

## Enhancing the Health and Sustainability of e-Commerce Ecosystem by Bringing Manufacturers Online: Evidence from Tao-Factory

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**Abstract**—E-commerce has been rapidly growing in China, but the problem of low quality products is becoming more and more serious and has become one of the most important bottlenecks for the sustainable development of e-commerce, especially online retailing. In a typical e-commerce industry chain, the retailing business is already online while upstream activities such as manufacturing and the majority of wholesaling are still running in the traditional offline mode. We think this creates a set of problems for the health and future development of e-commerce: First, limited choices of products are available for retailers to choose, leading to product homogeneity and price competition; Second, it is difficult for retailers to control the quality of the sourced products, and some of the low-quality products even counterfeits may end up getting to consumers; Third, it causes a great deal of frictions in transactions. In this paper, we explore how Tao-factory is able to help overcome the defects of traditional e-commerce. The result of our study showed that bringing manufacturers online, commercializing their production capacity, nurturing long-term ties between manufacturers and retailers, and reducing transaction costs are four ways to enhance health and sustainability of the entire e-commerce ecosystem which extend studies on e-commerce and ecosystem.

### I. INTRODUCTION

In recent years, Electronic Commerce (e-commerce) has been developing rapidly, which has not only become an important pillar of economic development, but has also attracted considerable attentions of researchers. The World Business Agenda for Electronic Commerce defines e-commerce as conducting business activities electronically, i.e., commercial transactions are conducted in electronic ways. Several aspects of e-commerce have been studied [10], [19], but nevertheless the study of e-commerce business ecosystem is still in its early stage. The term "e-commerce ecosystem" first appeared in 2001[18]. Combining the concept with the e-commerce environment in China, Some Chinese scholars expanded the member type of economic union on the basis of the definition Moore gave to business ecosystem. In [6], the authors proposed the concept model of e-commerce ecosystem composed of four populations. Based on the status of development of e-commerce, [12] pointed out that it is the cluster development of e-commerce that results in e-business ecosystem.

Although scholars have carried out many studies on e-commerce ecosystem, their studies have largely focused on the concept and structure of the e-commerce ecosystem. Fewer scholars are concerned about the health and sustainability of ecosystem. By analyzing the online trading

platform of Tao-Factory by Alibaba, this paper aims to explore the possible means to promote the sustainable and healthy development of e-commerce ecosystem, and we attempt to provide a new theoretical perspective for e-commerce ecosystem.

China's e-commerce market is continuing its rapid development and with it comes many problems. According to the "first half of 2015 China's online retail market monitoring report" released by the China Electronic Commerce Research Center, in the first half of 2015 China's online retail market has reached 1.614 trillion RMB, an increase of 48.7%; online retail market accounted for 11.4% of total retail sales of total consumer goods, an increase of 31%; the population of China's online consumers has reached 417 million, an increase of 19.1%.

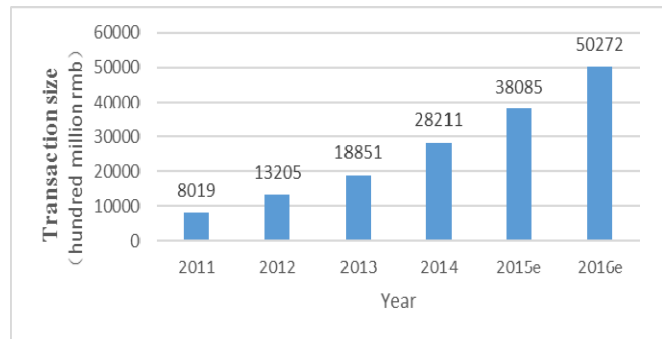


Figure 1. China's online retail market size in 2011-2016  
Data Source: China Electronic Commerce Research Center ([www.100EC.cn](http://www.100EC.cn))

With the rapid development of e-commerce in China there come all kinds of product quality problems, especially the problem of counterfeit and fake product that is becoming so severe that it has reached the top of China's top ten complaints about online retailing [13]. Taobao, the largest online retail website in China had twice boarded the "notorious markets" list of America. Alibaba Group has been sued by some well-known brands for the fake products in Taobao [11]. For example, several days before "the Double Eleven Shopping Festival" in 2015, Gucci and some other brands filed a lawsuit against Alibaba Group in the United States, accusing Alibaba of intentionally creating the possibility for counterfeiters to sell their fake products around the world. Fake products is not unique in online shopping, it is built-in commodity circulation system. However, due to the great convenience of online network, fake goods circulate faster, and in larger volume. E-commerce platforms sometimes are even called "fake products distribution center."

