

The Evolution of E-Commerce Service Ecosystem

(Full Paper)

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ABSTRACT

On the basis of defining e-commerce service ecosystem (ECSEM), we elaborated its population constitution and structure, drew on the theory of industrial ecosystem and the development course of e-commerce in China to discuss the evolutionary path and process, and concretely analyze the evolutionary process and characteristics of crucial components included in this ecosystem, such as all kinds of service providers, competitors, industrial rule and standard systems, etc. In the end, a case of Alibaba's ECSEM and its evolution was analyzed to testify our study. This paper aimed to build the basic theory of ECSEM and reveal its evolutionary process and laws, so as to provide reference for the construction and development of ECSEM.

Keywords: E-commerce service, ecosystem, evolution, Alibaba

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INTRODUCTION

Since the global financial crisis in 2008, China's e-commerce service industry has been developing as blowout. According to statistics, its market scale increased from 1.3 billion dollars in 2012 to 13.7 billion dollars in 2017, and the CAGR (compound annual average growth rate) reached 61% (China's Industrial Information Network, 2018). E-commerce service has been widely used in all aspects of the economic and social life, deeply integrated with production, circulation, consumption, investment and other fields. It becomes an important growth point and development engine of the national economy, and plays an important role in promoting the development of e-commerce, supporting economic transformation and upgrading, promoting industrial integration, optimizing the allocation of market resources, facilitating entrepreneurship and employment. With the rapid expansion of e-commerce and its service market, the in-depth application of new information technologies such as big data and cloud computing, the gradual improvement of industrial rules and related policy and legal systems, various e-commerce service enterprises and service providers are rapidly approaching different core enterprises to achieve large-scaled ecosystems. The change of competition mode between enterprises becomes more and more obvious. In the future, the competition among enterprises has gradually changed from competition among individuals, competition between supply chains and value chains, competition among business models into the competition among ecosystems based on shared value (Xiao, 2015; Jiang, 2016). Ecological development has become the consensus of leading e-commerce companies.

This paper proceeds as follows: in the next section, research related to e-commerce service ecosystem (ECSEM) is reviewed. This is followed by the definition and structure analysis of the ecosystem, which is the basis and essential factor to analyze its evolution. We then point out the three crucial forces that drive the ecosystem to evolve. Next, we show the evolutionary path and process of this ecosystem, and further analyze the evolutionary process and characteristics of key elements in it in order to further disclose the ecosystem's evolutionary rules. At the end of the paper, a case of Alibaba's ECSEM is clearly described to certify all the viewpoints above.

RELATED WORK

E-commerce Service Industry

AliResearch has studied a lot about e-commerce service industry and its ecological development based on business practice: 1) from the viewpoint of e-commerce ecosystem, studied the types and structure of its related service, analyzed the current development situation and the impact on the economy and society (IDC & Alibaba Research Center, 2012); 2) from the perspective of ecological system, divided the ECSEM into four parts: core layer, expansion layer, correlation layer and social layer (IDC & Alibaba Research Center, 2011); 3) analyzed the four stages of its ecological evolution: gestation, construction, expansion and leadership (Alibaba Research Center, 2011).

Ecological Development Mechanism of Certain Types of E-commerce Service

Wang (2014) studied the connotation and construction process of the Internet enterprise platform ecosystem and financial ecosystem based on the common value theory. The essence of brand ecosphere is the integration platform of brand relations under self-repair mechanism, self-differentiation mechanism and self-adaptation mechanism, and it deals with all kinds of brand relations based on these three mechanism (Xu et al., 2017). Based on the analysis of brand development history of Yunnan Baiyao Group from 1999 to 2015, Xu and his partners thought that the growth process of brand ecosphere is also the evolution of core competence from low to high level and finally gain self-adaptation capability based on the operation mechanism of brand ecosphere. In their view, the purpose of building a brand ecosystem is to form a systematic competitive advantage. With the rapid development and common use of mobile

payment technology, researchers defined and constructed the mobile payment service ecosystem, analyzed its technological innovation, and explored the evolutionary path of different payment modes (Liu, Kauffman & Ma, 2015; Hedman & Henningsson, 2015).

Structure and Evolutionary Path of Specific ECSEM

Zheng (2013) divided ECSEM of Taobao into 4 parts: core layer, tight layer, associated layer and environmental layer according to tightness between business subjects and the members of Alibaba Group. Meanwhile, he divided the ecosystem's development process into four stages: natural growth stage (2003-2004), ecological awareness stage (2005-2007), "big Taobao" strategy stage (2008-2010), "big Ali" strategy stage (after 2010). Based on the development status of e-commerce service industry, Li (2016) divided the developing process of seller service into three stages: germination period, growth period and expansion period. Alibaba Research Center & Business Department (2017) analyzed the development status of Alibaba cloud retailing service ecosystem.

The current research above has studied different aspects of ECSEM in detail, but also shows some limitations: 1) conceptually, it has not yet made a clear analysis of its connotation; 2) As for the research object, only one part of the ECSEM is studied, but global research about it is rare; 3) as for the evolution process, from the viewpoint of e-commerce service industry or e-commerce ecosystem only, partial and brief analyses are carried out on the basis of predicting the future development situation, which lacks comprehensiveness. Therefore, this paper attempts to discuss and analyze the whole ECSEM and its evolution from the perspective of industrial ecology, combined with the idea of species in natural ecosystem and more than ten years of e-commerce service practice.

KNOWING ABOUT ECSEM

The concept of ECSEM is the transplantation and reference of ecosystem in natural ecology. Ecosystem refers to a unified whole with self-coordination ability, which is composed of all living organisms and the surrounding microbial environment in a certain space (Qu, 2012). The members of the system interact and coexist through material circulation and energy flow to maintain dynamic balance. In the e-commerce environment, the service enterprises, application enterprises and their related members interact to form the ECSEM.

