The construction and evolution path of cross-border e-commerce ecosystem

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ABSTRACT

Cross-border e-commerce is a novel form of online commerce that has become increasingly important in driving the growth of international trade and promoting economic globalization. As a strategic tool, it allows businesses to expand their reach across borders, connect with a global customer base, and tap into new markets with greater ease and efficiency than traditional forms of trade. The "cross-border" attribute of cross-border e-commerce has led to a diverse and complex ecosystem. Although the industry has begun to recognize the important role of cross-border e-commerce, there is still a lack of effective theories to analyze it. In this paper, we use the theory of ecosystem to interpret the concept and analyze the structure of the cross-border e-commerce ecosystem. The paper argues that the cross-border e-commerce ecosystem evolves in a similar way to other ecosystems, including business and e-commerce ecosystems. While it aligns with the development of related practice fields, it is still in its early stages. Taking a symbiosis theory and niche theory perspective, this paper examines the evolution path of the cross-border e-commerce ecosystem, using a case study of Alibaba. The analysis focuses on the symbiotic unit, symbiotic relationship, symbiotic environment, and niche width.

Keywords: Cross-border e-commerce; Ecosystem; Symbiosis theory; Niche.

1 Introduction

With the global economy becoming more integrated and information technology becoming more accessible, China's cross-border e-commerce industry is experiencing rapid growth. This growth is being driven by China's initiatives to promote "Internet Plus" and "One Belt, One Road," as well as by the increasing income and demand for higher-quality products from consumers. As traditional import and export trade faces weak growth, cross-border e-commerce is emerging as a new channel and business form to promote the development of China's foreign trade. Moreover, cross-border e-commerce has unique advantages in driving industrial transformation and economic restructuring. As a result, cross-border e-commerce is expected to continue developing and improving in the years to come. China's cross-border e-commerce is experiencing rapid growth, driven by various policy dividends, and is now a global leader in the industry.

In recent years, the market for cross-border e-commerce in China has exceeded 10 trillion yuan, and has undergone significant changes in terms of participants, elements, and links over the past decade. Alibaba is a prime example of this transformation, with Jack Ma emphasizing the importance of an "ecosystem" in the company's prospectus. After more than ten years of development, Alibaba's platforms, including Alibaba, Taobao, and Alipay, have matched their American counterparts Ariba, eBay, and PayPal respectively. Additionally, Alibaba owns 13 platforms including Alibaba (B2B), Taobao, Tmall, Alipay, Ali Mama, Koubei, Ali Cloud, Juhusuan, Etao, China Yahoo, China Wanwang, CNZZ, and One Dayong, making it the largest e-commerce enterprise in China. Alibaba has also attracted more brand owners, manufacturers, logistics providers, financial institutions, and e-commerce value-added service institutions to join its platform system. These institutions gather in different ways, forming a growing, expanding, and prosperous cross-border e-commerce ecosystem. Alibaba Group's Ant Financial was once valued at more than one trillion yuan, demonstrating the company's significant impact on the industry. Cainiao Logistics, a subsidiary of Alibaba, has joined forces with three major logistics companies in China (STO, YTO, ZTO, Yunda) through self-construction, co-construction, and other modes to build a nationwide warehousing and logistics network. In addition, Alibaba is utilizing its cloud technology and digital platforms, such as Alibaba Cloud, to provide data support for all participants in the cross-border e-commerce ecosystem. This is promoting the overall...
synergy effect of the ecosystem and helping to facilitate the development of cross-border e-commerce in China. Exploring the construction mechanism of the cross-border e-commerce ecosystem and its implementation path is of high theoretical and practical significance, with Alibaba serving as an example. The company has successfully leveraged its various platforms, including Alibaba, Taobao, and Alipay, as well as its logistics and cloud technology subsidiaries, to create a comprehensive and thriving cross-border e-commerce ecosystem. The successful implementation of this ecosystem has contributed significantly to the growth of China's cross-border e-commerce industry and serves as a model for other companies looking to enter this space.