Therefore, it can be said that e-commerce platforms have become a very important channel to sell fake goods, which is extremely harmful for the healthy development of e-commerce.

Tao-factory is considered as one of the most important platforms of Alibaba Group which is specifically designed to solve product supply problems in Taobao and Tmall. And from its first operation in December 2013 to the end of 2015, more than 8,000 factories have joined. In view of this, Tao-factory is a robust example that can be used for this paper to explore how to promote the sustainable and healthy development of e-commerce ecosystem. The detail of our study unfolds as follows: Section 2 provides the research background, including the theoretical background and practical background; Section 3 is the research methodology; Section 4 is the result of the study, discussing how to promote the development of electronic commerce using Tao-factory as an example. Session 5 draws a conclusion and provides some discussions.

## II. RESEARCH BACKGROUND

### A. Theoretical Background

#### Business Ecosystem

The term ‘business ecosystem’ was first introduced by Moore in Harvard Business Review article “Predators and Prey” and further conceptualized in his book “The Death of Competition” [14]-[15]. He proposed that business ecosystem is a consortium including business organizations, investors, consumers, suppliers and competitors, and the interaction among them. In [15], the author also pointed out that the business ecosystem is symbiotic and dynamic and is consisted of four subsystems: the core supply chain system, supporting subsystem, competitive system and the macro-environment system. Business ecosystem concept was extended to that the business ecosystem is composed of business organizations that occupy different but related niches [7]-[9]. Once one of the niches changes, other niches will change accordingly. In [16], business ecosystem was defined more completely. They noted that the business ecosystem is a dynamic and complex systems composed of different stakeholders and has four basic characteristics of the complex adaptive system: self-organization, emergence of resistance, co-evolution and adaptability.

Based on the prior studies of the business ecosystem, [7] introduced the concept of “health” as an overall performance indicator of business ecosystems. According to them, productivity, robustness and niche creation are three determinants of business ecosystem health and each determinant includes many indicators. Productivity, which is the most frequently used in the study, refers to the efficiency with which an ecosystem converts inputs into outputs. It is consisted of three factors: total factor productivity, productivity improvements, and the delivery of innovations. Robustness is the capability of an ecosystem to face and survive disruptions. It can be broken down to five factors:

survival rates, persistence of structure, predictability, limited obsolescence and continuity. Niche creation is the capacity to create meaningful diversity and thereby novel capabilities. Variety and value creation are two factors making up this determinant.

TABLE 1. DETERMINANTS AND FACTORS OF BUSINESS ECOSYSTEM HEALTH

Determinants of Business Ecosystem Health	Specific Indicators
Productivity	Total factor productivity
	Productivity improvements
	Delivery of innovations
Robustness	Survival rates
	Persistence of structure
	Predictability
	Limited obsolescence
	Continuity
Niche Creation	Variety
	Value creation

### Internet Retailing Business Ecosystem

In the late 1970s, e-commerce emerged, and as the global economy entered into the information age, e-commerce grew rapidly, greatly impacting the traditional way of business and changing the way how consumers shop. Using businesses and consumers as the division standard, there are three e-business models: business to business (B2B), business to customer (B2C) and customer to customer (C2C). Compared with traditional business activities, not only does e-commerce break the time and geographical constraints, but it also provides an efficient, low-cost channel of information dissemination and information sharing. Meanwhile, in the case of online transactions, buyers and sellers can make deals directly online, shortening the entire supply chain and narrowing the distance between consumers and manufacturers.

With the continuous development of e-commerce platform, ecological phenomenon is gradually formed around e-commerce platform and the concept of e-commerce business ecosystem is evolving [20]. Here, we define the e-commerce business system as an organic ecosystem composed of different main bodies and all kinds of environments directly or indirectly affecting the survival of the body. Main organs include producers (sellers), transmitters (websites, trading platforms, etc.), consumers (or other end users) and decomposers (logistics companies, financial institutions, etc.) who belong to different subsystems. The environments include Social environment, legal environment, credit environment, information technology, information resources, and so on. E-commerce ecosystem is an open, dynamic, complex system, which is critical to all corporations within the ecosystem. E-commerce is not restricted by time or place, it may be proceeded cross-regional and/or even cross industries. Such advantage allows E-commerce-based trade business to develop faster, innovate more frequently, create more diverse relationships

among members, facilitate better information exchange and mutual participation to form a dynamic union. In addition, commercial activities online involve a wider range, and are more dependent on information communication and collaboration system among members.

