Research on China's export cross-border e-commerce ecosystem: a case study of Dunhuang Network

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Abstract. With the development of cross-border electronic commerce, the main body involved is also increasing. This paper studies the ecological system of China's export cross-border e-commerce from the perspective of ecological chain, and analyzes the relationship between China's export cross-border e-commerce enterprises, enterprises and the environment. Through the analysis of DHgate, the sixth online foreign trade transaction e-commerce website in the world, this paper points out that the service community is the basis for the expansion of the cross-border e-commerce ecosystem, and the close connection between the trading community and the supporting community determines the velocity of the material and energy cycle of the ecosystem, and there is a symbiotic relationship between the trading, service and supporting community. Finally, this paper puts forward the preliminary idea of the formation of export cross-border e-commerce ecological Circle, which provides the direction for the follow-up research.

1. Introduction
Cross-border electronic commerce has reduced the intermediate process of traditional cross-border trade through information technology means. Buyers and sellers trade directly through cross-border e-commerce platform. Not only the industrial chain is short, but also the importance of government supervision departments such as Customs and national inspection is more prominent. In terms of the direction of the transaction flow, cross-border e-commerce is divided into imports and exports, 2017 China's cross-border e-commerce exports in the total import and export (7.5 trillion yuan) accounted for more than 75%. Compared with imported cross-border e-commerce, export cross-border e-commerce involves more subjects, such as suppliers, buyers, cross-border e-commerce platforms, payment enterprises, logistics enterprises, financial enterprises, marketing and promotion enterprises, cross-border public service platform, government regulatory authorities. This paper will analyze the relationship among these subjects from the perspective of ecological chain. Concepts such as ecosystems and ecosystems in ecology help to understand the relationship among the various components of a complex system. The cross-border e-commerce ecosystem constructed accordingly will be more conducive to analyzing the interrelationship between Chinese export cross-border e-commerce companies, enterprises and the environment.
2. Construction of a cross-border e-commerce ecosystem

The basic content of the ecological discipline is to study the relationship among individual organisms, populations, communities and their interaction with the environment. All individuals of the same species in the natural region constitute a population. And the collection of various biological populations in a certain region at a certain time constitutes a community. The various ecological relationships formed by different biological populations through the transfer of matter and energy in the ecosystem are called ecological chains [1]. Multiple bio-chains in an ecosystem may overlap, forming a complex network of materials and energy for various organisms in the system, thus keeping the ecosystem stable [2].

The cross-border e-commerce ecosystem consists of three parts, including the subject, the environment and the relationship. There are more subjects in the cross-border e-commerce ecosystem, including suppliers, consumers, local wholesalers, local retailers, service providers, cross-border public service platforms, government regulators, cross-border trading platforms. The environment refers to the conditions covered by ecosystems, that is, the external conditions in which cross-border e-commerce principals are located, such as the policies, economic, cultural and technical conditions. The relationship refers to the connection between the cross-border e-commerce subject due to the transmission of material and energy, that is, logistics, capital flow, information flow, etc.

The main body of the cross-border e-commerce ecosystem is different in the system. And its function and office as well as the space occupied and the functions played are not the same. Therefore, it forms a community with different functions. The main community of the cross-border e-commerce ecosystem is the trading community of the main body of the industrial chain. While the auxiliary community includes the service community which provides the capital flow, the logistics support and the information flow support for the transaction, as well as the support layer which does not participate in the competition. The number, scale and market concentration of enterprises in trading communities and service communities reflect the competitive ecological situation of cross-border e-commerce market. There is a close relationship between the various communities, in which there is a mutual transmission of funds, goods and information. The ecosystem structure of cross-border e-commerce exports is shown as Fig.1.

![Figure 1. The ecosystem structure of cross-border e-commerce exports.](image)
2.1. Cross-border e-commerce trading community
Cross-border e-commerce trading communities consist of a number of trading entities, namely suppliers, purchasers and cross-border e-commerce platforms. Among them, cross-border e-commerce platform connected with suppliers and buyers, playing the role of docking supply and demand, is the core of cross-border e-commerce development [3]. Cross-border platforms are diversified from the perspective of the business model. According to the different corporate service subjects, it is divided into B2B and B2C. According to the different product range that enterprise platform contains, it is divided into vertical and integrated. According to the different business model of the enterprise, it is divided into information service platform and trading platform. The trading platform not only includes information service, but also provides the basic service needed for product transaction. At present, China's export cross-border enterprises mostly trade on international platforms such as Amazon, AliExpress, eBay and wish. A small number of enterprises will directly establish their own foreign trading platform. And the platform established is generally an export service platform. That is, the platform is not directly involved in the transaction, only to provide information display and information transmission services, and put the domestic seller's product information into the foreign platform for display to help sellers sell their products [7]. In order to realize the trading activities including payment, settlement, logistics, customs clearance, settlement and tax rebate on the trading platform, the cross-border export trading platform needs to cooperate with the service community and obtain the strong support of the supporting community.

