

## Retraction

# Retracted: Cross-Border e-Commerce Business Model Based on Wireless Communication Network and Blockchain

### Security and Communication Networks

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

### References

- [1] B. Chai and Y. Zhu, "Cross-Border e-Commerce Business Model Based on Wireless Communication Network and Blockchain," *Security and Communication Networks*, vol. 2022, Article ID 9572908, 13 pages, 2022.

## Research Article

# Cross-Border e-Commerce Business Model Based on Wireless Communication Network and Blockchain

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At present, traditional business models are gradually being replaced, and companies in different industries and fields are paying much attention to the innovation and reform of e-commerce business models. First of all, this article summarizes the e-commerce business model applicable to this article through the literature induction method, the detailed explanation of cross-border e-commerce business model, and the innovation of domestic and foreign business models. It categorizes business models and introduces cross-border import business. It also introduces the development process of cross-border e-commerce in China's consumer market, business processes, and the success factors of cross-border e-commerce. And, it introduces an evaluation matrix to create a cross-valuation model. The final research results show that the cross-border e-commerce business model has been comprehensively evaluated based on the evaluation index system. From the evaluation indicators and weights, it can be concluded that the organizational value weight of the platform in the cross-border e-commerce business model accounts for the largest weight, occupying a weight of 0.6370. Among the secondary evaluation indicators, the weight of key business capabilities accounted for the largest proportion, reaching 0.8571.

## 1. Introduction

JD.com and Amazon.com are the most popular success stories in cross-border e-commerce. However, the way these best practices work is still flawed to varying degrees. For example, the business models of e-commerce companies such as JD.com, Jumei, and NetEase Kaola have relatively high sales and obvious brand strategic advantages. However, resource allocation and operating procedures are relatively high and unreasonable. If it can further utilize the advantages of blockchain, reorganize resources and optimize operations according to market segmentation strategies, and understand consumer needs and changes, it can ensure efficient supply chain operations without causing impacts and losses. In the cross-border e-commerce field driven by the development of cross-border bilateral trade, the application of blockchain has been recognized by more people, and cross-border companies have a deeper understanding of

the path. e-commerce business model innovation must be practiced to understand the changes in the external environment and industry benefits brought about by new technologies at this stage. In order to better apply different blockchain technologies, and how to continuously innovate the existing business model, e-commerce is rapidly growing to promote the feasibility of multinational industries.

With the rapid development of cross-border e-commerce, the demand and importance of cross-border logistics are also increasing. Hu and Haddud report on the results of a study aimed at understanding the relationship between globalization and technology and the implications of this relationship for modern global supply chains [1]. Zhang and Wen proposed an Internet-of-Things e-commerce model specially designed for Internet of Things e-commerce. However, the e-commerce model they proposed is difficult to apply to cross-border e-commerce [2]. Zhang et al. proposed a multilayer network architecture. The results

show that, compared with existing networks, hierarchical identity networks provide better performance in terms of scalability, flexibility, and interoperability. But while pursuing performance, it ignores the basic requirements [3]. Sánchez-García et al. explored cluster-based coordinated spectrum detection (CSS) and cognitive wireless communication network (EH-CWCN) in energy harvesting. Finding the best local detection limit by constructing a virtual cognitive node (FCN) can be transformed into a search process for the best signal-to-noise ratio available on the FCN. Finally, numerical simulations verify the influence of theoretical analysis and optimized parameters on system performance. However, they formulated general optimization problems under collision constraints and energy constraints, which could not meet the optimization requirements [4]. Chen studies the impact of e-commerce, international hotel chains, local hotel chains, and green certification on the performance of international tourism hotels in Taiwan in terms of carbon emission reduction [5]. He et al. explore the dynamic interaction between international logistics and cross-border e-commerce trade [6].

The comparative analysis of many domestic cross-border e-commerce platforms, and horizontal and vertical comparative analyses of the current cross-border e-commerce problems are of positive practical value. In the theoretical analysis part, based on measurement analysis and data analysis, construct the characteristics of blockchain and discuss its suitability in electronic payment. Based on the research on the driving force of business model innovation and the concept of the system, the concept of the driving force of the business model system based on data-driven and technology-driven is proposed. Then analyzing the problems in the traditional e-commerce field, the concept and category are summarized. It finds out the distribution relationship between industry problems and business model elements and finds the direction of analysis for the research topic of this article [7].

## 2. Method of the Cross-Border e-Commerce Business Model Based on Wireless Communication Network and Blockchain

*2.1. Cross-Border e-Commerce.* Cross-border e-commerce is mainly for consumers in various countries and regions to realize the free exchange of freight correspondence through the Internet. It promotes products electronically, updates information, pays for foreign exchange, and so on [8, 9]. While supporting the policies of the Ministry of Commerce, national government departments have also successively introduced a series of policies on cross-border e-commerce business, such as the export preferential policies of these enterprises, export tax rebate policies, opening up cross-border payment methods, strengthening the construction of logistics and transportation, setting up e-commerce pilot cities, and so on. The implementation of these policies has undoubtedly opened a green channel for the development of cross-border e-commerce.

Traditional international trade development has many limitations. The development of cross-border e-commerce has transformed the traditional trade development model and has become an emerging model. Starting from the traditional business model of enterprises, enterprises can obtain higher economic benefits at a lower cost. Cross-border e-commerce focuses on the needs of market consumers, through combining the internal resources and value individuals of the enterprise, and integrates and innovates at a higher level from the inside to the outside. It generally involves resources, corporate management systems, and business models.

*2.2. Wireless Communication Network.* Wireless communication networks need to become a new branch of e-commerce. It can run on the communication network and combine traditional e-commerce with the already developed but popular e-commerce and further expand the business process from wired network technology to wireless network [10, 11]. The basic architecture of the wireless network is shown in Figure 1 [12, 13].

e-commerce is a network-level application based on wireless communication technology, but there are still some specific security threats and specific security problems. For example, wireless networks are more likely to be intercepted by the outside world, and the bandwidth of wireless channels is limited. The certificate may not be very large; otherwise, it will affect the processing of the system. But the mobile electronic communication module is mobile, which increases the uncertainty of the security mechanism [14, 15].