Online retailing (B2C, C2C, etc.) which is the most important component of e-commerce is moving the traditional retail stores directly to the internet by means of electronic technology and customers can buy goods or get the services they need directly from suppliers[3]. From late 1990s to the turn of the 21st century, big name online merchants such as eBay, Dangdang, and Joyo, started their business one after another, and China's online retailing market followed suit. And it has reached the booming stage since 2007. To date, China has become the world's largest online retail market. The following figure shows the typical C2C online retail ecosystem. We can see that the e-commerce platform, like other participants in the system, is the stem of the entire ecosystem.

Once up and running, online shopping sites provide information management and interactive communication platforms for sellers and buyer, and they also integrate trading-related services, such as payment, logistics, software and insurance. With the aid of e-commerce facilities, business is transferred from offline to online end, speeding up the circulation of commodities, and creating business value. These advantages benefit all players in the ecosystem. For example, well-designed shopping platforms with better functions and services promote business activities between buyers and sellers, and the increasing scale of sales and growth benefit existing participants and attracts potential market participants, which eventually contributes to the prosperity of the website operator. Besides of the economy of scale, due to the significant potential impact of reviews on future sales, an extra benefit is that online buyers and sellers will take extra care in every deal to build their credit in the

system, which is beneficial to the entire ecosystem.

*B. Research Context*

E-commerce is becoming a popular lifestyle for its low cost, high efficiency compared with traditional shopping activities. But with the fast development of e-commerce, the product quality, particularly fake goods resulted from virtual shopping, is also increasingly becoming problematic. Case in point, although “the 2015 Double Eleven Shopping Festival” once again broken the record in sales, the major e-commerce websites such as Tmall.com, JD.com and GOME all suffered from a large amount of complaints regarding product quality after the sales event.. The inability to guarantee product quality and the proliferation of fake goods make consumers question the trustworthiness of the online shopping platforms and the demand for goods quality has become a bottleneck issue for the health and sustainability of e-commerce.

In circumstance of e-commerce, no company can gain a firm foothold alone in this highly competitive environment, they must rely on the power of collaboration, pay more attention to supply chain management and improve the ability to integrate resources throughout the supply chain. Each subject occupies different but related niche in the business ecosystem, once a niche changes, other niche will change accordingly [9].Product supply chain is a major part of the core supply chain system, health of which affects healthy and sustainable development of the entire online shopping business ecosystem. From Fig. 4, we can see that the retail side has gradually matured in the electronic business environment, but the upstream supply side is still the traditional offline mode. Such a combination brings about some problems. For one thing, it is very difficult for online merchants to control supply chain. Insufficient flexible production capacity of big factory and no product quality guarantee of small factory make most of sellers get their merchandises from the traditional stalls (various commodity