The Definition of ECSEM

The concept of ecosystem is first proposed by a British ecologist, A.G. Tansley. He believed that the whole can be regarded as an ecosystem when there exists different species self-growing and interacting with each other to maintain a dynamic balance in structure and function (Tansley, 1935). Industrial ecosystem refers to the unity in which all industries and its existing environment interact and coordinate in a certain region to gain sustainable development capabilities through information sharing, material circulation and energy flow (Zhang, 2012). The relationship between industries lies not only in the recycling of waste and primary products, but also in the sharing of technology and information, the joint participation of commercial subjects and the coordinated development among different industries (Zhang, 2012; Tsvetkova et al., 2015). The core of industrial ecosystem is the three industrial chains of innovation, production and application, which simulate the biological ecosystem by tracking the energy exchange in the system (Li & Liu, 2013; Su, Zheng & Chen, 2018). Its purpose is to maximize the use of resources and energy and minimize waste emissions, in order to actualize a win-win situation between economy and environment (Fan et al., 2017). It's obvious that ECSEM inherits the ideas of natural ecosystem and industrial ecology, and extends according to its own characteristics.

Therefore, this paper holds that the ECSEM is an organic whole which can be understood from the following four keypoints: 1) It's based on e-commerce transaction activities; 2) It involves all kinds of e-commerce service enterprises and application enterprises, consumers, relevant governmental departments and social organizations, and external environment; 3) Its core is value sharing and co-evolution; 4) It's formed throughout resources sharing, advantages complementation and synergistic innovation among all subjects of the system, with the help of e-commerce platform, influenced by the flow of commodities, information and capital.

Population Structure of ECSEM

Population refers to the sum of the same species of organisms in a certain space, and is the basic unit of biological evolution and the main body of the system (Xu, 2016). In the ECSEM, the population can be regarded as the aggregation of individuals or groups with the same service functions in an industrial cluster. Its structure is the basic support of the ecosystem's evolution.

Figure 1 shows some forms of relationship such as member structure, niche, and population in the ECSEM. In terms of member structure, the ecosystem is divided into five layers: core layer, key layer, correlated layer, extended layer and environmental layer; In terms of population structure, the ecological subjects of the system are divided into four types: core population, key population, extended population and associated population, which can be divided into endogenous population and implanted population according to their source. Among them, the core population is generally endogenous population, while the key population, extended population and related population may be endogenous population or implanted population. The different population types correspond to their levels in the ecosystem.

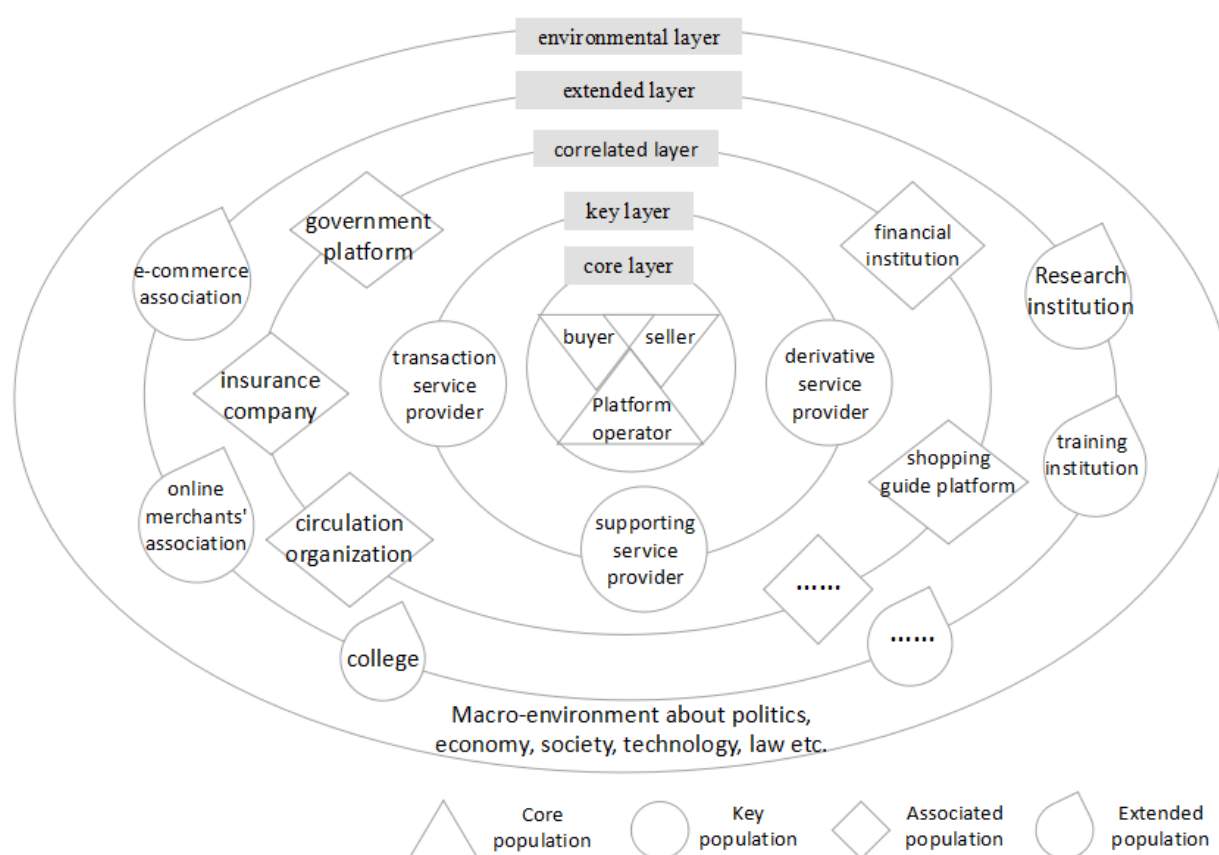


Figure 1: Population Relationship of ECSEM

Core population, including buyers, sellers and e-commerce platform operators, is the core of the entire ECSEM.

Key population, includes all kinds of e-commerce transaction service providers, supporting service providers and derivative service providers such as information service, platform service, payment service, logistic service, IT technology service, generation of operating service, marketing service, customer service, credit service, personnel training service, data service, etc.

Associated population, refers to institutions or organizations who have carried out business cooperation with core populations and key populations and can help improve their service levels and capabilities, for example, financial organizations such as banks, insurance corporations, various media platforms, shopping guide platforms, and various related circulation organizations and government platforms, etc.