1. Literature review

The concept of cross-border e-commerce ecosystems was initially introduced by industry figures such as Mr. Ma, and has since gained attention from academics. In recent years, a number of studies have explored cross-border e-commerce from an ecosystem theory perspective. For example, Zhang Xiaoheng identified the key elements of the cross-border e-commerce ecosystem and analyzed them using Jingdong as a case study (Zhang, 2016). The academic community has increasingly recognized the importance of examining cross-border e-commerce through the lens of ecosystem theory, and has explored the topic from various angles. However, there remains a need for a more systematic understanding of the evolution mechanism of the cross-border e-commerce ecosystem. Ji Chunyang and Li Yaoping's work on the China-ASEAN cross-border e-commerce ecosystem proposes a conceptual framework for understanding the different elements and relationships involved in such an ecosystem. The authors believe that by understanding the different components of the framework and their interactions, businesses and policymakers can work together to build a more efficient and effective cross-border e-commerce ecosystem that benefits all stakeholders (Ji and Li, 2016). Zhang Yanbin's research focuses on the collaborative operation mechanism of cross-border e-commerce ecosystem from the perspective of blockchain technology (Zhang, 2018). Cao Wujun et al.'s analysis focused on the logistics enterprise-oriented cross-border e-commerce ecosystem and proposed two concepts, namely the integrated cross-border e-commerce ecosystem and independent cross-border e-commerce ecosystem. The integrated cross-border e-commerce ecosystem refers to a cross-border e-commerce ecosystem that is formed by integrating various logistics resources and services, while the independent cross-border e-commerce ecosystem refers to a cross-border e-commerce ecosystem that is formed by independent logistics enterprises providing end-to-end logistics services. The study suggests that an integrated cross-border e-commerce ecosystem can effectively reduce logistics costs and enhance logistics efficiency, while an independent cross-border e-commerce ecosystem can provide more personalized and differentiated logistics services to customers (Cao et al., 2019). Li Xiangbo et al. constructed the cross-border e-commerce ecosystem through grounded theory and identified three levels of ecosystem components: ecosystem members, internal elements, and ecosystem environment. By analyzing the interactions among these three levels, Li Xiangbo et al. identified key factors that influence the development of cross-border e-commerce ecosystems, such as regulatory policies, cross-border logistics, payment systems, and consumer behavior. They also emphasized the importance of building trust among ecosystem members, which is crucial for the success of cross-border e-commerce (Li et al., 2019). Zhang Henan and Xu Zhengliang analyzed the components of cross-border e-commerce ecosystem from the perspective of symbiosis theory, which emphasizes the interdependence and mutual benefit among different members in the ecosystem. They proposed a symbiotic evolution path of the cross-border e-commerce ecosystem, which includes three stages: initiation, growth, and maturity (Zhang and Xu, 2020). From the existing literature, it is evident that the concept of a cross-border e-commerce ecosystem has gained recognition in the academic community. Various scholars have analyzed the elements and components of such ecosystems from different perspectives, such as blockchain technology, logistics enterprises, and symbiosis theory. However, the evolution mechanism of cross-border e-commerce ecosystems remains a relatively unexplored area of research. Therefore, future studies could focus on investigating the dynamic changes that occur within these ecosystems over time and how they impact the development of cross-border e-commerce.