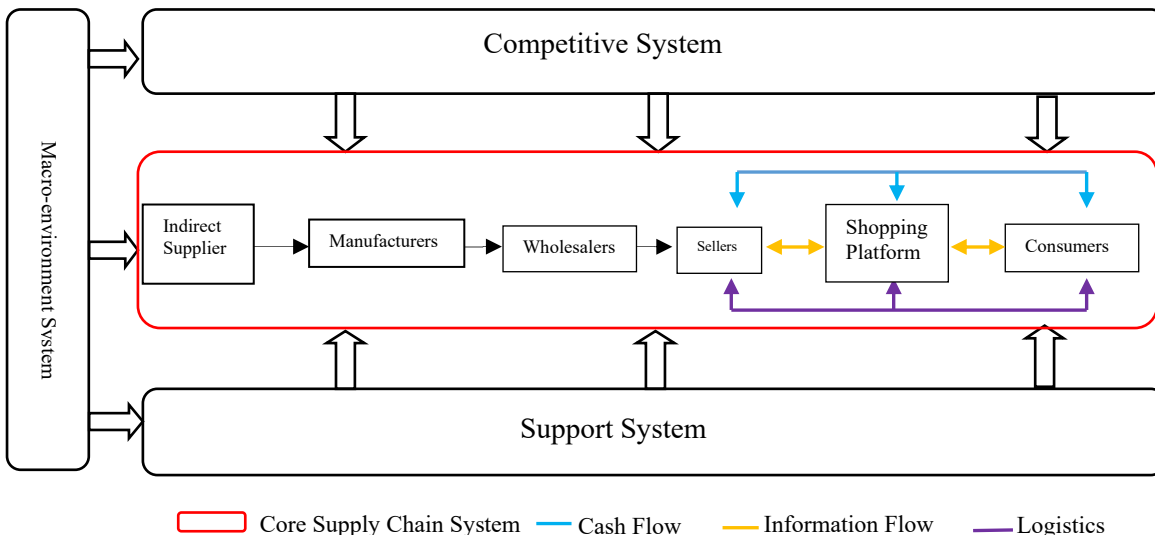


Figure 3. Typical C2C online retail ecosystem

wholesale and retail market), leading to uneven quality, inability to trace product source, and even fake and inferior products. Without the support of external resources and with the lack of internal resources, small online merchants are incapable of conducting their own research and development or have their own designs. This leads to their substantial difficulty in quality control and inevitability of homogeneous competition. On the other hand, on the offline side, information asymmetry, information opacity, high transaction costs and difficulty in supervision and control have always existed. Long delays in offline-fashion payments, generally three to six months sometimes up to a year, require more working capital, which is very difficult for manufacturers to cope with. As a result, the higher financial risk and slimmer profit margin often force entrepreneurs to weigh between continuing the business and closing the business and changing career. In summary, the lack of front-end supply chain control, production inflexibility, lack of innovations and designs are the four major obstacles in the development of e-commerce ecosystem.

### (1) Lack of upstream supply chain control

Fakes are a result of the defects of commodity circulation system and it is virtually impossible to completely eliminate counterfeits [2]. Due to its strong connection effects, e-commerce seems to inflate the problem at least in the current stage. So, to really have meaningful controls of counterfeiting, preventing the production of counterfeits at the source is a must. But because many manufacturers are offline and counterfeits are sold by small merchants, it is often incapable or not cost-effective for the e-commerce platforms to fully monitor or curtail counterfeit transactions. At present, a new seller on an open e-commerce platform, in general, only needs to submit some documents to begin selling with little chance of being audited. If complaints about counterfeits arise, most of the problems are dealt with through after-sale service. Although some e-commerce platforms are taking steps to combat counterfeiting, they tend to be flexible so to retain online sellers. As for luxury goods, because they are often sold by exclusive retail stores, their absence in the online market creates an opportunity for unethical sellers. Furthermore, most of sellers get their merchandises from the traditional stalls (various commodity wholesale and retail market), leading to uneven quality, inability to trace product source, fake and inferior products. After product quality problems appear, it is difficult to trace the source thus not likely to the production of counterfeit goods.

### (2) Insufficient production flexibility of factories

Flexibility refers to the ability an organization has to make effective responses to external changes. Production flexibility which is the most common flexible ability of supply chain flexibility is an organization's ability to change production output level based on demand [5]. Not only can flexible production maximize plant capacity and avoid wasting resources, but it can also effectively improve the

competitiveness of the factory. Because of small sizes and information technology, online retail stores constantly update their fashion items, frequently introduce new products to customers, and prefer small but repeated orders for supply. In general, an online store releases ten or so new products a week, most of them are small batch trial order and then quickly turn to repeat order production according to the sales data (amount of clicks, the collection and sales). Flexibility deficiency is the common problem of manufacturing enterprises in China. In such case, sellers willing to cooperate with big manufacturers are often rejected because of the problem of minimum quantity when they take samples to them. Small manufacturers or workshops who accept their orders frequently cannot guarantee product quality and the delivery date, which worsens the issue of small batch trial order.

### (3) Lack of innovation and self-design

The emergence of e-commerce has greatly changed people's lives, but the product circulation mode has not fundamentally changed. As shown in Figure 4, after production, products are then brought to market through a variety of distribution channels. In general, e-commerce sellers obtain supplies from manufacturers or traditional stalls (various wholesale and retail markets), it is a pure transactional relationship and sellers and suppliers lack interaction and communication. Because of product homogeneity amongst e-commerce sellers who do not have their own differentiated designs, inevitably online merchants have to engage in price competition. On the other hand, even if e-commerce sellers who have a better understanding of the market want to develop new product, it is difficult for them to find professional designers who can give guidance on development and design. For e-commerce sellers, there is no unique product specialty, there is no core competitiveness. An ecosystem with price competition as the dominant market rivalry is unlikely to sustain and grow.

