

Research Article

Research on Profit Maximization of New Retail E-Commerce Based on Blockchain Technology

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With the development of science and technology and the extension of online users, e-commerce platforms gradually and effectively gather social resources such as manpower, technology, production, and capital. More and more traditional enterprises combine online and offline business as their operation and trade methods. E-commerce, as a new channel, has become one of the main transaction modes in the society. Under the background of reform of the supply side, and with the high-speed development of E-commerce, we will promote stock adjustment through incremental reform and optimize the structure of investment and financing in the process of increasing investment of e-commerce enterprises. High-quality products and diverse trading experience are the new development pattern in e-commerce. There are different profit maximization strategies for e-commerce enterprises when they face different economic situations. Besides, cross-border business is an advised way to expand business when the enterprise is under bigger profit. Via all these methods, e-commerce enterprise can help to optimize the structure of industries, circulation, and consumption and promote resource integration and optimization, and people's living standards will be further improved. Finally, the e-commerce enterprise profit maximization will come true.

1. Introduction

With the rise of the Internet, the United States announced the opening of the Internet's commercial functions in 1995. The business development model developed from traditional offline physical stores to online shopping malls, and the economic market began to expand. A number of large B2C enterprises represented by amazon, <http://jd.com>, Alibaba, Vipshop, and so on emerged. Some e-commerce enterprises have gradually formed their own profit model, but some have not yet formed a stable profit model [1, 2]. Although most of the domestic e-commerce enterprises are also developing rapidly, and several of them have successfully listed on the stock market, it can be seen from the financial reports and market survey reports that these enterprises have not achieved sustained profitability or low profitability. As the profit subject, the ultimate goal of the development and operation of an enterprise is to maximize its profits. Although different types of enterprises have different profit models, they all follow the most basic profit formula, that is, profit increment equals the capital acquired by the enter-

prise minus the capital expended [3]. Otherwise, supply-side reform takes tackling difficulties as the core connotation, that is, solving the problem of effective system supply through deepening the reform, so as to further liberate productive forces and support China's modernization process. China's current supply-side reform is not a simple aggregate adjustment, but structural reform, which focuses on gradually reducing the capacity of low-end products and improving the capacity of high-end products. Through supply-side reform, China will lead the improvement of the level of demand. And, based on this background conducted by the government, the relationship between e-commerce and supply-side reform has become the focus of the development of the e-commerce industry [4].

2. The Basic Principles of Supply-Side Reform and E-Commerce Profit

2.1. Basic Principles of Supply-Side Reform. The global economy is in the next phase of the fifth wave cycle since the industrial revolution, and this is the background of the world

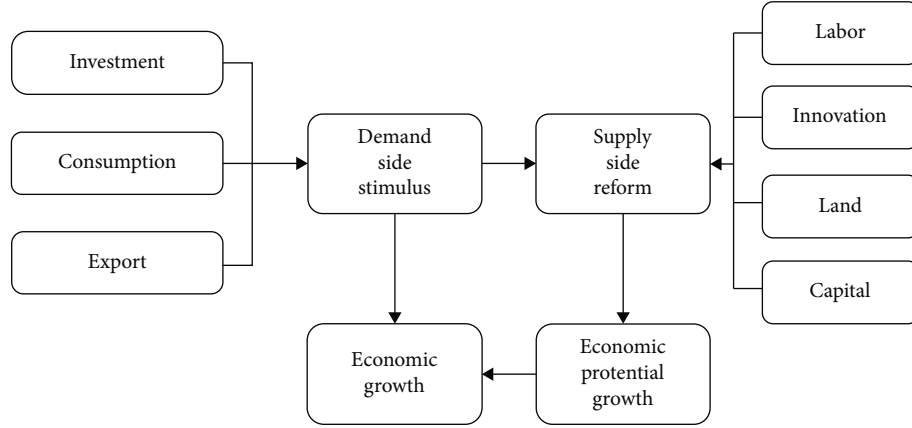


FIGURE 1: The diagram of supply and need in the economy.