*2.3. Blockchain.* Blockchain technology uses a cryptographic algorithm to calculate the interactive data formed by multiple nodes in the blockchain system and then records it in a block and connects to the next block after verification [16]. The synchronization of data information is also realized by regularly exchanging information with neighboring nodes between each node participating in the maintenance. Ensuring that the data information held by all legal nodes is consistent, a consensus mechanism is established using blockchain technology [17, 18]. The overall basic framework of blockchain technology is shown in Figure 2.

The data layer contains the underlying data block and chain structure and protects the integrity and traceability of block data through fragmentation algorithm, time stamp algorithm, Merkle tree algorithm, asymmetric encryption algorithm, and so on [19, 20]. The network layer contains a data distribution mechanism and a transaction verification mechanism. Its main task is to enable each node in the blockchain to achieve effective communication through the P2P network. This is mainly achieved through network capabilities and transmission and verification of data. The P2P technology used in the blockchain network is one of its core technologies and the main means to achieve decentralization and dynamic change. The agreement level includes agreement mechanism, issuance mechanism, and incentive mechanism. Its main function is to ensure data

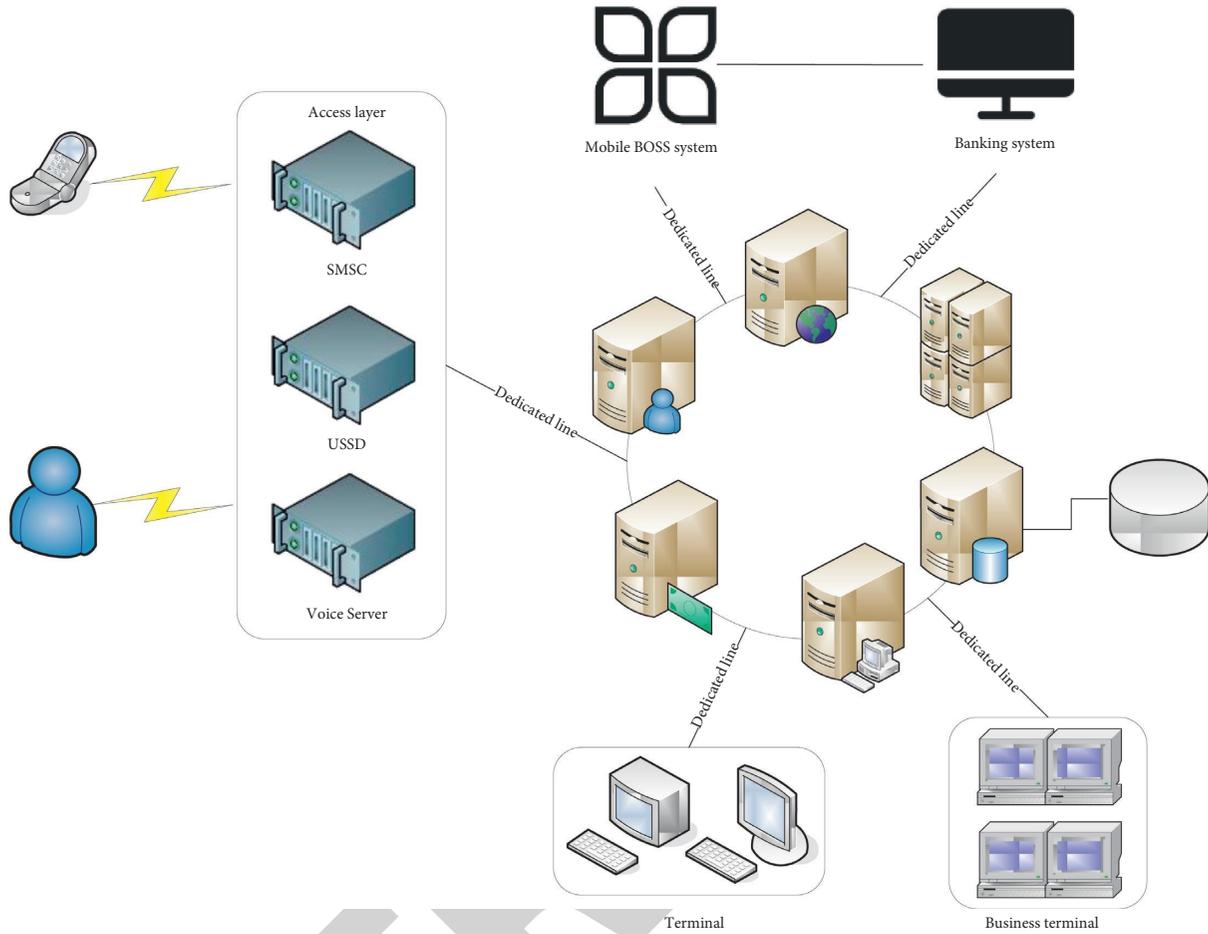


FIGURE 1: Network architecture diagram.

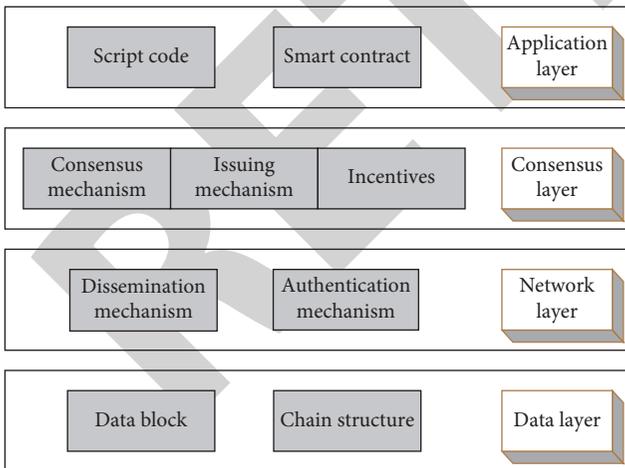


FIGURE 2: The overall basic framework of blockchain technology.

consistency and reliability between distributed nodes in the blockchain [21, 22].

Combining the development of Internet technology, this article uses blockchain technology as the breakthrough point, through combining the development status of cross-border e-commerce electronic payment models, and

analyzes the problems of existing payment models. Based on the unique characteristics of blockchain technology such as decentralization, trustlessness, and immutability, the feasibility of applying blockchain technology to the cross-border e-commerce electronic payment model is analyzed.