### (4) Payment delays and collection risk

Cash flow is the blood of running a business. For a manufacturer, faster cash flow lowers the requirement for working capital and reduces overall business costs. However, credit is often used to boost sales. If the payment period is too long, manufacturers would have to budget larger cash flow and face greater financial stress. If credit is not used at all, sales may be negatively affected. Some manufacturers may even ignore orders that are not prepaid or are on credit because of their doubt of the creditability of those orders. All of these issues not only lengthen the full product cycle but also increase the cost of management. In e-commerce ecosystems, the manufacturing and wholesaling for online merchants are still running in traditional offline mode, and so timely and secured payments are still issues facing the suppliers. Therefore, it may hinder the efficiency of the entire value chain and the health of the entire e-commerce ecosystem.

TABLE 2: EFFECTS FOUR MAJOR PROBLEMS HAVE ON E-COMMERCE BUSINESS ECOSYSTEM

	Productivity	Robustness	Niche Creation
Lack of front-end supply chain control	Fake or inferior products occupy part of production and market resources, low efficiency	Unstable goods supply, cannot withstand the fierce competition in the ecommerce market	new market and new product development take longer time
Insufficient production flexibility of factory	Waste of resources and production capacity	weak flexibility and anti-risk ability, inadaptable to the changeable environment	Longer new product project cycle, low efficiency of the development of new technology, small quantity of new business increased
Lack of innovation and self-design	Low degree of productivity improvement, long time of innovation or design, not conducive to the realization of innovation	Poor ability of risk resistance in the changeable environment	Hard to find a new niche market, miss opportunities to develop new products
Payment days	Slow the efficiency of production and the circulation of the entire goods	Members of the system pay attention to their own interests, sense of cooperation is weak, not favorable to the development of system	Shortage of cash flow limits the development of new markets and products, reducing the value creation

III. METHOD

A. Case Selection

To extend the existing theory on e-commerce, this paper intends to probe into the question of how to promote the sustainable and healthy development of e-commerce ecosystem through the method exploratory study. According to this purpose, case study is the most suitable research methods. Case study is one of the basic methods of organizational management and scholars researching on organization theories have generalized a set of principles, steps and methods for case studies[4]. This method is especially suitable for the understanding of individual phenomena, searching for new concepts and ideas, and even the theory generation[4]. This paper adopts the method of single case study, as [1] has pointed out that the advantage of single case study is a good way of deep investigation and analysis.

In [4], the authors pointed out that for case study method, a random sample is not unnecessary but undesirable. In [17], it has been repeatedly stressed that typical and extreme cases were more appropriate. With the rapid development of e-commerce, four problems outlined above need to be dealt with or will become worse. And some traditional manufacturers, like those in jeans cluster in Zhongshan have already speared part of capacity to serve for e-commerce orders. Some provide one-stop service for sellers in Juhuasuan and sellers only need to focus sales only. In various measures promoting sustainable and healthy development of e-commerce, Tao-factory is the most typical and representative. It is a platform formally launched in December 2013 by Alibaba's 1,688 division, and is intended to solve problems about finding manufacturers, trial order, repeat order and the development of new products. By January 2015, more than 8,000 manufacturers have registered

on Tao-factory, contributing to the sustainable and healthy development of e-commerce around the Taobao ecosystem. Tao-factory contains abundant Information and has high research value. A case like this is appropriate.

B. Data Collection

Data in this study were collected by both Tao-factory themed events and archives. As shown in Table 2, we took part in Tao-factory themed events three times from June to August in the year of 2015. In June, we participated in the Tao-factory experience sharing event and had a seminar with online store owners. In mid-August, we visited four manufacturers registered on Tao-factory who performed well : Shaoxing Mitu Clothing Co., Yage Garment Manufacturing in Shaoxing Economic Development Zone, Fuchun River Weaving Group in Tonglu and Baichun Cashmere Products Co., Ltd. in Tongxiang, understanding the current trend of small scale orders and the existing problems with regard to production flexibility and delivery. We interviewed a manager of a clothing factory in "the world's workshop capital" Dongguan City at the end of August. He told us a lot of stories and details about the firm and Tao-factory. We also collected available archived data. Industrial reports and internal documents were also collected.