2. Construction of cross-border e-commerce ecosystem

(I) Evolution of cross-border e-commerce ecosystem

Ecosystem, also known as the ecosphere, is a biological concept and theory that was originally proposed by A.G. Tansley in 1935. An ecosystem is defined as a complex of organisms interacting with their physical environment, which includes all the complex physical factors that form the environment. Ecosystems are natural systems with unique environments (A.G. Tansley, 1935). The universally recognized ecosystem is a dynamic and complex functional unit that is formed by the interactions between animals, plants, microorganisms, and their
inorganic environment (Zhang, 2007). Regarding the constituent elements of an ecosystem, some scholars believe that an ecosystem is comprised of three types of elements: producers, consumers, and decomposers. These elements emphasize the exchange of material, energy, and information with the external environment (Zheng et al., 1994). While others believe that an ecosystem consists of six elements, namely inorganic substances, organic compounds, climatic factors, producers, consumers, and decomposers (Sun et al., 1993). Whether based on the three-element theory or the six-element theory, an ecosystem can be divided into two parts: the complex community of species and their physical environment. Some scholars argue that ecosystems provide services to the social system, including materials, energy, and information that are relevant to human needs (Maarten, 2012). As society and industries continue to evolve, organizations must adapt to changing trends. With the transition from the industrial age to the information age, the traditional division of labor pattern has shifted, resulting in new organizational structures. Drawing from ecosystem theory, James F. Moore introduced the concept of a business ecosystem. A business ecosystem is an economic alliance comprised of multiple organizations that interact with one another. Its components include core enterprises, consumers, market intermediaries, suppliers, risk takers, and influential entities such as governments and legislative bodies. This view recognizes the complex interdependence and cooperation among different organizations within an economic system. It highlights the importance of collaboration and mutual support among different entities to achieve a common goal. Furthermore, it acknowledges that even competitors can play an essential role in an ecosystem by providing unique strengths and advantages (Moore, 1993; Moore, 1999). Scholars also refer to the concept of a business ecosystem as an enterprise ecosystem (Hu et al., 2008; Lou et al., 2002). The business ecosystem is a more inclusive concept than the enterprise ecosystem due to its broader range of components, including core enterprises, consumers, market intermediaries, suppliers, risk takers, and powerful members. Therefore, it has a richer connotation and is more widely recognized by the academic community. Domestic scholars have conducted extensive research on the business ecosystem, and Wang Xingyuan has proposed that it consists of core supply chain systems, supporting environment systems, competition systems, and social natural environment systems, with members including core enterprises, extended enterprises, and related social organizations (Wang, 2005). Lu Shan and Gao Yang have proposed that the business ecosystem not only encompasses the general supply chain, which forms the core part, but also comprises of government agencies, other management organizations, industry associations of the supply chain, and other similar supply chains that constitute the extended part of the business ecosystem (Lu and Gao, 2007). According to Zhong Gengshen and Cui Zhen Zhen (2009), the business ecosystem comprises four subsystems, namely the core ecosystem, competition system, support system, and society and natural environment system (Zhong and Cui, 2009). The concept of industrial ecosystem is based on the ecosystem theory, which was initially proposed by Frosch and Gallopoulos in 1989. They argued that the economy can be seen as a circular system that operates similarly to a natural ecosystem. This circular system comprises interdependent producers, consumers, and regulatory institutions that exchange material, energy, and information among themselves and with the environment (Frosch and Gallopoulos, 1989). Industrial ecosystems have structures and characteristics similar to those in biota (Korhonen, 2005; Zhou et al., 2005). This also highlights the origin of the industrial ecosystem from ecosystem theory. As time progressed, the concept of industrial ecosystem garnered increased attention and domestic scholars began conducting research on this topic. Zhang Pan and Geng Yong proposed that the industrial ecosystem is an extremely complex system with numerous interdependent components (Zhang and Geng, 2008). Based on systems theory, Shi Xiaoping proposed that the industrial ecosystem is a self-organizing system consisting of enterprises, consumers, and the environment, with the ability to self-regulate (Shi, 2013). Li Xiaohua and Liu Feng, based on the theories of business ecosystem and national innovation system, proposed that the industrial ecosystem is a collection of various factors that significantly impact industrial development and their interactions, including the innovation ecosystem, production ecosystem, and application ecosystem, as well as auxiliary factors such as factor supply, infrastructure, social and cultural environments, international environments, and policy systems (Li and Liu, 2013).