Extended population, refers to institutions or organizations that do not directly participate in system's business activities, but can affect the growth, maturity and profitability of the ecosystem's populations indirectly, mainly including various industrial research institutions, scientific research center, industrial associations, online merchants' associations, relevant policy and legal departments responsible to that, industrial regulators that are related to e-commerce service, such as AliResearch, iResearch, China's Network Merchants Alliance, China's Modern Logistic Network Alliance, China's Electronic Commerce Association and so on.

Due to the large scale, wide range and numerous influencing factors of ECSEM, the role of each ecological subject in the system will frequently change with factors such as time, space and scene. What's more, the relationship between subjects is also very complicated. Therefore, the layers to which subjects are attributed and the relationship among populations is elastic and changeable. Different layers and populations are interlaced and dynamic rather than completely separated.

EVOLUTIONARY DYNAMICS OF ECSEM

The evolution of ecosystem is a process in which system's main subjects interacts and functions in multiple angles and patterns in a certain environment, thus achieving coordinated evolution. The evolution of ECSEM refers to the process that, with the deepening of e-commerce application, e-commerce service enterprises are gradually specialized, large-scaled and clustered, market resources are constantly coordinated and redistributed among different ecological entities, relevant industrial rules and

standards, policy and legal systems are gradually improved, jointly promote the continuous expansion, maturity and improvement of ECSEM. The driving forces of ECSEM's evolution are mainly reflected in the fierce market competition among system entities, the ecological symbiosis among system entities and their interaction with the environment, and the collaborative innovation of all members.

Driven by Market Competition

In order to ensure the survival and development, compete for limited market resources and maintain its market position, there will be fierce competition among the core enterprises of different ECSEM and among homogenous or alternative entities in the same ecosystem. Enterprises will continually explore and stimulate market demand, capture changes and enhancements of individualized needs in a timely manner, or absorb new information technologies, imitate successful developing cases, thereby adjusting market strategies and transforming service models to provide innovative service, which will aggravate and upgrade competition. The fierce market competition among different ecosystems and their main entities has caused the dynamic changes of their niche, maintains or even promotes the process of removing enterprises and developing models that cannot adapt to market's development, and retaining enterprises with strong core capabilities and developing models most adaptable so that the ecosystem is constantly updated and optimized to promote the ecosystem's evolution.

Driven by Ecological Symbiosis

The driving forces of ecological symbiosis include the symbiosis among main entities of ECSEM and its surrounded environment. The symbiosis among main entities of the ecosystem includes four types: 1) Mutual industrial symbiosis, that is, enterprises, which don't have direct competition or interest conflicts with each other, establish an alliance to cooperate in the form of goal mutually seeking, resource and interests sharing, and risk sharing based on the principle of equality and mutual benefits, forming a community of interests in which mutual benefits, coexistence and advantages complementing is fulfilled; 2) Parasitic industrial symbiosis, that is, one enterprise exists parasitically on another enterprise, its survival, development and interest distribution depends all on the host enterprise; 3) Interest-deviated industrial symbiosis, that is, a symbiotic relationship which is beneficial to one enterprise but has no direct profit or less profit to another enterprise; 4) Mixed symbiosis, that is, a mixture of the above three symbiotic relationships (Qu, 2012). Different symbiotic modes between enterprises will produce different ways of energy and value flow, and different interest distribution, making the network of members in the ecosystem more diverse and complex, improving the stabilization of its structure, enhancing the vitality of the system and its members. At the same time, the symbiosis between ecological subjects and environment promotes a more coordinated ecosystem, and enhances the system's perception and reaction ability to changes of external environmental factors.

Driven by Collaborative Innovation

Every member of the ECSEM is a node in a symbiotic network in which all nodes are interrelated and interdependent, and changes of any member's niche will cause changes in the entire ecosystem. Therefore, when ecological entities mutually interact by all means such as industrial association, business alliances and so on, and combine their core capabilities to jointly develop and innovate, a complex relationship network of sharing, co-construction and symbiosis will be formed, the reform and perfection of other parts in the system will be driven and urged, then collaborative innovation of the entire ecosystem is accomplished and the comprehensive and profound evolution of the ecosystem will be pushed.

In addition, the application of various new information technologies, the regulation of policies and laws, and the feedback adjustment of consumers and the market are all important driving forces for the ECSEM's evolution. Different drivers interact to construct a synergy to form an orderly driving system with multiple levels, jointly promote the ecosystem's development and evolution (Guan et al, 2013).

EVOLUTIONARY PATH AND PROCESS OF ECSEM

Based on current research results and the developing process of China's ECSEM, this paper draws on the evolution theory of industrial ecosystem, combined with the research about the evolution of e-commerce system (Hu, Lu & Huang, 2009; Guo, 2014; Ji & Li, 2012), and summarizes the evolutionary path of ECSEM into four stages: initial formation - development and expansion - maturity and coordination - innovation and upgrading (see Figure 2).

Since the ECSEM is a brand-new industrial ecosystem, the experience and laws that can be used for reference are scarce. So it is vulnerable to the external environment, and may be transferred directly from the stage of initial formation, stage of development and expansion, or stage of maturity and coordination into the stage of innovation and upgrading (see Figure 3). At this point, if the system can subvert its original mode, a new ecosystem can be formed, and a new round of evolution can be resumed from the stage of initial formation. However, if the innovation fails, it will gradually be replaced by other ecosystems, going to recession and even death.