politics and economy of China's supply-side reform. Supply-side reform provides new ideas and new models for economic development; there are four elements: labor, land, capital, and innovation, which correspond to the need. Figure 1 illustrates the connection of supply and demand [5]. China's economic growth has been slowing every year since 2007, but demand stimulus has had little effect. The shortage of demand is only the appearance, and the mismatch of supply and demand is the essence. Therefore, supply-side reform is aimed at adjusting the economic structure to achieve optimal allocation of factors and improving the quality and quantity of economic growth [6]. Supply-side reform of our country moderately expand aggregate demand, and at the same time, production capacity and inventory, deleveraging, cost reduction, and short-board improvement are proceeding from strengthening the supply of high quality, reducing the invalid supply, expanding the effective supply, improving the supply structure adaptability and flexibility, improving the total factor productivity, and making the supply system to better adapt to the demand structure changes [7]. It is worth mentioning that China's supply-side reform is different from the American supply-side school theory. China's supply-side reform focuses on the strengthening of the structural adjustment.

2.2. The Theory and Influence of Supply-Side Reform. Based on the economic growth theory and new supply of the existing research results of the respect, such as economics, we must demand the raw power. Clear supply for demand response mechanisms is the key driving force of the development of the productivity level-up type contribution. The decisive factors affecting the long-term economic growth are summarized as six elements of the supply-side. Based on the supply side, the elements are labor, land and natural resources, capital, science and technology innovation, system (including management), and data [8, 9]. The six elements form a set of functions of economic growth, and the theoretical model can be expressed b in the following formula:

$$G = F(l, r, c, t, s, d), \quad (1)$$

In which, G represents economic growth, l represents labor, r is land and natural resources, c is capital, t is scientific innovation, s represents system, and d means data and information [10]. Generally, in the early stages of economic growth, labor, land, and capital are the most obvious factors, the main elements of the economy entering the middle-income stage, science and technology innovation and system would show a great potential and important value of hedge support at the first three factors of landslide and even become the main contribution of the total factor productivity factors. And the most important is, with the development of the Internet and technology transformation, data and information are inevitable [11]. The essence of informatization is networking and data flow. To release the efficiency of informatization, we must rely on the network to make the data resource flow fully in a larger range [12, 13].

In different stages of economic development, the relative contributions of the six elements are also different. And these different elements are combined with each other [14]. The situation, to a great extent, affects and decides the economic growth situation and its comprehensive benefits from the perspective of production; the supply-side reform will lead to the rise of the proportion of tertiary industry, the decline of the proportion of traditional industries, and the rise of emerging industries in the secondary industry. And from the perspective of the income, supply-side reforms will lead to the redistribution of the economy, which means that tax cuts will be led to the decrease of the net production taxes accounted [15]. Besides, accelerated depreciation and the capacity to change will lead to the depreciation of fixed assets of higher than short-term. What is more, reducing the cost and capacity will lead to the rise of enterprises operating surplus accounted, and the accelerating labor cross-regional, cross-sectoral circulation, and improving human capital will definitely lead to the raise of worker pay. Table 1 summarizes the major import and export e-commerce enterprises in China [16].

The broad prospect of cross-border e-commerce market also means a large number of participants and fierce competition. The competitive theory of "survival of the fittest" tells us that market share will be carved up by the strong, while the

TABLE 1: E-commerce enterprises of the major import and export in China.

Transaction type	Operation way	Case
Import transaction	Platform only	Alibaba, NetEase Kaola
	Self-support	JDcom, Suning
	Free trade zone	Cross-border shopping
Export transaction	Platform only	Alibaba
	Self-support + platform	JDcom
	Self-support	DealExtreme

weak will be squeezed out of the market [17]. For e-commerce enterprises, the craze of “overseas online shopping” can be either a breakthrough or a bottleneck. Of course, the emergence of a cross-border market is a new opportunity for a company if it can fully mobilize its high-quality resources to occupy a piece of land in the overseas market. However, if the enterprise lacks resources and has no overseas advantages, the enterprise may face threats [18].