Based on the theories of ecosystem, industrial ecosystem, and business ecosystem, the concept of e-commerce ecosystem emerged. Some scholars view the e-commerce ecosystem as a variant of the business ecosystem adapted to the internet environment (Zhou, 2011). In the early study of e-commerce, Liu Zhijian incorporated the concepts of ecosystem and business ecosystem, and posited that the e-commerce ecosystem is an organic system in which closely-related enterprises or organizations achieve complementary advantages and resource sharing through alliances and other forms on Internet platforms (Liu, 2006). This view was later recognized and adopted by Hu Lanlan et al., who categorized the members of the e-commerce ecosystem as "species," including leading population, key population, supporting population, and parasitic population (Hu et al., 2009). In addition, the most important subsystem in the business ecosystem is the core enterprise ecosystem, which consists of the core enterprise and its...
suppliers and customers (Li et al., 2015). Some scholars have proposed the concepts of Internet enterprise platform ecosystem and Internet business platform ecosystem. (Wang, 2014; Li and Wang, 2016). Such views still rely on the ecosystem and business ecosystem theory, and emphasize the formation of complementary advantages of organizational alliance with enterprise platform or business platform as the core through resource integration.

Through literature review, the evolution mechanism of the above ecosystem views is clarified, as shown in Figure 1. The cross-border e-commerce ecosystem is rooted in the ecosystem theory, which is applied in the field of cross-border e-commerce. The essential attributes of the ecosystem, including the constituent elements and the operating mechanism, are crucial to understanding the cross-border e-commerce ecosystem. Additionally, the cross-border e-commerce ecosystem follows the layer-by-layer evolution mechanism, which means that it is based on the ecosystem theory and follows the evolution logic of "ecosystem—business ecosystem—e-commerce ecosystem—cross-border e-commerce ecosystem." Furthermore, the evolution of the cross-border e-commerce ecosystem is aligned with its practice field. Initially, ecosystem theory was a biological concept. However, as commercial organizations grew more complex, the theory was introduced into the business category, and commercial and industrial ecosystems were derived. With the advent of the internet, e-commerce emerged, which led to the development of the Internet enterprise, e-commerce, and Internet industry. By introducing the e-commerce ecosystem into cross-border e-commerce, the cross-border e-commerce ecosystem was established. However, as cross-border e-commerce is still relatively new, there are still shortcomings in theoretical research. Although ecosystem theory has been introduced into cross-border e-commerce research, it is still in the early stage of theoretical development and has not yet reached the theoretical richness of commercial ecosystem and e-commerce ecosystem.

![Figure 1. Evolution of cross-border e-commerce ecosystem](image)

(II) The theoretical support of cross-border e-commerce ecosystem

1. Business ecosystem

Business ecosystem theory is based on natural ecosystem theory and applies ecological principles to economic research. The concept of "business ecosystem" was first explained by Moore in 1996, who defined it as an economic union based on the interaction between organizations and individuals that produce products and services of value to consumers. The members of the organism mainly include suppliers, consumers, producers, competitors, and other risk takers. The commercial ecosystem evolves through four stages: development stage, expansion phase, leadership stage, and self-renewal or death stage. The evolution of a business ecosystem is important for its long-term survival and prosperity.

