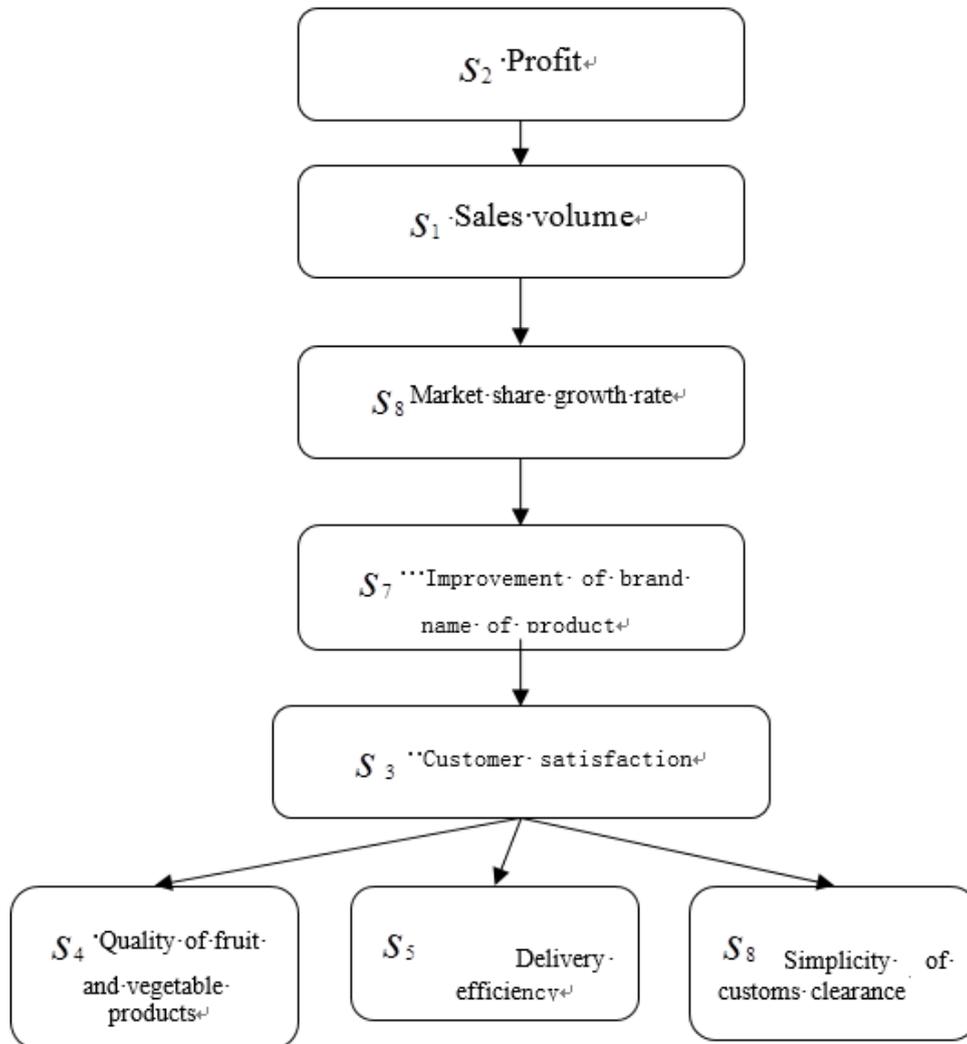


Fig. 1 ISM model of cross-border fresh export logistics operation

According to ISM model of cross-border fresh e-commerce export logistics operation strategy, the most direct factor affecting the profit and sales of cross-border fresh e-commerce export logistics operation is the growth rate of market share, while the increase of product brand awareness directly affects the growth of market share. secondly, product brand awareness is directly affected by customer satisfaction, which is directly affected by the quality of fruit and vegetable products, delivery efficiency and ease of customs clearance.

3.3 Xi'an Cross-Border Fresh E-Commerce Export Logistics Operation Strategy

3.3. 1 Promote the Establishment of Overseas Warehouses

Overseas warehouses with service functions such as supply of goods, warehousing and logistics, display and sales, and after-sales maintenance have become the preferred overall service solution for cross-border fresh e-commerce. Actively promoting the establishment of overseas warehouses in target countries can effectively solve the problems of high logistics cost and long delivery cycle. Enterprises can take the overseas warehouse as a fulcrum, build distribution and radiation outlets, transform scattered international transportation into bulk transportation through air transportation and

delivery by mail, reduce the logistics cost of enterprises, improve the transportation efficiency and enhance the user experience, so as to enhance the competitiveness of cross-border fresh e-commerce.

### 3.3.2 Establish the brand of Fresh and Increase Their Popularity

Brand is a sign and a symbol. It is an intangible asset that adds value to the product. The brand reputation of fruit and vegetable products not only represents the excellent quality of fruits and vegetables, but also represents the service level of cross-border fresh e-commerce. There are many famous fruit and vegetable brands in Xi'an city, such as apples, cherries, pomegranate, kiwi fruit, etc. However, most of them are limited to the domestic market and have not entered the international market. Because there is no independent brand, they cannot enter the foreign fruit and vegetable consumption market, which directly affects the international competitiveness of fruit and vegetable products in Xi'an city and hinders the further expansion of fruit and vegetable exports in Xi'an city. Thus, only having excellent quality is not enough to occupy the international market. To expand the cross-border trade of fruits and vegetables in Xi'an city, we need to have our own excellent fruit and vegetable brands.

## 4. Conclusion

Standing at the outlet of cross-border fresh e-commerce development, enterprises should seize the opportunity and integrate into the trend of cross-border e-commerce development based on their own characteristics. Logistics is the key to cross-border fresh e-commerce. Enterprises should fully consider factors such as cost, fruit and vegetable quality, customer satisfaction, delivery efficiency, difficulty in customs clearance, etc. They should choose the appropriate logistics method according to the development of enterprises and formulate reasonable operation strategies so as to bring the greatest benefits to enterprises. With the further maturity of the cross-border fruit and vegetable business transaction market, the rising space of cross-border fresh e-commerce export logistics, which is a new thing in the field of modern logistics, is still very large, so it is necessary to face the wind.

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