2.3. Basic Principles of E-Commerce and Profit Maximization

2.3.1. Definition and Status of E-Commerce in China. E-commerce usually refers to the wide range of business and trade activities around the world. In the opening network environment of the Internet, it realizes the electronic, digital, and networking in the entire business process based on server application with the help of the computer technology, network technology, and remote communication technology [19]. The rapid development of e-commerce has upended the traditional business model and becomes a new driving force for economic development [3, 4]. Since the emergence of e-commerce in 2000, e-commerce has experienced several different development stages, and it is growing at an amazing rate after 2013 [20]. According to the scientific data published, the scale of e-commerce transactions in China continued to expand and maintain rapid growth in 2017 and it reached 29.2 trillion yuan, which is up 11.7% compared to 2016. Besides, the rapid development of e-commerce in China since 2009 shows the deepening and popularization of mobile Internet, network video, social network, network shopping, and transformed from blog to Weibo and WeChat. In recent years, the number of mobile Internet users, application level, terminal popularity, and market size in China has all shown a rapid growth trend [21]. Figure 2 has shown the trend of e-commerce. E-commerce has maintained a rapid development trend, the market size has been expanding, and the online consumer group has been growing rapidly [22].

Different from the traditional concept of commercial economy, e-commerce does not only regard the Internet as a simple sales channel or technical means, but it gradually extends from up and down and closely connects consumers, platform manufacturers, and production enterprises. Thus, an ecological chain has formed, which is an internet-based whole industrial chain ecosystem. Figure 3

shows the internal connections among the general e-commerce business [23].

2.3.2. The Profit Patterns of E-Commerce. The profit model refers to a mechanism formed to guarantee that an enterprise can continuously earn excess profits and update them in a timely manner after identifying the operation elements and effectively integrating enterprise resources. The profit model of the enterprise is generated around the enterprise value creation, which is reflected in the increase of the present value of the free cash flow of the enterprise. The conceptual “value” form is materialized through the use of financial indicators and financial tools, while the free cash flow of the enterprise is related to the net cash flow of operation and the operating results. There are four key points and a center of a basic profit pattern [24]. With the enterprise value creation serving as the core, four strategic elements: profit point, profit source, profit leverage, and profit barrier are formed. This model covers the design level and implementation level, which are the most basic enterprise profit model framework. With the development and reformation of e-commerce, the enterprise profit has six patterns as displayed in Table 2, with representative companies and introduction. Actually, it is quite difficult to divide e-commerce enterprises into which profit pattern nowadays, this is because more enterprises have already abandoned the unitary profit pattern. More confluent pattern is popular which can create bigger enterprise value [25].

2.3.3. The Theory of Profit Maximization. Profit maximization is the behavioral goal of an enterprise in early western capitalism with the respect of pure economics. Recent economics adds an ethical dimension. In the long term, only those enterprises with business reputation and social responsibility can maximize their profits. In general, in economics, the assumed behavior of enterprise profit maximization is achieved when marginal cost equals marginal revenue that is $MC = MR$. It is supposed that π is profit, Q is manufacturer’s output, TR is the total revenue of the manufacturer, and TC is the total cost, then

$$\pi(Q) = TR(Q) - TC(Q). \quad (2)$$

The necessary condition for profit maximization is that the first derivative of π with respect to Q is zero, while the first derivative of TR with respect to Q is marginal revenue MR , similarly, is marginal cost MC . Therefore, when $MR = MC$, that is, the marginal revenue equals the marginal cost; the profit is max.

$$\begin{aligned} \frac{d\pi(Q)}{dQ} &= \frac{dTR(Q)}{dQ} - \frac{dTC(Q)}{dQ} = 0, \\ \frac{dTR(Q)}{dQ} &= \frac{dTC(Q)}{dQ}. \end{aligned} \quad (3)$$

The sufficient condition for profit maximization also requires that the second derivative of π is negative, which