In recent years, cross-border e-commerce has emerged as a new research hotspot in the field of e-commerce. As such, a research perspective based on business ecosystem theory has gradually gained attention. Specifically, Zhang Xiaoheng has built a cross-border e-commerce ecosystem based on Moore's business ecosystem structure. Using Jingdong as an example, he proposes a development path for the cross-border e-commerce ecosystem by analyzing its cross-border e-commerce operation mode (Zhang, 2016). Xu Hui and Cui Liangliang put forward the components of the cross-border e-commerce ecosystem based on the development model of the cross-border e-commerce industry. They also suggested countermeasures for the development of the cross-border e-commerce ecosystem from the perspectives of cross-border logistics and international policies (Xu and Cui, 2017). Starting from the composition of the cross-border e-commerce enterprise ecosystem, including consumers, suppliers, payment, and logistics, Qiu Lin and Hong Jinhua conducted a quantitative analysis of the influencing factors of cross-border e-commerce (Hong, 2019). Wang Hong et al., Cao Wujun et al., led by logistics enterprises, discussed the construction, evolution, and evaluation of cross-border e-commerce logistics ecosystem (Wang and Guo, 2018). Xue Chaogai et al. constructed a cross-border e-commerce ecosystem model, analyzed the risk elements existing in the operation process of cross-border e-commerce ecosystem based on social network analysis, and proposed effective risk
avoidance strategies (Xue et al., 2019). Yang Xiaoxia took Henan Province of China as the research scope, analyzed the components of the cross-border e-commerce ecosystem in Henan Province, and proposed improvement paths for the problems existing in the system elements (Yang, 2019).

Currently, cross-border e-commerce is rapidly developing in China. While research on the cross-border e-commerce ecosystem has made some progress, most of the research perspectives are simplistic, lacking a clear understanding of the concept of the cross-border e-commerce ecosystem, and failing to conduct in-depth and dynamic analysis of the interactions among system elements. Countermeasures and suggestions for system development also lack sufficient theoretical basis.

3 Symbiosis theory

The term "symbiosis" does have its roots in biology. It was first proposed in 1879 by the German mycologist Heinrich Anton de Bary to refer to the close and long-term interaction between two or more different biological species that can be mutually beneficial and harmful. It could be neutral. Used to describe any close and long-term relationship between different entities, whether or not they are biological in nature (Douglas, 1994). With the continuous development of related research, scholars have extended the study of symbiosis to social sciences, achieving significant progress. Yuan Chunqing, for instance, was the first to introduce the theory of symbiosis into Chinese economics, defining symbiosis as the relationship between symbiosis units in a certain symbiosis environment according to a certain symbiosis model. The three basic elements of symbiosis include symbiotic unit, symbiotic environment, and symbiotic mode. Symbiotic unit is the basic energy production and exchange unit of symbiotic or symbiotic relationship. Symbiotic mode, also known as symbiotic relationship, is the way symbiotic units interact or combine. The symbiotic environment is the sum of factors outside the symbiotic unit. Among the three elements of symbiotic relationship, the symbiotic unit is the internal foundation, the symbiotic environment is the external condition, and the symbiotic mode is the core key. The symbiotic mode not only reflects the production and exchange relations between symbiotic units but also determines the positive or negative impacts that symbiotic units may have on the environment, thereby determining the role of symbiotic relations on symbiotic units and the symbiotic environment (Yuan, 1998). Hu Xiaopeng argues that the symbiotic relationship is driven by the continuous development of the industrial chain, while the value-added generated by each link of the industrial chain serves as an external catalyst (Hu, 2008). In an ecosystem, according to the symbiosis theory, a species can only be dominant in the system when it establishes a sustained cooperative relationship with other species through resource complementarity. Such symbiosis can ultimately promote the continuous evolution of the system (Hao and Ren, 2009). Additionally, the theory of symbiosis highlights three fundamental elements of symbiosis, namely, symbiotic unit, symbiotic environment, and symbiotic mode. The symbiotic unit refers to the unit that produces and exchanges basic capabilities in a symbiotic relationship, while symbiotic mode refers to the way in which symbiotic units interact with one another. The symbiotic environment, on the other hand, comprises the accidental cooperation of symbiotic units, which collectively promotes the efficient operation and evolutionary innovation of the commercial ecosystem.