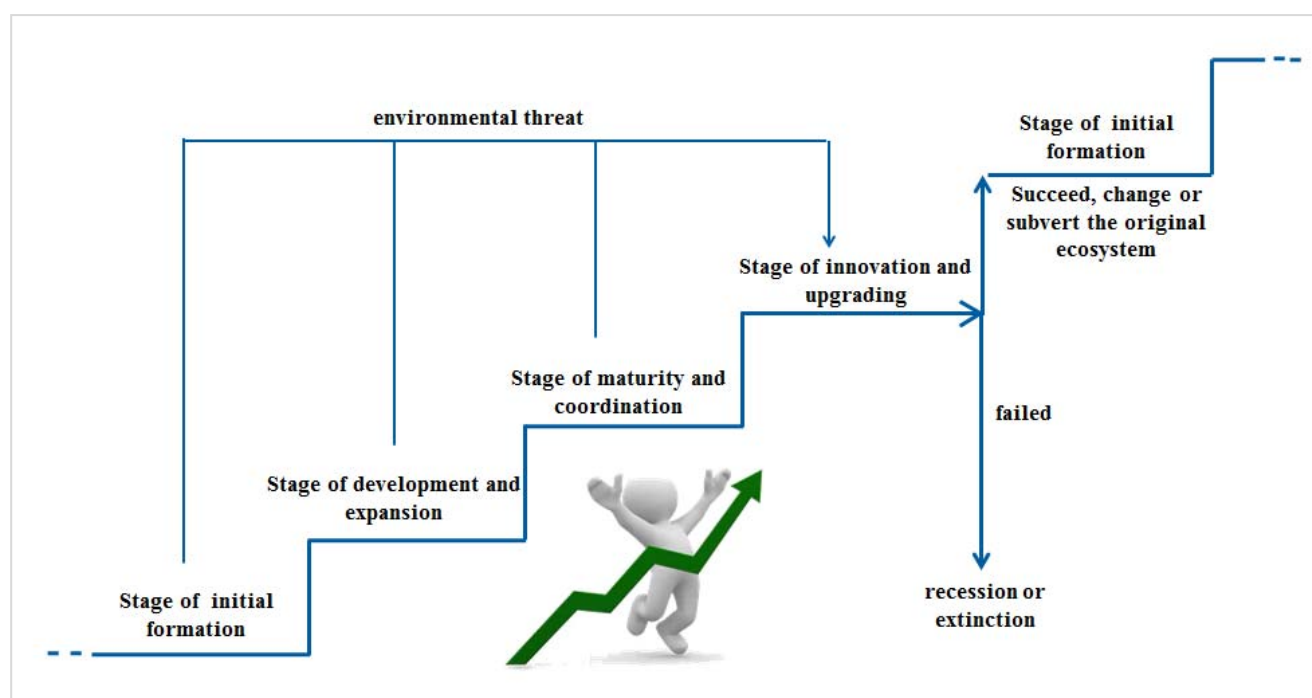


Figure 2: The Evolutionary Path of ECSEM

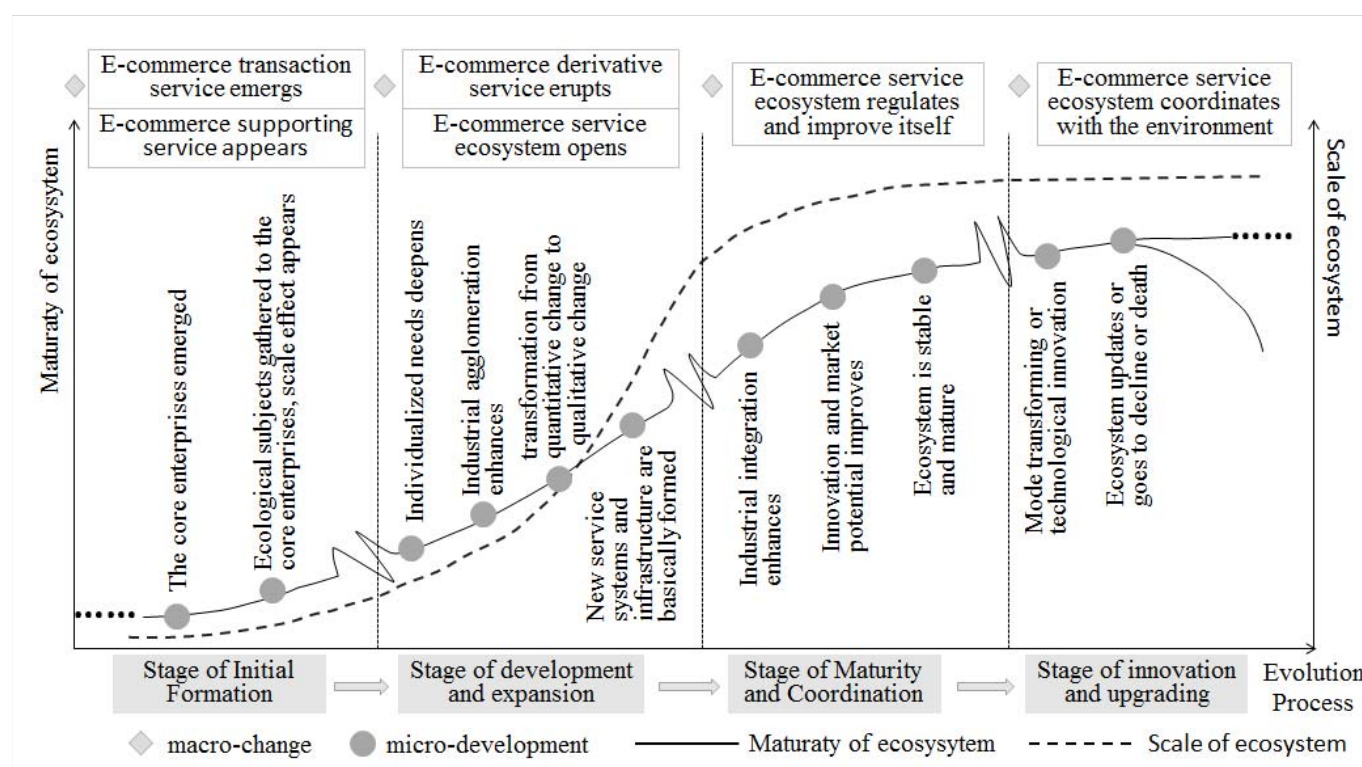


Figure 3: The Evolutionary Process of ECSEM

Stage of initial formation. The core enterprises appear. Various types of e-commerce service enterprises and application enterprises gradually emerge and gather to the core enterprises. The scale effect begins to appear. The ECSEM is initially formed and gradually scaled. At this stage, the types of e-commerce service are relatively simple, the number of members in the ecosystem is small and the growth rate is slow, and the competition among members is not obvious. The main e-commerce service in the stage of initial formation is transaction service, while supporting service is gradually emerging.