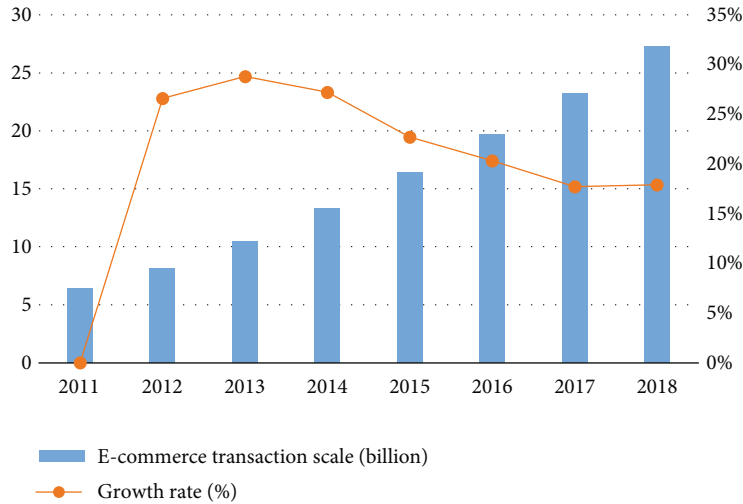


FIGURE 2: The trend of e-commerce transaction scale of China from 2011 to 2018.

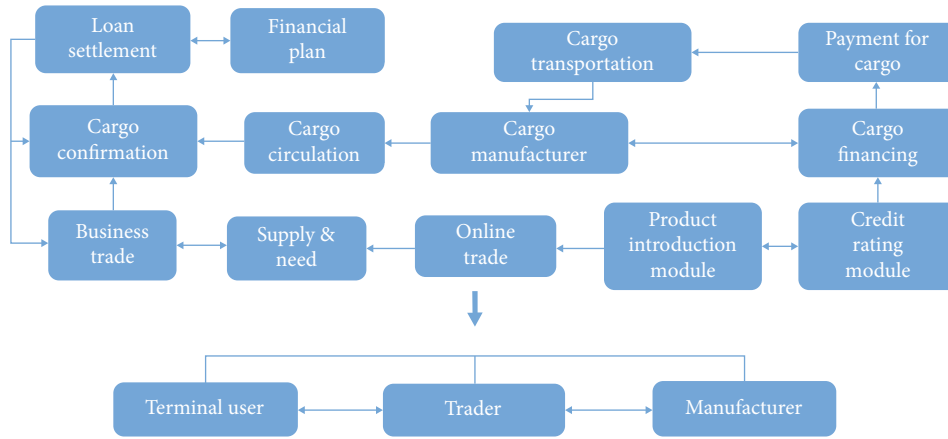


FIGURE 3: The internal connections for a general e-commerce business.

TABLE 2: The summary of six profit pattern of e-commerce.

Pattern	Representative company	Introduction
Product website	Dell	Introduce the products
Shopping	Amazon, Taobao	Introduction service and sales service are available for our products
Portal and Shopping	AOL	Shopping platform combined online and offline
Resale	Onsale, Xianyu	Bidding
Online auction	Ebay	Price negotiations between suppliers and demanders
Bedrock Price	http://Buy.com	No intermediate links

means that profit maximization requires the slope of the marginal cost function to be greater than the slope of the marginal benefit function.

That is

$$\frac{d^2TR(Q)}{dQ^2} < \frac{d^2TC(Q)}{dQ^2}. \tag{5}$$

$$\frac{d^2TR(Q)}{dQ^2} - \frac{d^2TC(Q)}{dQ^2} < 0. \tag{4}$$

When $MR = MC$, we can achieve profit maximization, as displayed in Figure 4.

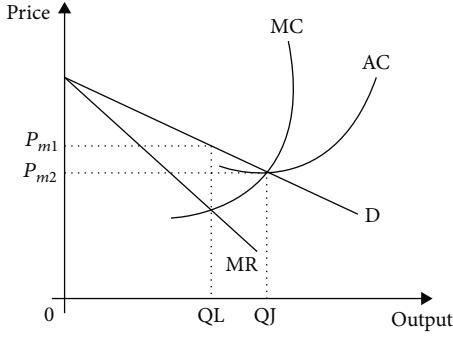


FIGURE 4: The price in profit maximization.

In this figure, P_{m1} is the profit maximization price. By adjusting the output to the level of MR and MC by controlling the output (QL), the enterprise determines the price P to obtain the maximum profit.