*2.4. Wireless Communication Network Combined with Blockchain Technology.* Blockchain uses encryption technologies such as asymmetric encryption and digital signatures to perform well in trust establishment and data protection. At the same time, the blockchain also has better flexible adaptation capabilities. The content of block data can be flexibly adjusted according to the needs of the scene, which creates the possibility of introducing the blockchain into the communication system. The blockchain-based wireless communication network is roughly shown in Figure 3. Within the coverage of the base station, all devices connected to the network and the base station form a blockchain subnetwork. Access requests within the current coverage area are all processed in this subnetwork. After all access requests are uploaded through the blockchain network, the base station guides the equipment to complete the subsequent authentication access process. In the blockchain network, each user opens an account and creates a

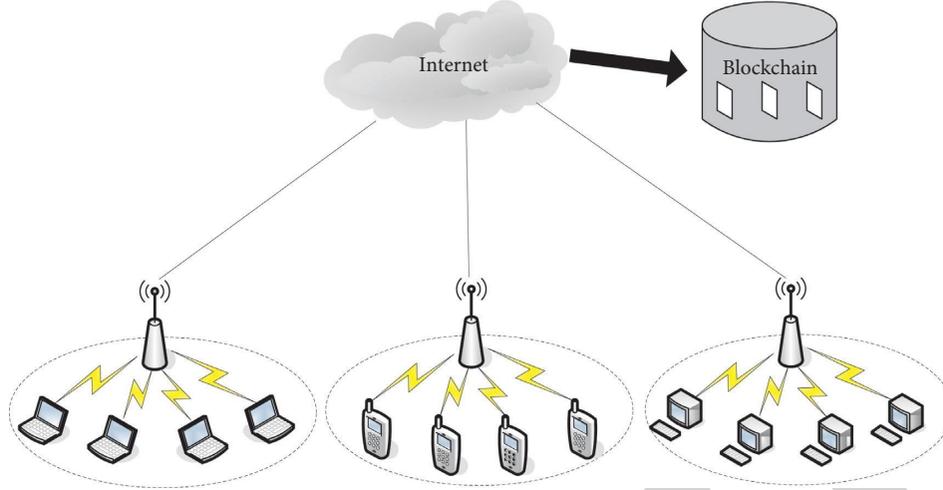


FIGURE 3: Blockchain-based wireless communication network framework diagram.

corresponding public and private key, the private key is kept secret, and the public key can be made public. Each device user has a unique corresponding account address in the blockchain, and each access request and the request for adding and deleting user equipment after access are recorded in the blockchain.

Perform privacy data collection and encryption processing on aggregated data:

$$A_i = Enc(B_i) = B_i + ID_i, \quad (1)$$

where  $A_i$  means ciphertext;  $B_i$  means encryption function; and  $ID_i$  means node threshold.

Then, the homomorphic message verification code of the sensing data is calculated for the initiating node to judge the integrity of the received data. The homomorphic Hash verification code function is

$$Hash(B_i) = \varepsilon^{B_i} \sum A_i. \quad (2)$$

Finally, upload the ciphertext information of the child node and the Hash message verification code to the upper aggregation node.

In the data integration stage, the data that needs to be aggregated and privacy protected will be aggregated after verification is completed. First, perform ciphertext aggregation processing, and adopt an end-to-end encryption processing mechanism. The upper aggregation node directly aggregates the private information without decrypting the received private information. This reduces computational overhead, reduces the risk of nodes being compromised, and enhances the confidentiality of private information. Secondly, the node IDs are aggregated so that the intermediate aggregation nodes only need to upload a small amount of data to reduce the communication overhead of the network to a certain extent. The aggregate function can be expressed as

$$A_n = \sum_{i=1}^m A_i = \sum_{i=1}^m B_i + \sum_{i=1}^m ID_i. \quad (3)$$

Then, aggregate the Hash function message verification code. The upper aggregation node aggregates the received message verification codes and aggregates them into a message verification code to reduce data communication overhead. Its aggregate function is expressed as

$$Hash_n = \prod_{i=1}^m Hash(B_i) = (\varepsilon^{B_1})(\varepsilon^{B_2}) \cdots (\varepsilon^{B_n}). \quad (4)$$

Finally, upload the aggregation result of the private information to the upper node, and loop the operations of the data aggregation stage until the start end receives the final aggregation data.

After the data aggregation is completed, the results of the aggregated data need to be verified. Before starting the verification, the initiating node must first decrypt the aggregated data it receives. Its decryption function is expressed as

$$T_B = R(A_n) = A_n - \sum_{i=1}^n ID_i = \sum_{i=1}^n B_i. \quad (5)$$

Among them,  $T_B$  is the decryption function, and then recalculate the decrypted private information, and check its homomorphic message verification code:

$$R = Hash(A_i) = \frac{r \times W \times T_B}{A_i}. \quad (6)$$

Strengthen the wireless network's ability to support heterogeneous authentication, reduce the risk of privacy leakage during the authentication process, and realize the security authentication of users and devices. This paper constructs a set of multilevel hierarchical reputation evaluation models, which can be used for reputation identification and evaluation of user equipment, which is convenient for the authentication of user equipment. Among them, first define and classify the various behaviors of the device in the blockchain network, and then evaluate the reputation of the user's device based on the classified device behavior.

The calculation of device credibility is based on the block generation process. As mentioned earlier, at the beginning of the cycle, each device node will try to find the block header. At the same time, the base station broadcasts the suspicious behavior statistics of the device node in the previous cycle and broadcasts the calculated change value of the device node's credibility accordingly. The formula for calculating the credibility of the device is

$$G_{temp}^{(a)} = 1 - \frac{c^{-(ca-axb_i)}}{2}. \quad (7)$$

Among them,  $G_{temp}^{(a)}$  means the current credibility of the device node  $a$  calculated by the device node  $a$  that continues to participate in the consensus based on past behaviors (including trusted behavior, untrusted behavior, and suspicious behavior).  $c$  indicates the cumulative value of the trusted behavior of the device node in the consensus process.  $b_i$  represents the cumulative value of the untrustworthy behavior of the device node in the consensus process.  $i$  represents the weight of punishment for untrustworthy behavior. The greater the value of  $i$ , the greater the penalty for the untrusted behavior of the device node.