4 Niche theory

The concept of niche also originates from the field of biology and was first proposed by ecologist J. Grinnel. It is considered to be the position and functional role of organisms within a community (Zhuang, 2005). Later, Hannan et al. introduced the concept of niche into enterprise research and described it as the competition between one population and all other populations for occupying a specific resource space. (Hannan and Freeman, 1977). Chinese scholar Wang Nan et al. proposed that the ecological niche refers to an enterprise's environmental state, its own resource endowment, and its competitive position in the commercial ecosystem (Wang et al., 2009). Niche theory primarily focuses on the position, function, and role of species in an ecosystem and reflects the structure of the ecosystem. Each species in the natural ecosystem has a unique ecological niche and growth resources, and each plays its own role and influences one another. Species interact with one another to form a unique ecological chain and build an invisible but solid and stable biological network to cope with unpredictable challenges together. In the cross-border e-commerce ecosystem, the dominant player serves as the core, and each member assumes different functions, transmits information to one another, shares resources, and achieves common goals through cooperation to gain benefits. The upstream and downstream are closely connected, forming an intangible value chain. The value chain intersects with one another around the core members of the ecosystem, forming a massive value network to achieve energy transfer and growth of cross-border electronic ecosystems. Ding Ling et al. also propose that spatial expansion can be achieved through mergers and acquisitions of enterprises with different ecological niches in the
same field, combined with self-renewal through research and development capabilities, to achieve independent innovation of ecological niches and realize the innovation evolution of enterprises (Ding and Wu, 2019).

2. Interpretation of the concept of cross-border e-commerce ecosystem

(I) Definition of cross-border e-commerce ecosystem

Cross-border e-commerce is a novel business model that has emerged from the development of e-commerce. While it shares many characteristics with traditional e-commerce, it also possesses unique features that distinguish it from e-commerce. By drawing on the concepts of ecosystem, business ecosystem, and e-commerce ecosystem, it is possible to formulate the concept of cross-border e-commerce ecosystem. From the standpoint of the business ecosystem and e-commerce ecosystem concepts, both can be interpreted as manifestations of the ecosystem concept, which are combined with their respective characteristics. The cross-border e-commerce ecosystem is rooted in the e-commerce ecosystem, and its conception is based on the e-commerce ecosystem concept, but it is not a simple equivalent of the e-commerce ecosystem concept. Although the cross-border e-commerce ecosystem can be considered a type of e-commerce ecosystem to some extent, its complexity is far greater than that of the e-commerce ecosystem. This complexity is commensurate with the complexity of cross-border e-commerce, particularly in terms of the complexity of the cross-border e-commerce main actors and the complexity of the environment in which they operate.

(II) Cross-border e-commerce ecosystem structure system

The cross-border e-commerce ecosystem is an organic whole composed of related species that complete commodity transactions on the cross-border e-commerce platform as the core. Based on the development status and background of cross-border e-commerce and from the perspective of ecological chain, this paper uses the concept of e-commerce ecosystem to study and analyze the composition of cross-border e-commerce ecosystem with the help of relevant research theories and conclusions of scholars on ecosystem. The ecosystem structure of cross-border e-commerce is shown in Figure 1.

The cross-border e-commerce ecosystem can be viewed as a dynamic and complex system composed of different subsystems, where individuals, enterprises, organizations, or government agencies engaged in cross-border e-commerce activities are considered as "species". The cross-border e-commerce platforms serve as the communication, competition, and cooperation channels and media, facilitating the exchange of resources and complementing each other's strengths in various forms. The ecosystem involves the dynamic flows of logistics, business, capital, and information, as well as the communication, sharing, and circulation of energy and information among the species and between the species and the environment. The ecosystem is characterized by its complexity, with multiple elements, layers, angles, and levels, which are constantly changing and evolving over time. Therefore, the adoption of the term "cross-border e-commerce ecosystem" is more appropriate than "cross-border e-commerce ecosphere" (Zhang, 2017).

Based on the actual situation of cross-border e-commerce industry chain, this paper divides the cross-border e-commerce ecosystem into three layers: core layer, service layer and support layer. The core layer is the main body of the transaction, that is, suppliers, trading platforms, customers and so on. The parties to the transaction trade on the platform and then pass the information on to the other levels.