3. The Optimization Strategy of Profit Maximization for E-Commerce

3.1. Analysis of Optimization Strategy for E-Commerce. Supply-side reform is inseparable from innovation. So, the quality of the e-commerce industry, as a bridge connecting supply and consumption, will have a significant impact on the success or failure of supply-side reform. In order to implement the outline of the national informatization strategy and promote the innovation of e-commerce development pattern, we have to pay attention to the following problems.

First, the awareness of facilitating supply-side structural reform through e-commerce model innovation must be enhanced. At present, it has reached a critical period to innovate the development mode of e-commerce and improve the quality of e-commerce. Some scientific data showed that Chinese consumers are upgrading their consumption preference from mass to high-end products, with 50 percent of consumers claiming to pursue high-quality and expensive products, a significant increase from previous years. Therefore, this kind of demand not only presents obvious upgrading characteristics of the structure of the urban high-income class but also presents obvious characteristics of gradient catch-up with the sustained and rapid growth of rural residents' income, gradual diffusion of urban consumption demonstration effect, and rapid update of consumption concepts and consumption patterns. However, the current e-commerce and platforms have the problem of the mismatch between the supply and demand of products and the inability to adapt to new demands.

Second, the important role of e-commerce model innovation and development in the supply-side reform has to be clarified. As the middle-end of the ecological chain of the Internet industry, the influence of e-commerce mode and its service quality on the upstream and downstream is increasingly prominent, which will play an important role in the supply-side reform. Among them, the e-commerce platform becomes the intermediate link connecting the upstream and downstream. Therefore, the quality of e-commerce not only determines whether the demand of

terminal consumers can be truly met but also has a significant impact on the upstream industrial chain.

Third, an innovative e-commerce mode achieving precise matching between supply and demand is needed. With personalized and diversified consumption becoming mainstream, the younger generation of shoppers who are more familiar with e-commerce has different tastes and consumption habits. The current online shopping consumers are becoming younger and younger, and the consumers are more in pursuit of individuality and are more willing to accept new things and stronger purchasing power. Therefore, how to deliver consumer demand to the upstream and downstream of the industrial chain faster and better through the e-commerce platform and how to promote the accelerated development of industries related to consumer experience and personalized design have become a major topic to facilitate the supply-side reform.

The last but not the least, e-commerce mode innovation will become an important field in which the cross-border integration and application of the Internet will be advanced in a profound way.

At present, the innovative development of e-commerce is expected to further become a pioneer in promoting reform in all fields. E-commerce model innovation and cross-border integration are not only the need for the implementation of the national "Internet +" strategy but also the need for comprehensively deepening reform. In this way, we can establish and improve the government and social capital cooperation mechanism, inject new vitality into the construction of informatization in the public service sector, and change the innovative service mode of informatization in the public service sector.

3.2. The Theoretical Framework of Profit Maximization Optimization. Generally speaking, in different market structures, the slope of the marginal cost function is positive, while the slope of marginal benefit function is zero in perfect competition market and negative in imperfect competition market.

Suppose there are n enterprises and the demand amount for m business is x_{nm} , thus the profit function can be expressed as

$$\pi_n(x_{nm}) = TR_n(x_{nm}) - TC_n(x_{nm}). \quad (6)$$

In which, π_n is the total profit, TC_n is the total cost, TR_n is the total income (transaction amount), and

$$TR_n = P_n \times Y_n. \quad (7)$$

In which, P_n is the trading price for the n e-commerce enterprise, and Y_n is the transaction amount for the n e-commerce enterprise. Then, we can get the transaction function as follows:

$$Y_n = F_n(x_{nm}). \quad (8)$$

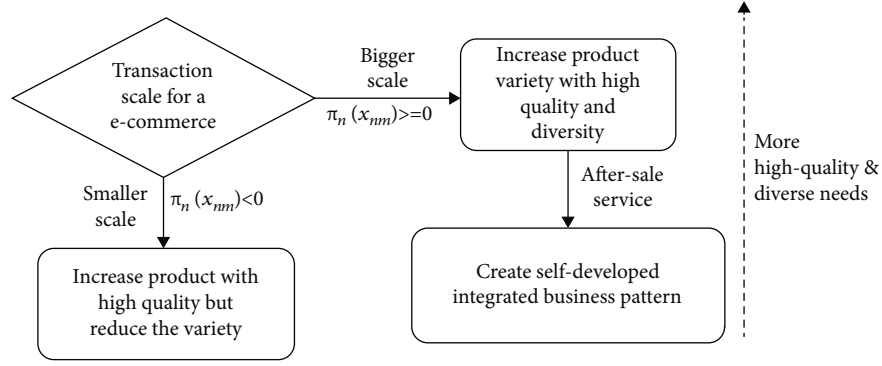


FIGURE 5: The diagram of profit maximization optimization framework.

Then, the total cost can be transformed as

$$TC_n = TC_{nm} + TF_n = W_{nm}x_{nm} + \bar{W}_n\bar{x}_n. \quad (9)$$

In which, \bar{W}_n is the price of the m business for the n e-commerce enterprise, and \bar{x}_n is the total input in addition to the m business, which is constant.

Then, we can get the specific profit function for e-commerce enterprise:

$$\pi_n(x_{nm}) = P_n \times Y_n(x_{nm}) - W_{nm}x_{nm} - \bar{W}_n\bar{x}_n. \quad (10)$$

Take the derivative of both sides of formula (10):

$$\frac{d\pi(x_{nm})}{d(x_{nm})} = P \times \frac{dY(x_{nm})}{d(x_{nm})} - W_{nm}. \quad (11)$$

And if we want to achieve profit maximization, equation (11) must equal to zero, that is expressed as follows:

$$P \times MP_{nm}(x_{nm}, \bar{x}_n) = W_{nm}. \quad (12)$$

In a word, if e-commerce enterprises want to achieve profit maximization, the price of one of their business demand amount should be equaled to the value of the marginal products. Based on the above analysis of profit maximization and the content of supply-side reform, we create the theoretical framework of profit maximization optimization for current e-commerce. Figure 5 elaborates the procedures in detail.

4. Specific Implementation Method for E-Commerce Max Profit

With the rapid development of e-commerce, it has become the consensus of the industry to integrate e-commerce online business with the whole traditional trade chain in the future. Based on the above transaction logic and profit maximization analysis, the e-commerce platform can be conducted in accordance with modularization to ensure the chain connection and operation. In the entire business process, once the offline business migrates to online business, the first thing to be guaranteed is the uniqueness of cargo rights and the reliability of product quality. Therefore, the whole-process

online support of technology is required to correspond to the layout of the offline warehouse center. Second, the accumulation of capital flow and transaction information flow and big data analysis will make the financing service of supply chain finance significantly reduce credit risk, and the buyers and sellers can arrange more orderly in the production and procurement plan and improve the turnover efficiency of the overall production and marketing system, so as to obtain maximum benefits. In addition, consumption upgrade is really a home for young people. Not only do they have relatively higher brand awareness, easier finances, and, more importantly, greater curiosity and the ability to use international channels more freely. And the latter becomes the core industry driving force. Therefore, under the premise of sufficient funds, cross-border e-commerce business can be expanded to integrate with world business and guarantee the transaction of high-quality goods. In this way, more young people will be attracted, and quality consumption space will be released to meet the increasing consumption upgrade.

Therefore, based on the module mode e-commerce business, we create a new method which adds various channels to seek high-quality products to attract buyers, and at the same time, seeking operation with more sellers for lower cost and fluent circulation of the trading chain. Thus, we can adjust cargo needs more flexibly to achieve profit maximization. Figure 6 shows us the diagram of the new strategy.