The accumulated equipment credibility is expressed as

$$G(a)_i = \gamma \times G_{temp}^a + (1 - \gamma) \times G(a)_{i-1}, \quad (8)$$

$$G(a)_0^t = \gamma \times G_{temp}^a + (1 - \gamma) \times G_{-1}^{t-1}, \quad (9)$$

where  $G(a)_0^t$  represents the credibility at the end of the last time slot of the previous cycle. At this time, the addition of suspicious behavior changes the calculation:

$$g_t = s_{\eta 1} \times \text{count\_site} + s_{\eta 1} \times \text{count\_f}. \quad (10)$$

Among them,  $\text{count\_site}$  represents the number of significant geographic location changes, and the value of  $\text{count\_f}$  is based on the average rate of change in the upload and download of the device in a cycle.

In order to improve the enthusiasm of device nodes to participate in the consensus, based on the aforementioned credibility growth model, a credibility reduction mechanism is introduced, and the credibility of the device will be reduced due to not participating in the generation and verification of the block. Specifically, when the device does not participate in the consensus for a period of time, the credibility of the device will continue to decrease because it does not participate in the consensus until it participates in the consensus process of the blockchain here. Therefore, the specific comprehensive calculation process of the credibility of the device node  $a$  is

$$G_{temp}^{(a)} = G_{before}^{(a)} \times \left| \frac{\Delta t}{a} \right|^{-\gamma}. \quad (11)$$

Among them,  $\Delta t$  means the cumulative time from when the device does not participate in the consensus until it participates in the consensus here.

Considering that a single user has multiple terminal devices, in order to prevent users with low-credibility

devices from interfering with the network with the help of another device identity, user credibility evaluation is introduced.

$$P_m^M \geq \log_2(a) + \log_2 M - 1, \quad (12)$$

where  $M$  represents that there are  $M$  transmission links in the wireless communication network, and the worst-case communication complexity of scheduling based on finite weight comparison is limited by the lower limit.

$$D_{i+1} = \left[ \frac{w_i + P_i}{2} \right], P_{i+1} = P_i, \quad (13)$$

$$D_m^M \leq \sum_{i=1}^M \binom{M}{i} \frac{M + D_i^{m-1}}{2} + \frac{M + D_m^{m-1}}{2}, \quad (14)$$

where  $D$  is the minimum number of communication bits, and each communication protocol can be represented by a binary tree. The decision-making process is the same from root to leaf. For the lower limit of the difference, the lower limit of communication complexity needs to be obtained. For the lower limit of network communication complexity, the calculation formula is

$$P_m^M \left( \frac{1}{2} - \sigma \right) \geq \log_2 \left( \frac{2\sigma}{W_j} \right), \quad (15)$$

$$\frac{1}{2} + \sigma \leq P|P(n) = W(m)|. \quad (16)$$

For the lower limit of communication complexity, the difference can be calculated. The difference of the entire network is defined as  $W_j$ , and then the lower limit is obtained through the difference function.

Assuming that the difference reaches the maximum, then

$$W_j(m) = P(n \in D, W(n) = i - P(n \in D)), \quad (17)$$

$$W_j = 2 \int \min(m_1, n_2) = 2 \sum_{w=1}^M \frac{1}{M - w + 1}. \quad (18)$$

Due to the symmetry of the data, when  $M$  is large enough, it is difficult to find the exact matrix that achieves the maximum difference. By making the differential equal to 0, find the best point, and then maximize the value to obtain the difference.

$$W_j = (1 - n_1)n_2 - (n_1 - n_2)^2, \quad (19)$$

$$D_m^M(N) = \sum_{i=1}^N \left( \frac{N + D_i^{n-1}}{2^N} + \frac{N + D_j^{m-1}}{2^M} \right). \quad (20)$$

By obtaining the lower limit of communication complexity, it can be observed that the lower limit is nonlinear with respect to  $N$ . At this time, the average number of bits of each node is less than 1. Its priority cannot compete with other nodes and will not transmit any information.

### 3. Wireless Communication Network and Blockchain-Based Commercial Model for Cross-Border Electronics Business

*3.1. The Business Model of Cross-Border e-Commerce.* From the existing e-commerce business model, it can be divided into B2B (Business to Business), B2C (Business to Customer), C2C (Customer to Customer), and O2O (Online to Offline). Specifically, these companies exhibit their products through e-commerce platforms and provide customer service consultations. In the end, after the two parties have reached a deal, the goods will be delivered to consumers through logistics and transportation of express mail and parcels. Among them, the most important business model in the cross-border e-commerce industry is the B2B model. Among them, the O2O (Online to Offline) business model is an online-to-offline business model, which has the advantage of in-depth integration of online and offline resources. But it is not suitable for cross-border e-commerce, so this article does not explain it.

Its transaction characteristics are large batches, small batches, and concentrated orders. Typical representative cases of the B2B model are Alibaba International Trading Market and Global Sources.com. This can provide thousands of online merchants with massive information on business opportunities and a convenient and safe online trading market. If a buyer purchases samples or foreign trade trial orders on the international station, it is like buying something in a free market. The price of the product needs to be negotiated and confirmed by the buyer and the seller before the order can continue. B2C transactions are characterized by small batches, multiple batches, many customers, and scattered orders.

Regardless of the transaction mode adopted by cross-border e-commerce, there are differences from domestic trade e-commerce channels. The risks of cross-border e-commerce transactions mainly lie in channel risk, product standard difference risk, logistics risk, information risk, and policy risk, which hinder the research of cross-border e-commerce business models [23].

*3.2. Design of Cross-Border e-Commerce Business Model Based on Wireless Communication Network and Blockchain.* Business model innovation is a more advanced business innovation activity that guides business operations, product, technology, and system innovation. Traditional business innovation generally focuses on individual business activities. Business model innovation is through the combination of internal resources and the value of business personnel. It is generally the highest level of integrated innovation at home and abroad, including resources and business, consumer management systems, and business models. Business model innovation is mainly manifested in four aspects. First of all, business model innovation is centered on consumer market demand, reorganizing business activities in the business market, and general business model innovation is more open. The essence of business model innovation is to improve the operating efficiency of the enterprise value

creation mechanism and enhance the enterprise's competitiveness in market management. This article uses wireless communication networks and blockchain technology to study cross-border e-commerce business models, which can effectively help businesses obtain user information. This guarantees a safe trading environment and ensures the safety and convenience of commodity transactions. Figure 4 is a structural diagram of cross-border e-commerce industry chain.

Figure 5 is a schematic diagram of cross-border e-commerce.