TABLE 3: DETAILS OF INTERVIEW

Number	Research activities	Time
1	Tao-factory experience sharing event	2015.6.17-19
2	Visiting four manufacturers settled in Tao-factory: two in Shaoxing, one in Tonglu and one in Tongxiang	2015.8.13-15
3	An interview with manager of a clothing factory in Dongguan City	2015.8.31

IV. RESULT

A. Case Description

Tao-factory intending to connect online sellers with offline manufacturers officially launched in December 2013. On the one hand, the platform is trying to solve problems of e-commerce sellers about finding manufacturers, trial order, repeat order and the development of new products. On the other hand, Tao-factory makes manufacturers get orders from Taobao and Tmall, helping them make the transformation and build up the whole ecological system of online goods supply chain.

Fig. 4 is the core supply chain system after the existence of Tao-factory platform. Tao-factory platform invites manufacturers to settle in and provides third party audits of their information (business registration, production capacity, skilled categories, skilled technology, number of workers, development capabilities, production lines, equipment, workshops, quality control. Manufacturers settled in Tao-factory also need to follow a set of requirements, providing 30 days spare time schedule, making the production capacity and schedule commercialized. With this new platform, online merchants are able to more easily scan potential manufactures and find the best match. Manufacturers have the responsibility and obligation to provide free proofing, provide quotation, schedule for Taobao sellers and make agreements of accepting small scale orders (the minimum amount is 30) and credit certificate guarantee transaction and producing within 7 days. In addition, in payment service, Tao-factory helps to facilitate transactions between manufacturers and Taobao merchants. Taobao merchants can use Ali credit as a payment to order supplies

from manufacturers, which is guaranteed by Taobao even when the merchant breaks its promise for payment later. This payment guarantee reduces the friction of transaction and benefits all participants. From December 2013 when the Tao-factory platform officially launched to early 2015, more than 8,000 manufacturers have settled in.

Fuchun River Weaving Group, a traditional manufacturer with 2,000 employees, has been doing export contracting and domestic OEM business for 22 years and its major clients include Burberry, CK, Gerry Webber, and many world famous brands. After joining Tao-factory, the number of clients has grown to nearly 270, with 85% of them placing orders, 50% make repeated orders, and 3 clients on average daily make order proofing. Its enquiries rate reached 98% and order quantity generally around 100-500. Qingdao Jinduoer Garment Manufacturers having been specializing in foreign trade woven clothing for more than eight years, is one of manufacturers in China's foreign trade industry base. In order to seek greater development, it entered into business in the e-commerce in 2013 and explore with advantages of their own. In the end of August 2014, it joined the Tao-factory. After depth audits, its views and visit customers have been greatly improved, of course, it received more orders.

B. Lessons from Tao-factory

Through research and analysis, this paper proposes that Tao-factory offers at least four insights in the development of e-commerce ecosystem: digitalizing offline data and commercializing production capacity, increasing flexibility of manufacturers, enhancing interaction to promote innovation, guaranteeing payment for goods by credit voucher.

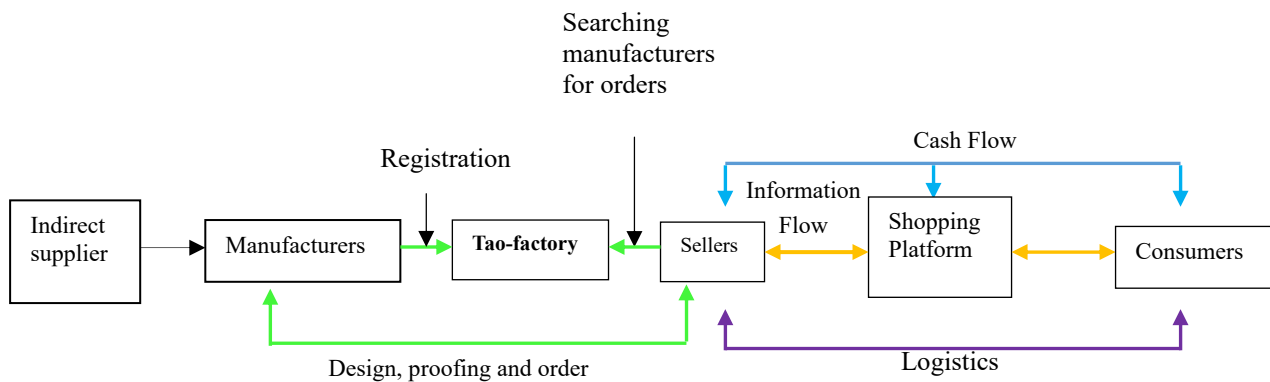


Figure4. The core supply chain system

TABLE 4: INFORMATION ABOUT QINGDAO JINDUOER GARMENT MANUFACTURERS

Month	Exposure Amount	Page Views	Visitors
July	31,348	1,060	458
August	50,505	7,495	4,316
September	133,869	11,613	5,356
October	254,595	27,540	12,702