The service layer mainly refers to the service layer which is integrated by the comprehensive service platform to the relevant service subjects that provide capital flow, logistics and information flow services for transactions. Including marketing services, technical services, logistics services and so on. This level can determine the overall level of the cross-border e-commerce industry and ensure the normal operation of the entire ecosystem.

The number, scale and market concentration of enterprises represented by the subjects at the above two levels reflect the competitive ecology of the industry market. In addition to the support layer, in the whole system plays a link between the preceding and the following role. The transaction subject of the support layer does not directly participate in the competition. The function of this level is to realize the unified transmission and exchange of information. It is the cross-border e-commerce public service platform that integrates all kinds of information of the two levels of core layer and service layer, and then transmits the information to the customs to complete the customs clearance of goods and the supervision of the transaction process.
3. Analysis on the evolution of cross-border e-commerce ecosystem based on Alibaba Case

Based on the above theoretical elaboration, this paper further analyzes the formation mechanism and evolution mode of the cross-border e-commerce ecosystem by examining the case of Alibaba. As a global representative of cross-border e-commerce, Alibaba has gradually evolved from the initial Alibaba International Station into a cross-border e-commerce platform represented by Tmall International, AliExpress, Lazada, and Kaola Overseas Shopping, a cross-border payment platform represented by Alipay, a cross-border logistics network represented by Cabbage Bird Logistics, and a data center represented by Alibaba Cloud. Through these various enterprises, Alibaba has built a complete cross-border e-commerce ecosystem. Within the cross-border e-commerce ecosystem, Alibaba constantly optimizes its niche through mergers and acquisitions and technological innovation, and continuously cooperates with other species and environments to form symbiotic advantages, promoting the evolution and development of the cross-border e-commerce ecosystem.

(I) Expand and strengthen symbiotic units and consolidate the core species status of cross-border e-commerce ecosystem.

Symbiotic units are the fundamental elements of the cross-border e-commerce ecosystem. They participate in cross-border e-commerce trading activities, with cross-border e-commerce platforms playing a more prominent role. Logistics enterprises and payment enterprises are also included as they contribute to completing the business flow, logistics, and capital flow of transaction activities.
Alibaba is a global leader in cross-border e-commerce platforms. Starting with the Alibaba International Site, they have since expanded to include AliExpress, Tmall International, Taobao Global Shopping, and have even acquired Lazada and Kaola Overseas Shopping. According to internal data, the average annual compound growth rate of transaction volume reached 200% and the average annual compound growth rate of order volume reached 308% from 2015 to 2018. As the core species, Alibaba has continuously expanded and strengthened its cross-border e-commerce platform, consolidating its position and playing important functions in the cross-border e-commerce ecosystem.

Furthermore, Alibaba also focuses on the construction of supporting species, such as payment and logistics, continuously enlarging and strengthening these symbiotic units. This not only opens up the cross-border e-commerce trading chain but also supports the construction of core species, promoting the development and evolution of the cross-border e-commerce ecosystem.

(II) Continue to optimize the symbiotic relationship and promote the synergy of symbiotic units in the cross-border e-commerce ecosystem

The ecosystem of cross-border e-commerce is comprised of multiple symbiotic units, each forming different symbiotic modes and resulting in various symbiotic relationships. The interaction between these units promotes the achievement of cross-border e-commerce transactions. In this ecosystem, each symbiotic unit has a unique ecological niche, and their positions, functions, and roles in the system vary. An effective evolutionary path for the cross-border e-commerce ecosystem involves continuously optimizing the symbiotic relationship among internal symbiotic units and transforming it towards mutualism and stable symbiotic relationships.