The online shopping bonded import model corresponds to the bonded warehouse business model. Cross-border import e-commerce companies stock imported goods in the bonded area. After consumers place an order to purchase cross-border goods on the cross-border e-commerce service platform, the cross-border e-commerce company transmits the consumer order information, payment vouchers, electronic waybill, and other information to the customs. The company or cross-border e-commerce representative submits a declaration form to the customs; the customs handles the customs formalities and completes the declaration after confirming that it is correct. After customs clearance, the parcel will be carried and delivered by the logistics company in the area to the buyer.

Direct purchase imports correspond to overseas direct mail companies and are linked to cross-border e-commerce companies and customs. From abroad to the customs post office, through mail or express, the customs clears customs in accordance with relevant taxation standards, and finally the package is carried by the domestic logistics company to the buyer.

*3.3. Determining the Evaluation of Indicators at All Levels of the Cross-Border e-Commerce Business Model.* The cross-border e-commerce business model itself is a complex system designed with multiple participants. According to the hierarchical process of ambiguity analysis, first determine the weight of each indicator, and then perform multilevel evaluation.

This paper adopts the analytic hierarchy process, using numbers and reciprocals as a scale to evaluate the relative importance of the two indicators, as shown in Table 1. After determining the scale of the judgment matrix, the eigenvector and the maximum eigenvalue of the index weight are determined.

After calculating the eigenvector and the maximum eigenvalue of the evaluation value index weight, all the judgment matrices must be checked for consistency so as to ensure the correctness and validity of the evaluation index.

Table 2 is the value evaluation index of cross-border e-commerce business model. The index weight is divided into two levels. The first level is the weight of each specific indicator contained in each main indicator category in the main category, and the second level is the weight of each main indicator category in the business model. First, construct the first-level categories of indicators and the weight ranking.

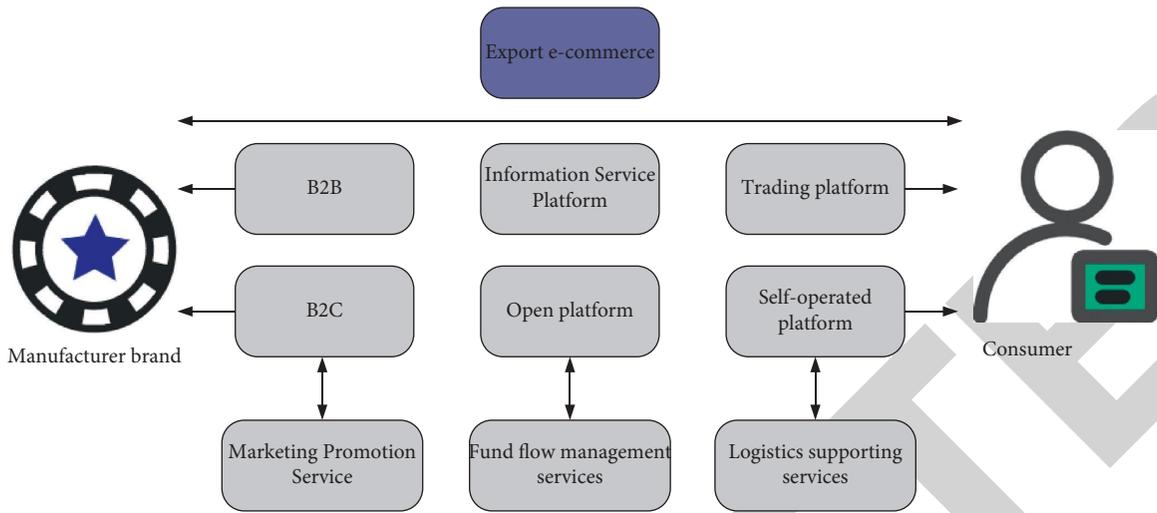


FIGURE 4: Structure of cross-border e-commerce industry chain.

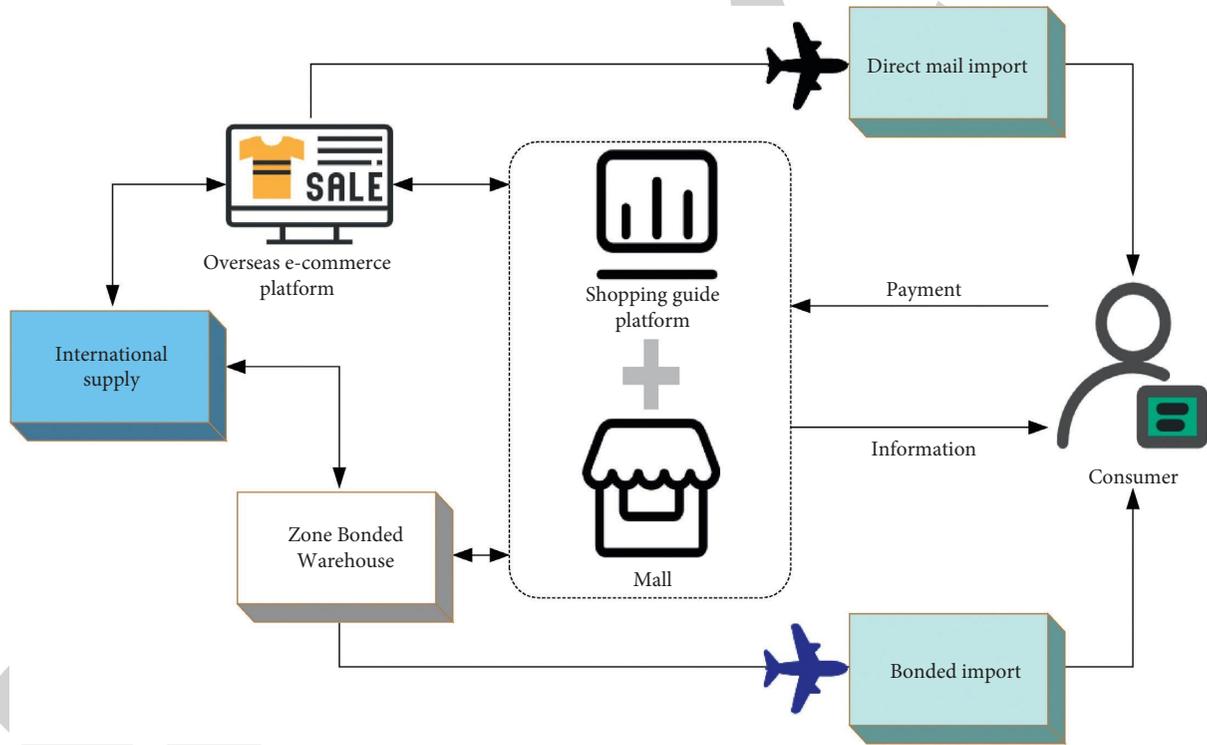


FIGURE 5: Schematic diagram of a cross-border e-commerce.