2.2. Cross-border e-commerce service community
Cross-border e-commerce enterprises need the assistance of a variety of service-oriented enterprises in the process of transactions, such as integrated service enterprises that provide integrated service solutions for trading enterprises, logistics enterprises that provide cross-border logistics services, payment enterprises that provide various means of cross-border payment, financial enterprises that provide solutions to financial problems, Enterprises that provide insurance for cross-border import and export business, etc. These service enterprises and platforms form a service community. Actual logistics and capital flows occur between the service community and the trading community.

2.3. Cross-border e-commerce support community
Support community is the basis of cross-border e-commerce development. Cross-border e-commerce trading orders are fragmented and virtualized, and often in small batches of multiple batches, which needs to dock with the relevant departments repeatedly. The cross-border e-commerce public service platform established and operated by the government is one of the means to solve these problems [4]. The model commonly used in China is the electronic port model. That is, the customs clearance supporting services are provided by cross-border public service platform, and the logistics and payment are provided by market-oriented enterprises, which are connected to the public service platform to provide data support. The public service platform will transmit documents and data of order, logistics and payment to customs and national inspection. The goods are released from the point of supervision after customs clearance. Cross-border e-commerce supporting community integrate logistics, capital flow, information flow in the trading community and service community, which is easy for the regulatory authorities to carry out online information checking and offline cargo clearance.

3. Analysis of the cross-border e-commerce ecosystem of DHgate
The most important thing in the cross-border e-commerce ecosystem is the trading community, and the core of the trading community is the trading platform. Taking DHgate as an example, this paper focuses on the analysis of how to construct the cross-border e-commerce ecosystem with the trading platform as the core, and discusses the development of China's export cross-border e-commerce. Since the development of cross-border e-commerce, China's cross-border e-commerce export platform has emerged. At present, China's cross-border e-commerce platform mainly includes Dunhuang Network, Alibaba International Station, Dalong Network and so on. Among them, Dunhuang Network is the
number one e-commerce website for online foreign trade in the Asia-Pacific region and the sixth largest website in the world. Dunhuang Network was established in 2004. According to the business model, it is the cross-border e-Commerce export trade platform. Its profit model mainly uses commission system, which means that users can register free of charge, and the relevant fees will only be charged after the buyer and the seller complete the transaction [5]. Dunhuang Network is mainly based on trading communities, gradually adding the service community and expanding, and initially forming its own export cross-border e-commerce ecosystem. The trading community, service community and supporting community of the cross-border e-commerce ecosystem with Dunhuang Network as the core are analyzed below.

3.1. Analysis of the development of trading community
Dunhuang Network targets its target customers in small and medium-sized buyers in developed countries such as Europe and the United States. Such groups have procurement needs, but no the inherent channel advantages of large buyers. Based on the cross-border trading platform (DHgate, DHport), Dunhuang Network helps domestic small and medium-sized supplier companies to export their products abroad. The two trading platforms of Dunhuang Network are not the same. DHgate established in 2004, is a small B2B online trading platform, focusing on the small wholesale model. DHport established in 2013, is the M2B commodity wholesale platform, establishing communication channels between domestic foreign trade factories and foreign wholesalers, focusing on large and medium-sized transactions. In 2013, China's e-commerce accounted for less than 10% of total exports. And the remaining 90% of the market was dominated by traditional B2B trading operations. While the advent of the digital trading era has promoted the development of cross-border e-commerce business, and also promoted the formation of a new platform model, namely the M2B model, so that large and medium-sized transactions gradually become the main orders of the platform.

3.2. Analysis of the development of service community
Dunhuang network through different tools to integrate payment, logistics, finance and other service community, including Dhpay, DHlink, DHfinet and so on. Dunhuang Network established the DHpay online payment platform in 2010, which is an independent third-party payment tool, Through the cooperation with VISA, MasterCard, American Express, Maestro as well as Bank of China, Agricultural Bank of China, Merchants Bank of China, etc. To provide online payment services for sellers of Dunhuang network platform. In 2014, Dunhuang Network set up a DHlink Integrated logistics platform, but did not set up their own logistics distribution system and team. It achieves the outsourcing of logistics services through the long-term cooperation with the international logistics company DHL, FedEx and so on. In 2016, Dunhuang Network set up a DHfinet, including return treasure, foreign exchange, e-commerce data loans and other financial products. Dhfinet matches the corresponding financial products for the seller according to the Seller's logistics, information flow and capital flow message on Dunhuang network platform. It obtains profits by the trading commission. On the one hand, Dunhuang Network expands the service community. On the other hand, it integrates the various service links of the trade chain, to achieve the docking of the platform and the government’s single window, and one-click customs clearance, and to reduce the costs of foreign trade enterprises.