Stage of development and expansion. The system's members accelerate to grow and aggregate, significantly enhancing the industrial agglomeration effect and expanding the system's boundaries. Various e-commerce applications accomplished the transformation from quantitative change to qualitative change. E-commerce service enterprises flourish and its market's

specialized subdivision deepens. Traditional industries are beginning to be replaced. At this stage, with the growth of core enterprises and the expansion of system scale, the demand for e-commerce applications is gradually diversified, and the demand for personalization is deepening. Various types of supporting service, innovative service and characteristic service is generated and enters the ecosystem. Types of e-commerce service keep diversifying, and service models are continuously innovating and improving. The successful developing model of a certain enterprise will also be replicated and applied to other enterprises. The competition between the homogenous populations of different leadership cores will continue to escalate, and the market competition pattern will be basically determined. In the stage of development and expansion, the e-commerce service ecology is open. The transaction service is developing at a high speed, supporting service continues to be constructed and extended, and derivative service is erupting. New service systems and infrastructure is basically formed.

Stage of Maturity and Coordination. Members of the ecosystem have already a large scale, the number has broken through the growth threshold and begins to saturate. The relationship between ecological subjects has become increasingly complex and it becomes particularly important to coordinate the development of the system. At this stage, the competition among homogenous ecological entities in the system is particularly fierce, and the complementary ecological entities cooperate or form alliances through various forms. The roles played by the system's ecological subjects are also in the process of continuous transformation. Various fields, such as production, circulation, consumption and investment, are gradually integrated with e-commerce service fields to realize the transformation and upgrading of enterprise's competitive strategies, and the innovation and market potentials are comprehensively improved. At the same time, various certification systems, industrial rule and standard systems, policy and legal systems have been gradually improved, thus coordinating conflicts of interest and value divisions to ensure the sustainable and healthy development of the ecosystem. The ECSEM in the stage of maturity and coordination has strong sustainable profitabilities and self-renewal capabilities, and the ecosystem is mature.

Stage of innovation and upgrading. When the existing ECSEM is impacted by new technologies, new rules and models, or external political, economic, social factors, etc., the system will face a huge threat of recession, substitution or death. At this point, the ecosystem needs to absorb new developing concepts, and change or subvert its original developing models, then carry out mode transforming or technological innovation, and update it.

The above four stages basically summarize the lifecycle of ECSEM's evolution. During this process, the ecosystem's ecological subjects have always been closely connected with various kinds of resources and external environment to form a stable equilibrium. Meanwhile, the ecosystem is also dynamically changing under the regulation of various substances, information and energy, so the ECSEM, at any stage, is developing in a dynamic balance.

EVOLUTIONARY ANALYSIS OF ECSEM'S KEY ELEMENTS

The key elements of an ecosystem refer to the vital factors in the system whose rise, fall and level of development can significantly affect the growth and maturity of other system members. They can produce sustained and far-reaching effects on the maturation and evolution of the entire ecosystem. In a sense, it is the growth, maturity and continuous optimization of key elements of the ecosystem that reflect and promote the evolution of the ecosystem. The evolution process has also gone through stages of initial formation --- development and expansion --- maturity and coordination --- innovation and upgrading.

Composition of Key Elements

Key elements of the ECSEM include various e-commerce service, market competitors, industrial organizations and business alliances, industrial rule and standard systems, and policy and legal systems, etc. Among them, all kinds of e-commerce transaction service, supporting service and derivative service is the main content and soul of the ECSEM, including platform service, payment service, logistic service, marketing service, data service, customer service, etc.; Competitors refer to market competitors of key populations of an ecosystem, which are playing an important role in promoting the growth, maturity, and innovation of system's entities; Industrial organizations and business alliances are mixed-type entities consisting of a wide range of members, including various e-commerce service providers, exerts group effects and joint effects to promote the growth of individual members; The industrial rule and standard systems, policy and legal systems, formulated by the ecosystem's core leaders and government agencies, are the coordinators of the ecosystem. They regulate, constrain and coordinate the behavior of all system members, regulate the development path and posture of the whole ecosystem. It is a kind of underlying constraint and macro-control, which is essential for maintaining the sustainable and healthy development of the ecosystem.

Evolutionary Process of Key Elements

The development and maturity of the ecosystem's key elements is strong evidence and driving forces for the maturity and evolution of the ECSEM. With the development of e-commerce and continual rise of its application requirements and consumer personalized needs, the developing levels and maturity of various key elements of the ECSEM is gradually increasing, and the ecosystem is approaching mature.