TABLE 1: Standard score of evaluation index.

Scaling	Interval	Quantitative index	Qualitative indicators	Meaning
1	1	3	3	Equally important
3	2	4	4	Slightly important
5	3	5	5	Stronger important
7	4	6	6	Strongly important
9	5	7	7	Extremely important
2, 4, 6, 8	6	2	1	Median

TABLE 2: Cross-border e-commerce business model value evaluation index.

	Index	Weights	Sort
Business model value evaluation index	Customer value	0.2583	2
	Platform organizational value	0.6370	1
	Merchant value	0.1047	3

#### 4. Cross-Border e-Commerce Business Model of Wireless Communication Network and Blockchain

*4.1. The Scale of China's Cross-Border e-Commerce Development in Recent Years.* The cross-border e-commerce market is huge and growing rapidly. In recent years, with the growth of e-commerce users, most traditional foreign trade companies have adopted cross-border e-commerce as their main sales channel. The scale of China's cross-border e-commerce continues to grow, the share of imports is growing rapidly, and the upgrading of the domestic industrial structure is imminent. Figure 6 shows the transaction scale of China's cross-border e-commerce market from 2013 to 2019.

Huge market demand is driving the rapid growth of cross-border e-commerce in the context of domestic consumption growth. In 2013, my country's cross-border e-commerce market trade volume was only 3.15 trillion yuan. It exceeded 8 trillion yuan in 2017 and 10 trillion yuan in 2019.

Figure 7 shows the import and export scale structure of cross-border e-commerce in 2013–2019. From the perspective of the import and export structure of cross-border e-commerce, the proportion of exports has fallen, and the proportion of imports has increased significantly. In 2013, cross-border e-commerce accounted for 85.70% of exports, which dropped to 76.50% in the first half of 2019. Import volume increased to 14.3% and 23.50% in 2013 and the first half of 2019, respectively.

*4.1.1. Classification of Cross-Border e-Commerce Business Models.* With the continuous growth of the user scale of the cross-border e-commerce market, its market structure has entered a relatively concentrated era.

As can be seen from Figure 8, among the top e-commerce platforms currently occupying this market, Tmall Global and NetEase Kaola have the highest proportions, followed by JD Global Shopping and Vipshop International. Their market structure has entered a relatively centralized era. From an overall point of view, the platform category still accounts for a large market share, but the development momentum of independent stations is even more rapid. It is estimated that the export channels of cross-border foreign trade sellers will increase from 9.8% to 20.3%. This trend will continue in the future, and the cross-border e-commerce market will continue to expand.

Among them, platform-based imported cross-border e-commerce companies do not participate in the value chain links of production, transportation, retail, after-sales, and so on, like self-operated companies, but integrate resources. It links resource demanders (consumers) and resource

suppliers (merchants) and connects the upstream and downstream of the value chain to deintermediate. Self-employed enterprises try to shield the information exchange between the upstream and downstream parties of the value chain and earn profits through the operation of intermediate links, always expecting to achieve the strongest monopoly effect; the platform type is the opposite. It strives to promote exchanges and cooperation between resource supply and demand and cultivate and help settled merchants with brand building and marketing activities.

Figure 9 shows the results of consumer surveys on cross-border e-commerce platforms. Therefore, the business model of cross-border e-commerce should be optimized for such problems, strengthen the guarantee of genuine products, improve competitiveness, and establish a corporate image.

Regarding product quality issues, cultural differences will also have a certain impact on the experience of product quality. This also includes other influencing factors that will cause differences in product quality experience. For this reason, third parties are particularly important in this situation. It can provide effective improvement suggestions to businesses based on buyers' suggestions, thereby reducing the impact of cultural differences.

#### *4.2. Elements of the Cross-Border e-Commerce Business Model.*

The current problems of cross-border e-commerce are as follows: the tendency of product homogeneity is serious, product branding is backward, counterfeit and inferior products frequently appear, security problems in payment face security threats, personal information is difficult to guarantee, and so on.

The biggest disadvantage of today's B2B business model is the traffic problem and the B2B model requires a subscription system. The display of products requires high prices, but the actual conversion rate is not very high. However, the recent increase in domestic customer consumption has increased the willingness of consumer groups to consume cross-border products.

From the distribution of business model elements in Figure 10, it can be seen that the value proposition issues accounted for the highest proportion of 32.97%, followed by the interface model 27.45%, followed by the resource mix 19.74% and the operation process 18.56%. Other problems accounted for only 1.29%, which can be almost ignored. According to the traditional cross-border e-commerce business model structure proposed in the previous article, it can be seen that the above questions basically cover all aspects of the business model elements. Among them, products and services, customer needs, and other issues related to corporate value propositions accounted for the

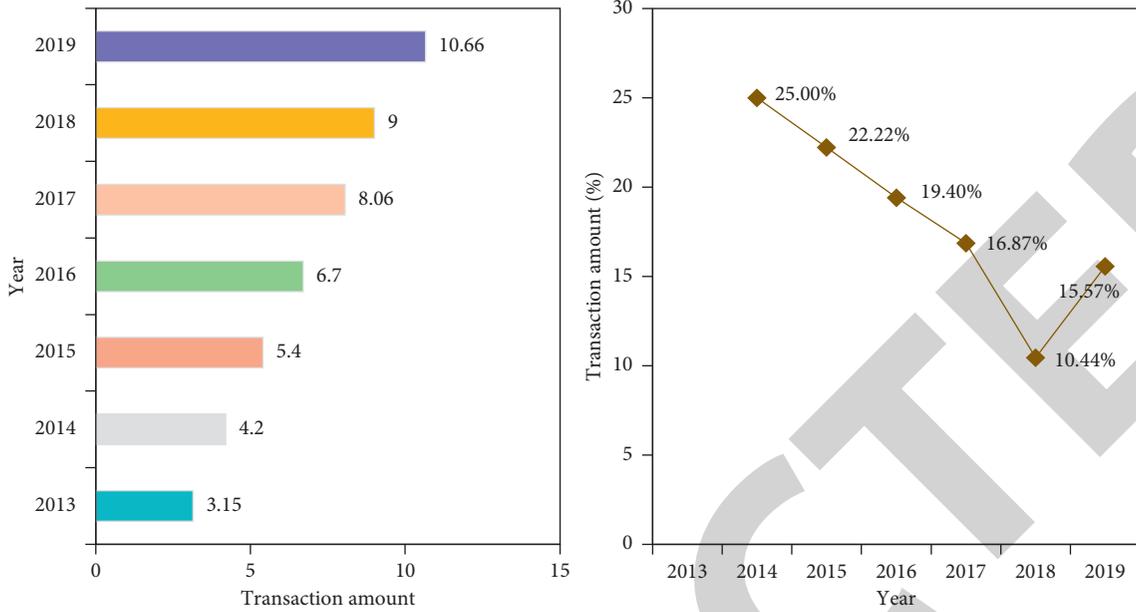


FIGURE 6: 2013–2019 China’s cross-border e-commerce market transaction scale.