**(1) Digitalizing offline data and commercializing production capacity**

Tao-factory platform integrates offline data of manufacturers, publishing them online and therefore are accessible to Taobao sellers. It helps manufacturers to understand market demand better and e-commerce sellers also get stable supply of goods. This not only makes up the innate flaw of commodity circulation, but also greatly accelerates the speed of new customer development. Manufacturers in Tao-factory have complete information, any quality problems of their products can be traced back to the source. Moreover, strict scrutiny on the manufacturing firm's information, to a certain extent, reduces the unethical or illegal use of the e-commerce platform for profit seeking, playing a positive role in insuring product quality and crack down counterfeiting. In addition, compared with traditional offline trading, Tao-factory enables online merchants to attain new customers more quickly, saving time cost and other related costs of both sellers and buyers. For example, the development of a new customer for foreign orders, you need to look at manufacturing firms in advance, send samples, inquiry prices, inspect suppliers, this may take around one year. As for domestic orders, from contact to the transaction may require at least three months. But development of a new customer in Tao-factory needs only two hours from negotiations online to sending samples, the second order transaction can be completed within two weeks and become old customers.

Excess capacity has always been an important problem of China's manufacturing industry. Excess clothing manufacturing capacity is about 1.5 trillion in the year of 2014. Orders from Japan and South Korea in many places such as Qingdao, Haiyang was sharply shrinking, orders in Changshu, Shaoxing shrink by more than 40%, Zhongshan, Foshan, Gongguan and other places were just like them. Tao-factory "packs" capacity, service and schedule of manufacturing firm and move them to the Internet, becoming a kind of goods can be chosen by e-commerce sellers. This makes the reasonable utilization of resources, avoiding waste of capacity, and also has greatly increased the value of production capacity, service and schedule. In Tao-factory platform, manufacturers interact with sellers and provide personalized service for with, promoting the healthy development of the core supply chain.

**(2) Increasing flexibility of manufacturers**

In general, to sell a new product, a small online merchant needs to place a small order to test the quality of the supplier and test the market before it can place large-scale orders. On the other hand, a traditional manufacturer would do market research, then design and produce its product, and lastly promote the product in the market. Therefore, without enough production flexibility, it is quite difficult for manufacturers to meet the demand of sellers. On the Tao-factory platform, transactions are made as follows: (1) find the factory, match schedule; (2) pay for proof and confirming delivery; (3) pay

by credit voucher and manufacturing begins; (4) goods receipt and payment for goods. We can see that the production process is no longer initiated from the manufacturers but Taobao sellers. Taobao sellers have more choices and are more likely to choose those manufacturers that produce flexibly to meet their needs of small trial test. Meanwhile, manufacturers on the Tao-factory need to serve for different Taobao sellers and produce different types of products, which requires manufacturers to enhance its flexibility to adjust quickly to meet the requirements of different orders. Manufacturers with high flexibility receive more orders, and manufacturers with insufficient flexibility are likely to be eliminated in the fierce competition. The mode that orders force production subverts the traditional mode of production, promoting the production supply flexibility.

Pride Shirt is located in HuMen, Guangdong garment capital. With 2,000 square meters of floor space, the company's monthly capacity is 1-2 million. It is a manufacturing firm that professionally designs and produces high-grade business dress shirts, casual shirts, fashion shirts and other clothes for men and women workers of the enterprise. With a shrinking offline market, Pride Shirt began the transition and became one of the first firms that settled in Tao-factory. At first, the transition was not accomplished as expected, as it took a long time to make samples. Samples are unable to meet customer expectations and the customer rejected a large order after receiving samples, which awakes Pride Shirt that achieving rapid and flexible production, the reform only with the whole personnel is not enough.

Pride Shirt leaders then decided unanimously to open e-commerce production line in response to the e-commerce customers.