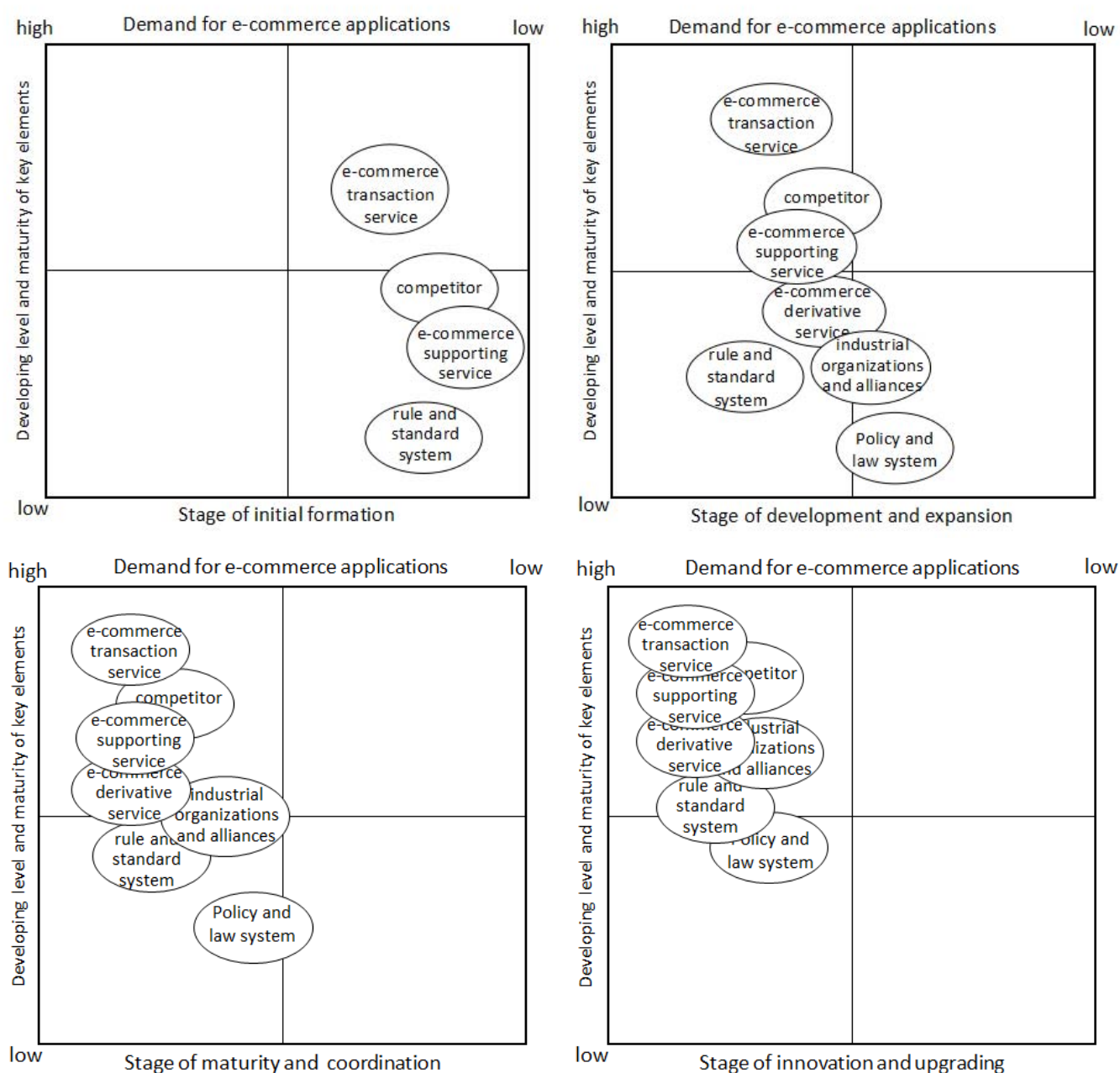


Figure 4: The Evolution of ECSEM's Key Elements

During the evolution of the ECSEM, the evolutionary process of its key elements is mainly reflected in the following aspects:

First, all kinds of e-commerce transaction service and supporting service is continuously developing and becoming more perfect. Its service functions are continuously enriched, service capabilities are unremittingly improved, and service models are frequently innovated. For example, the initial e-commerce platforms only have basic transaction functions, and its payment service is mostly based on online bank transfer. Nowadays, they have collected almost all kinds of functions, such as commodities trading, customer management, marketing, personalized recommendation, community communication, value-added applications, etc. The payment methods have developed to a co-existence of Alipay, WeChat, Huabei, online banking, credit card payment, points and coupon deduction, etc.

Second, competitors have risen rapidly in the stage of initial formation, but their competition is much chaotic at first. With the survival of the fittest in the market, the competition is gradually ordered and its competitive landscape is gradually stable. For example, when Alibaba began to enter the e-commerce market, there were competitors such as Amazon, Ebay, paipai and so on. In today's Chinese market, Alibaba Group, JD, LeEco, and Suning are not only leading in their respective advantageous fields, but also competing with each other in their cross-cutting areas.

Third, derivative service is almost non-existent in the stage of initial formation, and their market demand is also low. However, in the second stage, with the expansion of the market and the intensification of competition, derivative service is rapidly erupting and their application demand is comparatively high. Derivative service's maturity is relatively high and its sustainable development and innovation is continually generating due to the fact that it is application of service industries in other fields to the field of e-commerce. Its service mode goes from some forms of outsourcing service, such as simple product photography, online shop decoration etc., to full-scale service model based on the "people-goods-scene", such as channel planning, brand building, user's portrait creating, live video streaming, etc.

Fourth, various industrial organizations and business alliances gradually emerge and develop rapidly, such as China's Network Merchants Alliance, China's Modern Logistic Network Alliance, the strategic cooperation between Alibaba Group and Suning, strategic alliance of JD and Wal-Mart.

Fifth, the demand for relevant industrial rule and standard systems, policy and legal systems has been relatively high, but its level of development is always lagged behind that of the market. After the market expands to a certain extent, its importance becomes particularly prominent and its maturity degree of development will also rapidly increase. For example, the emergence of "Taobao Declaration", "Research Instructions of New Business Civilization (2010)", and "China's E-commerce Laws" has injected new vitality into ECSEM.

It should be noted that the key elements' evolution map in the stage of innovation and upgrading presented in figure 4 is a state naturally evolved from the stage of maturity and coordination. If it's evolved directly from the stage of initial formation or the stage of development and expansion, its key elements and their location will differ from this diagram.

Characteristics of Key Elements' Evolution

Continuous Enrichment in Variety

The ECSEM only has basic service functions in the stage of initial formation. Most of the derivative service, industrial organizations and business alliances related to e-commerce service, and policy and legal systems gradually appear and grow with the development of ecosystem. Key elements of the ecosystem are gradually increasing during the evolution process and their service contents become more and more abundant. For example, data service is a kind of e-commerce service that serves marketing and individualization. It's generated with the rapid growth of the number of netizens and online merchants in the stage of development and expansion.

Gradual Improvement in Maturity

The growth and maturity of ecosystem's key elements is gradually advanced and improved with the development of the market under the joint action of various internal driving forces and external environmental factors. For example, e-commerce platforms only have basic trading functions in the stage of initial formation. After continuous improvement and innovation, they gradually absorb large quantity of elements, such as customer service centers, business management systems, fans and community marketing ports, various e-commerce applications and individualization recommendation systems, etc., continuously enriching and improving its service functions, and enhancing the service capabilities.

Continuous Increase in Relevance

Key elements of the ecosystem are not isolated, but related to each other. This association is mainly shown as the division of labor and combination of functions in the stage of initial formation. With the evolution of key elements, this association will become more and more manifested as an interrelated and interdependent state, which means the correlation is continuously enhanced. For example, the agency operation service has gradually expanded from simple front-end store operations to many aspects of e-commerce, such as channel planning, site building, customer service, warehousing and logistic service, product shelves, marketing, financial settlement, etc., closely connecting with platform service, information technology service, customer service, logistic service, data service, marketing service, etc.; Data analysis service is based on data collected by e-commerce platforms, and its results are applied to various aspects such as marketing service, product operation, and the design and improvement of personalized recommendation systems.