FIGURE 7: 2013–2019 China’s cross-border e-commerce import and export structure.

highest proportion, followed by supply chains, logistics systems, and marketing models, and other factors related to corporate interface models also accounted for a higher proportion. It also involves China’s government and enterprise informatization management and related laws and regulations. This makes government departments and enterprises not only have to face changes in the internal environment, but also actively adapt to changes in the external environment.

Table 3 shows the weights of the customer value evaluation indicators for the cross-border e-commerce business model.

Table 4 shows the organization value evaluation index weights of cross-border e-commerce business model platforms.

Table 5 shows the weights of cross-border e-commerce business model merchant value evaluation indicators.

The judgment matrices of all levels of indicators conform to the consistency test. From the table of index weights at all levels, it can be seen that the organizational value weight of the platform in the first-level indicators of the cross-border e-commerce business model accounts for a relatively large weight, occupying a weight of 0.6370. Among the secondary evaluation indicators, the weight of key business capabilities

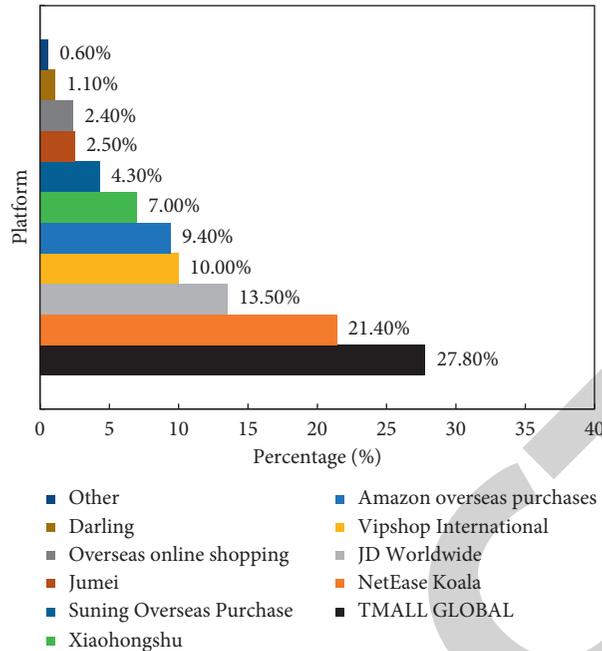


FIGURE 8: Proportion and recognition of cross-border imported retail e-commerce market size.

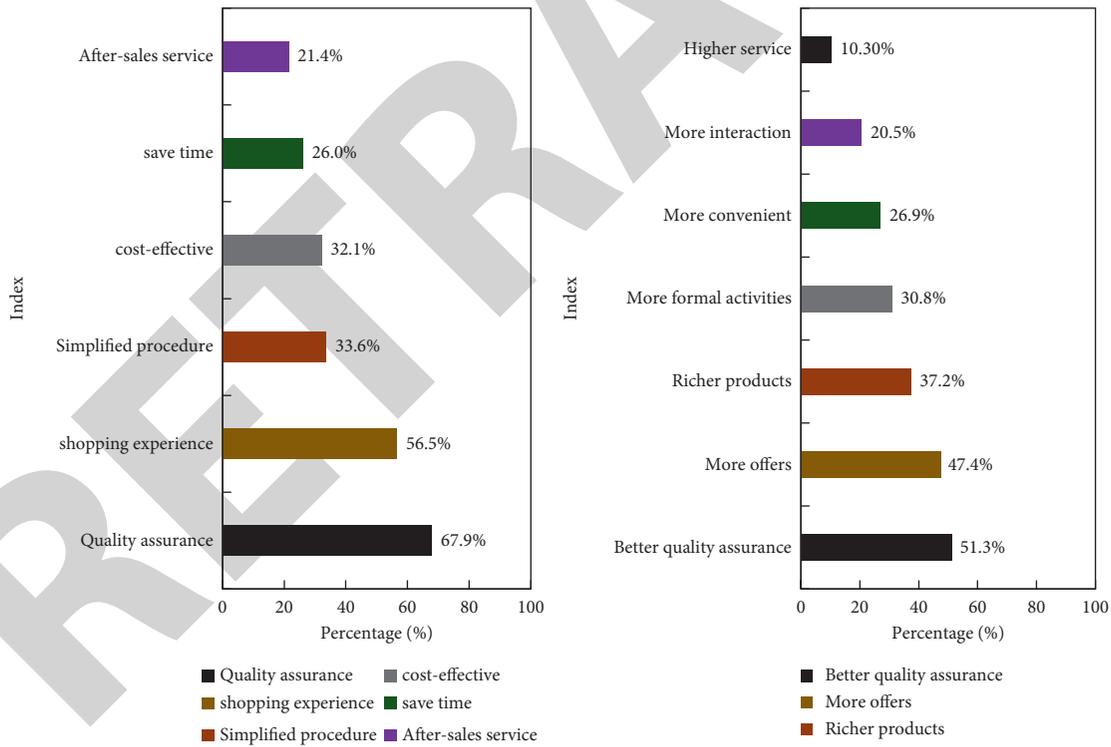


FIGURE 9: Consumers' recognition and expectations of cross-border e-commerce services.

accounted for the largest proportion, reaching 0.8571, which is also among the best in the overall indicators.