**(3) Enhancing interaction to promote innovation**

Products homogenization in Taobao and the consequent price competition are becoming more serious, but Taobao sellers who cannot control the supply chain find it difficult to have their own unique product design and innovation, because there is just simple transaction relationship with manufacturers, they do not interact or cooperate, sometimes there is even interest conflict. But after Tao-factory platform appeared, massive ODM factories have settled. Taobao sellers have great choice of styles and can enjoy new products development and modification services provided by big-name designers. They interact frequently by using the Internet communication tools, not only promoting sharing of information between them, but also increasing the mutual trust. Meanwhile, ODM factories will unregularly invite sellers to visit their firms in person, the deep interaction greatly contributes to the trust between the two parties. E-commerce sellers understand sales and market, know the real needs of consumers, their deep cooperation with professional designers makes it easier to develop new products and their own competitive advantage.

**(4) Guaranteeing payment for goods by credit voucher**

After Tao-factory is active, deposits and payments are paid through multiple steps so that buyers and sellers both are secured. Meanwhile, manufacturers are guided to use quick account, making a quick turnaround of precipitation funds. Tao-factory sellers no longer need to worry about payment issues by using of Ali credit payment. Manufacturers do not need to worry about order abandon, deadbeat and so on either. As long as the two sides reach a deal, manufacturers can recover the rest payment for goods after the confirmation of delivery.

As for internal line production staff, they are paid in cash as long as the order finished, greatly improving the production enthusiasm. Compared with traditional offline mode, Tao-factory which not only improves the capital turnover, but offers certain profit margins for manufacturers is very attractive to manufacturing firms.

V. CONCLUSION AND DISCUSSION

China's e-commerce sector has been growing rapidly in recent decades to become an important part and driver of the whole economy. But with its rapid development, problems arose. Through the analysis of e-commerce business ecosystem, this paper found that the entire product value chain is operating on two different tracks: the retail section is online but the manufacturing and wholesale are still largely offline. This causes a lot of issues: the lack of front-end supply chain control, insufficient production flexibility of factory, lack of innovation and self-design and payment days-resulted from this affect the healthy development of the entire e-commerce ecosystem. Through the study of Tao-factory, we found that strengthening the control of supply side can effectively solve some problems of e-commerce, especially difficulty in product quality guarantee and fake goods issues. Specifically, the emergence of Tao-factory platform helps e-commerce sellers get more information about manufacturing firms, providing an interactive communication platform to promote product innovation and new product development as well as contributing to the control of the source of production providing. In addition, manufacturers with high degree of flexibility will get more orders, this forces manufacturers to make self-adjustment and enhance their flexibility.

There are several theoretical implications from this paper. First, [15] pointed out that structure and characteristics of a business ecosystem can help us to understand its generation, development, leadership, self-renewal and death objectively and accurately and divides the business ecosystem into four subsystems. This paper argues that internal change or death of subsystems, especially the core supply chain system is also crucial to the development of the whole system. Based on this, this paper analyzes the effects that supply side has on retailing side within the system, making the study of business ecosystem more complete. Second, studies on the health and sustainability of e-commerce ecosystem is still in the

exploratory stage. In order to solve the growing problem and make sure the system can adjust to new challenges and demands, e-commerce ecosystem needs to be explored more. This paper can be a viewpoint. Finally, the current academic research on counterfeiting in e-commerce market mainly focus on market information asymmetry and uncertainty, online trust, the framework of consumer online shopping attitudes and behavior, we break the framework and try to analyze product quality problems from supply side.

This paper also provide insights for practitioners. First of all, manufacturing firms with high flexibility are more desirable as the trend in the future is turning to personalization and small scale orders. Therefore, it is a good opportunity for manufacturing firms. There will certainly be a batch of specialized flexible supplier in the near future, as a matter of fact, Tao-factory is actually a microcosm of this. Then as we all know, the emergence of Internet provides a great convenience for information exchange and transmission, but in fact, compared with traditional market, information asymmetry is more serious in e-commerce market. Virtuality and openness of Internet also make e-commerce lack of trust. Information asymmetry and lack of trust between members are factors that results in many problems like fake goods. Creating multiple information communication channels, establishing guarantee system and the identity authentication mechanism are necessary to reduce information asymmetry and increase trust between members. Lastly, coordinating function of e-commerce platform is the important guarantee to the healthy development of e-commerce business ecosystem, and a necessary part of building e-commerce platform competitive advantages. Platforms should not only provide conditions of development for members of ecosystem, but also encourage them to have further cooperation.

There are limitations of this paper. First, case study has its unique situation, research conclusions still need further testing. Second, all information used are obtained from the public recourses, the accuracy and degree of correlation still have room for improvement. Lastly, we only focus on the relationship between manufacturers and small online merchants when we study supply side, and so the role of other players such as indirect suppliers in the core supply chain need further research.

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