CASE ANALYSIS --- ALIBABA'S ECSEM

Alibaba Group was founded in 1999 in Hangzhou, China by 18 individuals headed by Jack Ma. Over the years, Alibaba Group has provided the basic Internet infrastructure and marketing platforms for network operators, brands and other enterprises with the mission of "to make it easy to do business anywhere". With the power of the Internet, it promotes the interaction with users and customers, and changes marketing and operating styles, empowering companies from all aspects, and building a future business ecosystem.

As a new product of deep integration of information technologies and business service, the ECSEM has emerged with the booming of e-commerce transactions. Based on a series of platforms such as Taobao, Tmall, AliExpress, etc., Alibaba Group is collaboratively developing with various e-commerce service providers to achieve frequent interaction, communication,

competition and innovation between platforms and service providers, forming a huge commercial service ecosystem, which is based on platforms, customers and service merchants, and is co-constructed, shared and coexisted by many commercial service groups.

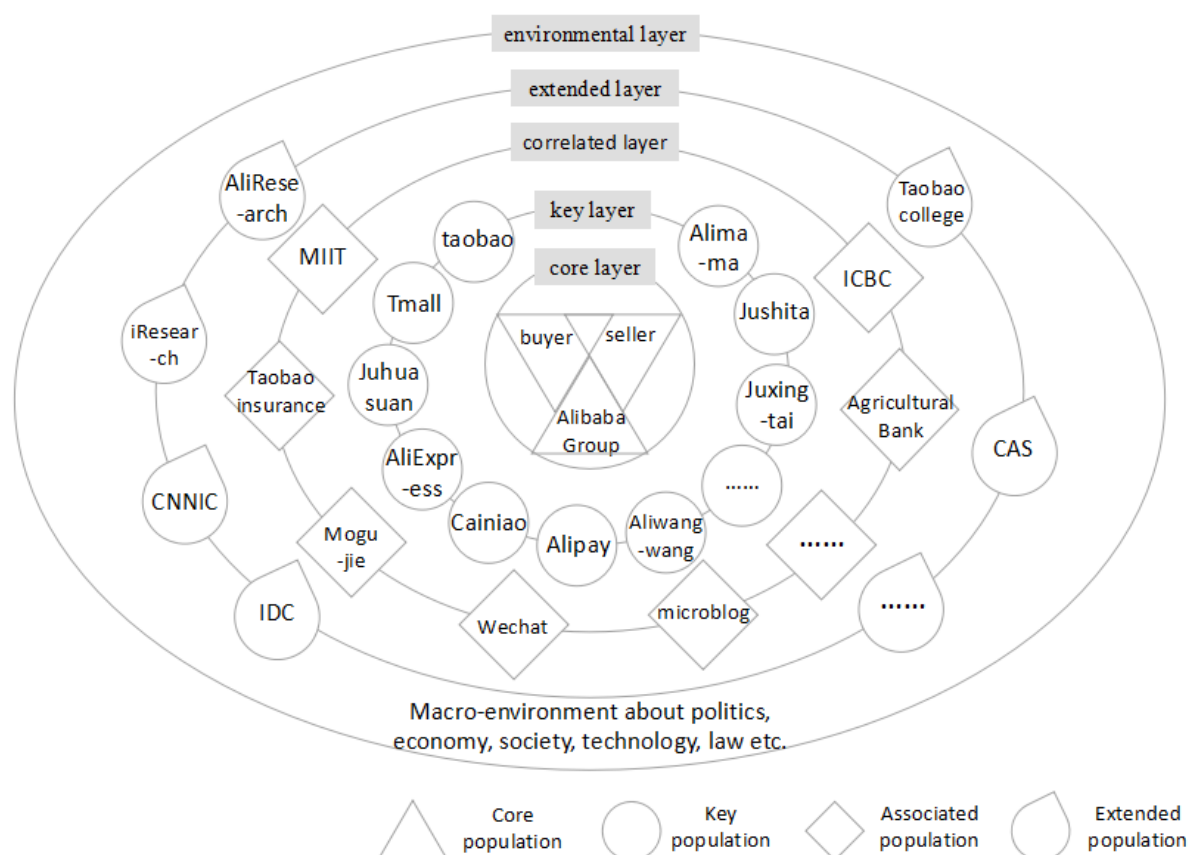


Figure 5: Alibaba's ECSEM

From the perspective of ecosystem evolution, Alibaba's ECSEM has gone through three stages of initial formation, development and expansion, maturity and coordination.

Stage of Initial Formation (1999-2007)

In 1999, Alibaba Group launched the global trade version of Alibaba in the wholesale trade market and the domestic version of the Chinese transaction market (known as "1688" now). Its e-commerce service activities began to sprout. At this time, the number and types of netizens, online merchants, and e-commerce service providers were relatively less.

Table 1: The Ecological Layout of Alibaba's ECSEM in the Stage of Initial Formation

Time	Events Related to E-commerce Service	Service Type
1999	Alibaba Group established and launched a double-version of wholesale trade market domestically and abroad	Platform service
2003	Established online retail platform, Taobao	Platform service
	Released Alipay	Payment service
2004	Taobao launched Taobao Trademanager	Customer service
	Alibaba held the first "Network Business Conference" in Hangzhou	Exhibition service
	Cooperate with advertising alliances such as "Yitian Network" to develop marketing and popularizing	Marketing service
	Established Ali College, popularize e-commerce knowledge, and cultivate electric merchants	Personnel training service
2005	Alibaba cooperates with various banks to conduct bank-enterprise cooperation such as ICBC, etc.	Financial service Payment service