3.3. Analysis of the development of supporting community
As the basis for the development of cross-border e-commerce, the supporting community of Dunhuang network platform includes cross-border e-commerce public service platform and government supervision department. Dunhuang Network immediately followed government’s policy trend of vigorously developing cross-border e-commerce export. DHport outside the comprehensive service platform gradually began to dock with the local single window and the general administration of Customs Data center, which can declare with China's electronic ports directly. It achieves system direct connection and data exchange of two sides of data, including transactions, customs clearance, product information, booking, freight, logistics information, achieving data direct connection, customs
declaration mutual recognition, order information sharing, as well as the sharing of transaction list information between China and designated countries, contributing to more accurate marketing and services.

3.4. Symbiotic relationship between communities

In the export cross-border e-commerce ecosystem, the relationship during trading community, service community and supporting community is similar to the symbiotic relationship in ecology. As a key part of the ecosystem, trading community dock domestic and foreign supply and demand information through the cross-border e-commerce export platform. While service community provides logistics, payment, finance, marketing and other ancillary services; support community provides customs clearance services. They help the trading community to obtain higher benefits together and also derive benefits from the progress. In addition, there is a symbiotic relationship within the community, which is manifested in the internal division of work and cooperation. The enterprises cooperate with each other, together to meet the needs of buyers and sellers, and jointly obtain higher benefits. The Dunhuang Network's export ecosystem is dominated by trading communities, connecting domestic suppliers and foreign buyers through the DHgate and DHport platforms. Service community provides logistics, information flow, capital flow and other services for the trading community in the form of the internal division of business. At the same time, the trading community increases the business volume and expand the profit source for the service community. Service community provides two of the order information to the support community, that is, the logistics order information and the payment order information. And trading community provides the transaction order information to the supporting community. And then supporting community provides customs clearance services for the trading community to help the enterprise realize cross-border trade. This symbiotic relationship enables the continuous flow of information and materials within the system, leading to the healthy and stable development of the ecosystem.

4. Suggestions for the development of China's cross-border e-commerce ecosystem

At present, China's cross-border e-commerce should establish a complete ecosystem centered on the platform, deal with community relations well, and constantly adjust the coordination strategy of the community according to the environment.

First of all, service community is the foundation of whether the ecosystem can be expanded. Service community with optimized structure can attract more trading subjects to join. With the development of the industry and the renewal of technology, the types of individual in service community will increase. Cross-border e-commerce export platform should expand the service community according to the development trend of the industry, absorb more service enterprises for the trading community, improve the customer experience and promote the diversification of the ecosystem [6]. For example, the development of big data technology has led to the emergence as well as widely concerned and applied of big data-based marketing and financial products. Dunhuang Network United with Nanyue Bank developed the internet big data credit product: e-commerce data loan, which realize the real-time synchronization of credit limit, using the big data technology.

Secondly, the degree of cohesion between trading community and supporting community determines the speed of the material and energy cycle of the ecosystem. In recent years, government has continuously introduced policies to promote cross-border trade facilitation. Therefore, cross-border e-commerce trading community subjects should follow the major policy trends and actively contact cross-border public service platform, cross-border customs clearance service platform, national inspection and other departments to speed up information transmission and promote the rapid development of the ecosystem.

Thirdly, the normal operation of the ecosystem relies on the cooperation of the community. Specifically, service community provides logistics services, capital flow services, information services to trading community. Support community provides customs clearance services to trading community. Consequently, cross-border e-commerce export platform should introduce preferential strategies
individually, establish long-term and stable cooperative relationship with service community and support community. Communities also need to establish a letter system. Only when there is a highly trusted relationship during the members of the ecosystem, the trade, logistics, payment and other information can be shared well, the resources of the system can be used effectively, and then the response capacity and efficiency of the entire ecosystem can be improved [7~9].

Finally, the ecological circle is a more complex organic whole than the ecosystem, which is integrated by a number of ecosystems formed by the core of the platform. In the cross-border e-commerce export ecosystem, service community, supporting community, trading buyers and sellers of the different ecosystems may overlap. Hence, the same population in the service communities of different ecosystems, the same population in the supporting communities of which, and different cross-border export platforms may have competition. The intensity of its competition is related to the scarcity and substitution of resources in the ecological circle. In service community, there will be a competitive relationship during enterprises that provide the same or similar services for the cooperation opportunities with cross-border e-Commerce export platforms. And there will be competition between different cross-border export platforms for customers. In supporting community, local governments will compete for more enterprises to enter. According to ecological theory, moderate competition can promote the development of ecosystem. But when competition reaches a certain level, it will form a vicious competition, which will damage the ecosystem. Therefore, government should encourage competition, but also regulate the degree of competition [10].

The environment is constantly changing. But the direction of rapid and vigorous development of cross-border e-commerce in China is constant. China's cross-border e-commerce should take the platform as the center, on the basis of close connection support community, take expanding the service community as the basic line, to realize efficient communication during communities, a high degree of trust, good cooperation, to form a cross-border e-commerce ecosystem with information connectivity, strong pressure resistance, sustainable development [11].

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