Alibaba leverages Ali Cloud technology to build Cainiao logistics with other logistics enterprises such as Sandong Yida, which not only realizes resource integration but also enhances logistics operation efficiency. Furthermore, Alibaba’s Ant Group online banking fund of ten billion yuan aids small and micro cross-border e-commerce enterprises in Caixian County. By relying on the internet, characterized by data, scale, mass, and intensification, and focusing on small and high-frequency business, this fund explores the potential capital needs of small and micro enterprises by providing pure data credit and loan services, efficient and convenient payment and settlement services. It has helped Caixian County become a wood products cross-border e-commerce industrial belt, driving the collaboration of different symbiotic units, such as cross-border e-commerce platforms, suppliers, payment providers, and comprehensive service providers, within the cross-border e-commerce ecosystem.

(III) Timely follow up the symbiotic environment and optimize the external conditions attached to the cross-border e-commerce ecosystem

The symbiotic environment is a crucial element of the cross-border e-commerce ecosystem and plays a vital role in promoting the symbiotic evolution of the system. In China, the development of cross-border e-commerce is facilitated by favorable external conditions such as an increasing Internet penetration rate, a growing policy dividend, a positive momentum in the development of cross-border e-commerce enterprises, and an increasing number of consumers who are cultivating cross-border e-commerce consumption habits. These factors have contributed to creating a conducive symbiotic environment for the cross-border e-commerce ecosystem. Emerging ecosystem institutions can integrate the internal functions of enterprises with external environmental resources, thereby providing a favorable symbiotic environment for the development of the cross-border e-commerce ecosystem (Hong and Lv, 2017). Alibaba Group is taking advantage of the favorable symbiotic environment to continuously strengthen its own ecological niche, actively interact and cooperate with other symbiotic units, and promote the symbiotic evolution of the cross-border e-commerce ecosystem. For example, in 2018, Alibaba International Station launched the "Going Digital" strategy, which centers on the top-level design of the national digital economy, and aims to attract more small and medium-sized enterprises to participate in the cross-border e-commerce industry. Alibaba Cloud and Ant Group Online Business Bank are making full use of big data, cloud computing, blockchain, credit, payment, and other technological means to promote the digital "new infrastructure", actively catering to the national "new infrastructure" strategic development, and continuously optimizing the external conditions attached to the cross-border e-commerce ecosystem.

(IV) Actively expand niche width and promote the integration of cross-border e-commerce ecosystem resources

In the cross-border e-commerce ecosystem, enhancing species’ influence and performance can be achieved by expanding their niche width. Symbiotic units can broaden their niche width through mergers and acquisitions, research and development, and innovation, which can improve their resource integration ability in the cross-border e-commerce ecosystem. Through mergers and acquisitions, technological development, and mode innovation,
Alibaba has not only widened its niche by leveraging the original symbiotic units but also actively developed and established new symbiotic units.

Alibaba has achieved spatial expansion through the acquisition of different ecological niches in the field of cross-border e-commerce platforms, such as Lazada and Kaola. Building on Alibaba International Site, the initial cross-border e-commerce trading platform, Tmall International emerged through the cross-border expansion of Tmall and established cross-border e-commerce platforms such as AliExpress and Alibaba Global Shopping, actively expanding into other cross-border e-commerce types. With the advantage of being the core species of the cross-border e-commerce platform, Alibaba has diversified its business by entering into payment, logistics, and comprehensive services.

Furthermore, Alibaba leverages its Ali Cloud platform and data technology to provide technical and data support for its own symbiotic units within the cross-border e-commerce ecosystem, as well as other symbiotic units. Alibaba has actively broadened its niche width in the cross-border e-commerce ecosystem through various means and is committed to promoting resource integration between different symbiotic units, symbiotic units, and symbiotic environment within the system. By fully leveraging the comparative advantages of each symbiotic unit within the cross-border e-commerce ecosystem, the synergistic effect of resource sharing and mutual cooperation is generated, which promotes the optimization of the cross-border e-commerce ecosystem with Alibaba as the core species.

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