2006	Cooperating with PSBC. EMS became the recommended logistic service provider of Alipay, and its postal green card was linked to Alipay's business. In the same year. EUB was released.	Logistic service
	China's E-Commerce Association and Ali Group jointly held the second "E-Commerce Application Talent Training Forum" in Hangzhou	Exhibition service
2007	Invested 100 million RMB to build Ali Software Business Management Software Co., Ltd. and launched three software product projects on the same day: Ali Software Foreign Trade Edition, Domestic Trade Edition, C2C Edition and AliTrademanager.	Information technology service
	Alipay launched the second-generation of digital certification to improve users' account security	Information security service
	"Wanghui-E" launched by Ali and PSBC successively launched on the national postal outlets to achieve direct shopping with postal remittances and free of bank cards.	Payment service
	Alibaba Research Center officially established (AliResearch)	Information service Consultant service
	Alipay announced the beginning of the Internet Trust Program	Credit service
	Alimama was established	Marketing service

At this stage, Alibaba Group had successively launched various platforms, absorbed a large number of partners, and deployed extensively in the field of e-commerce service, providing various aspects, such as platform service, logistic service, financial and payment service, information security and technical service, marketing service, exhibition service, and credit service, etc. Since then, Alibaba's ECSEM had initially taken shape.

Stage of Development and Expansion (2008-2016)

In 2008, Alibaba Group determined its next core strategy to "build an e-commerce infrastructure and foster an open, collaborative and prosperous e-commerce ecosystem", launched a series of strategies and plans to promote service ecosystem development, expansion and improvement.

The characteristics of Alibaba's ECSEM in the stage of development and expansion are mainly reflected in the following four aspects:

First, the service infrastructure continued to be built and deployed. During the stage of development and expansion, Alibaba set up a search technology center, a P4P operation center and a media sales center; established Yahoo Koubai, Alibaba Cloud, and Ali Small-Loan; launched a marketing platform Juhuasuan which focused on time-limited sales promotions, "Good business store statistics" providing statistical products for sellers with operational data, AliExpress focused on brand export, "Haitao" based on the model of interaction between TV and the Internet, mobile Taobao, cloud computing service platform JuShita, data marketing Service platform Juxingtai, etc.; acquired China's one-stop export service provider, Yidatong; established CaiNiao Network with a number of logistic service providers. While constantly improving its existing infrastructure and service systems, Alibaba provided a wide range of e-commerce service to consumers and online merchants from different perspectives.

Second, the service market was constantly expanding and subdividing. With the rapid expansion of Alibaba's e-commerce service market, its service types had also increased rapidly. Various derivative service, online shop decoration service, e-commerce photography and model service, agency operation service, data analysis and mining service, foreign trade integrated service, e-commerce parks, etc., erupted and deepened into the process of e-commerce activities. For example, marketing service continually subdivided and spread to consumers, enterprises, products, markets, channels, scenarios, supply chains and other fields. At the same time, the original transaction service and supporting service had been continuously subdivided and improved.

Third, service capabilities had increased rapidly. The number of open APIs of Taobao Open Platform increased from 148 in 2010 to 7288 in 2016; The number of daily calls for Taobao Open Platform increased from 70 million at the end of 2009 to 13.58 billion in 2016; The application operated online increased from 2632 in 2010 to 338,803 in 2016; The number of Taobao's registered partners increased from 75,000 in 2010 to 1.685 million in 2016; From 2012 to 2015, the growth rate of Alibaba e-commerce service business increased from 61.9% to 78.6%, the growth rate of active service providers increased from 1.8% to 33.5% (Alibaba Research Center & Business Department, 2017; Alibaba Research Center, 2010; Cui, 2016).

Fourth, the industrial rule and legal systems had gradually matured. The rapid expansion of e-commerce market scale had led to a rapid increase in the demand for relevant industrial rule and legal systems. Alibaba, in the course of improving its credit service, created a special publication, "the Network Regulations", in April 2010; released "Big Taobao Declaration" in September; released the "Research Instructions of New Business Civilization (2010)" in October; in 2011, Taobao signed a

"Consumer Protection Service Agreement" with all of its merchants, and invested 200 million guarantee funds to escort hundreds of millions of consumers; in 2014, AliResearch and Network Research Center jointly released the "New Century of Big Data and Anti-Counterfeiting --- China's E-commerce Anti-Counterfeiting Frontier Report of 2014"; in 2015, Ant Financial Service Group launched sesame credit points to create a personal credit service system.

Stage of Maturity and Coordination (2017-Now)

After more than ten years of rapid growth in the first two phases, the digital commercial infrastructure integrated with various new information technologies such as cloud computing, Internet finance, and intelligent logistic service etc., had been initially established. Taobao Service Market is already the largest commercial service portal in China. It contains hundreds of thousands of related service and instruments including shop decoration, product shooting, traffic promotion, commodity management, order management, internal management within enterprises, personnel outsourcing, quality inspection and quality control and so on to form a full-link diversified business ecosystem. The entire commercial ecosystem began to enter the depth water of transformation, and Alibaba's ECSEM entered a maturity and coordination phase in 2017. At this stage, Alibaba's strategy in the field of e-commerce service had shifted to further improving the merchant service system. To be specific, firstly, further standardizing the unified data interface to provide more comprehensive, smarter and better qualified basic service; secondly, using big data to explore and find the balance of traffic between consumers' individualization and stocking certainty; lastly, improving the distribution mechanism of interests, decoupling old relationships and reconstructing new relationships, including consumer perception, customer relationships, partnerships, and internal relationships.

Alibaba's ECSEM is still relatively young and in the process of healthy development. Its stage of innovation and upgrading has not come. But it lives under the environment of rapid economic and technological changes and innovation, any huge threats may subvert its original system.

CONCLUSION

The ECSEM is rich in content, covers a large market scale, contains many members and shows complex relationships among populations. Defining the connotation of ECSEM, and clearly clarifying its population structures and evolutionary process can contribute to, comprehensively, systematically and profoundly, understand and clarify the functions and roles of each part of the ecosystem, the status of its current stage, and the opportunities and risks that it may meet in the future, provide reference to the rational allocation of resources of ECSEM, and the formulation and guidance of relevant policy and the overall coordination of the ecosystem. We believe that the evolution analysis of ECSEM can also be used for problem analysis and strategic planning of e-commerce industrial belts, e-commerce industrial parks, e-commerce public operation service centers, etc., which are more obvious in industrial clusters. It will also be the future research direction of this paper.

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