First of all, e-commerce enterprises must expand their consumer group, like young people, who are a consumer group with huge purchasing power, and multiarea, like rural areas and foreign countries. The rural e-business will leave the era of barbaric growth and gradually move to a new stage of transformation and development. As the “One Belt And One Road” initiative continues to advance, “One Belt And One Road” related industries continue to emerge. “One Belt And One Road” is not only an overland and maritime silk road but also an online silk road in the new era. Therefore, these will bring a chance for Chinese e-commerce enterprise, but also the risks. Then, more high-quality manufacture should be in cooperation. After the tariff reduction since December in 2017, the possibility of “the same price” for both domestic and overseas imported goods will be greatly increased. More overseas goods will enter the Chinese market through general trade, of course, the e-commerce trade is included, and the more open market environment will

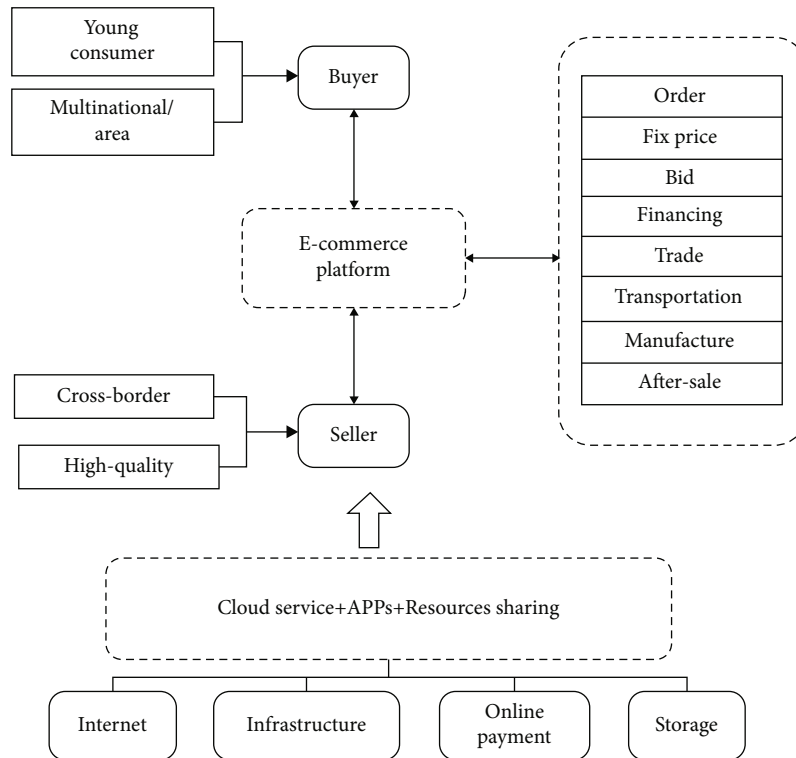


FIGURE 6: The module mode of e-commerce profit maximization.

stimulate the upgrading of domestic brands. This will bring driving forces for Chinese enterprises to produce higher quality products, which will give more choice for e-commerce enterprises to seek low-price and good products.

The opening of online and offline channels means that all the customer's consumption behavior, the circulation of goods trajectory, and the change of inventory data will be in real-time unified channel flow at the same time. After that, the above data will be collected and analyzed. Thus, it is helpful to guide the enterprise marketing to be more precise, their management will be more careful, and the entire supply chain optimization will be achieved. Eventually making production can shift from B2C to no inventory C2B, which will realize the reform of the supply side.

5. Conclusion

The government has further established the strategic, fundamental, and leading position of informatization, which means that China's economic development needs informatization more urgently and becomes the core driving force for transforming the mode of production in various sectors of the economy. For China's economy in the new normal, an important and significant move is to promote in-depth integration of informatization and industrialization and to facilitate supply-side structural reform through innovation of the e-commerce development model. Therefore, solid efforts will be made to promote the innovation of e-commerce development mode and the development of new e-commerce and high-quality e-commerce, which will contribute to profit maximization. We will promote stock adjustment through

incremental reform, optimize the structure of investment and financing in the process of increasing investment, optimize the structure of industries, circulation, and consumption, promote resource integration and optimization and regeneration, promote sustainable economic development, and improve people's living standards, and finally, the e-commerce enterprise profit maximization will come true.

Data Availability

All author information is available from the author.

Conflicts of Interest

The author declares that he has no conflicts of interest.

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