4.3. Countermeasures and Suggestions to Promote the Development of Cross-Border e-Commerce Business Models

- (1) Build a user management platform to enhance user value

It can create face-to-face communication opportunities for users and businesses and bring development opportunities for the integration of traditional service industries and Internet thinking. In the value chain, user value is the source of business model value. The digital synchronization of online and offline user information, product

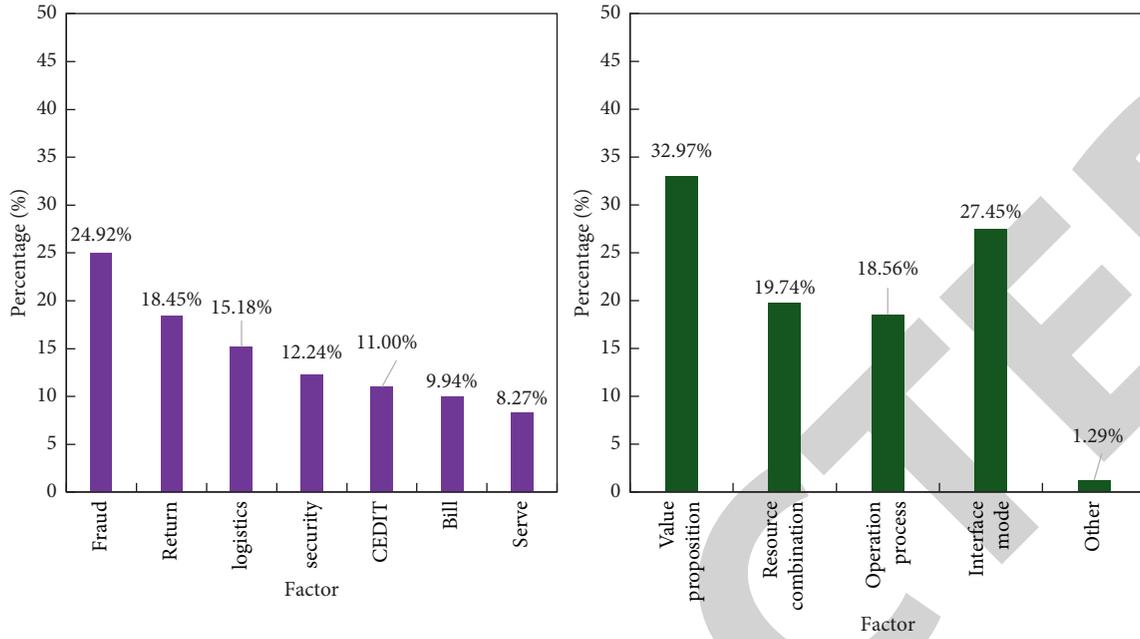


FIGURE 10: Summary of cross-border e-commerce complaints.

TABLE 3: Weights of customer value evaluation indicators for cross-border e-commerce business models.

Index	Secondary indicators	Weights	Tertiary indicators	Weights
Customer value 0.2583	Customer cost	0.25	Currency cost	0.7089
			Time cost	0.1786
			Risk cost	0.1125
	Customer utility	0.75	Functional utility	0.75
			Experience utility	0.25

TABLE 4: Organizational value evaluation index weights of cross-border e-commerce business model platforms.

Index	Secondary indicators	Weights	Tertiary indicators	Weights
Platform organization value 0.6370	Value to the industry chain	0.279	Value chain extension benefits	0.8333
			Supply and demand balance	0.1667
	Operational value	0.6491	Key business capabilities	0.8571
			Transaction matching efficiency	0.1429
	Profit value	0.0729	Redistribution of benefits	0.8333
			Profitability	0.1667

TABLE 5: Cross-border e-commerce business model merchant value evaluation index weight.

Index	Secondary indicators	Weights	Tertiary indicators	Weights
Merchant value 0.1047	Merchant qualification	0.8	Product/service quality	0.8
			Cooperation value	0.2
	Operational capability	0.2	Customer relationship management	0.8
			Supply chain management	0.2

information, transaction information, and other information provides a large amount of data resources for customer relationship management. Therefore, the customer relationship management platform is an excellent tool to continuously understand and explore user needs and continuously improve products and services to meet user needs.

(2) Improve the credit evaluation system and increase the value of businesses. Establish a sound credit evaluation mechanism to prevent fabricating false reviews. In this regard, the credit evaluation system can be divided into two parts: one is qualitative evaluation, that is, descriptive evaluation feedback of text and pictures; the other is quantitative evaluation, that is, a point mechanism. Consumers can score

based on their shopping experience and the value of the products or services they have purchased. Through scores, merchants can be comprehensively considered.

- (3) Improve the profit mechanism and enhance the organizational value of the platform

For the platform, it can provide a platform for merchants to display products and services, and collect advertising fees from the merchants. It integrates industry resources, gathers high-quality merchant resources, helps consumer-related merchants to realize mutual introduction of consumers, and provides user management services for offline merchants.

- (4) Establish a sound basic information management system

For basic information issues, there is prerequisite for honesty and intercommunication. The town government department takes the lead to establish and improve the transaction theme and product basic information database and management system and share data management with the industrial and commercial departments, public security departments, industry authorities, and CA agencies. It must actively promote information sharing, mutual recognition of supervision and mutual assistance in law enforcement among various regulatory agencies.

- (5) Using blockchain technology to effectively improve e-commerce business models

Blockchain technology is applied to the current logistics business model, one of which can be applied to general ledger sharing: that is, multiple parties can participate in logistics settlement, expand the service field of the current platform model, and achieve cross-border development. The second can be applied to product traceability. Finally, there is the field of logistics finance. The new e-commerce model also reduces the cost of establishing corporate trust. Since blockchain technology adopts a decentralized global model, it will not violate every transaction, and the reliability of information is maintained on the global network. With the help of blockchain technology, a high-quality, cost-effective, and high-quality e-commerce platform can be built. Blockchain technology has formed a decentralized, highly autonomous distributed network platform that makes e-commerce transactions completely transparent, reliable, and traceable. Blockchain technology can also enable the government to monitor the e-commerce market more effectively.

## 5. Conclusions

This article studies the cross-border e-commerce business model based on wireless communication network and blockchain technology. First, it reviewed the theories, business models, innovative ideas, and connotations of wireless communication networks and blockchain business models, as well as a review of related literature. And using

the framework to effectively innovate the cross-border e-commerce business model. With the rapid development of the cross-border e-commerce industry and the rapid expansion of the consumer market, relevant government departments and cross-border e-commerce companies need to truly establish e-commerce thinking, that is, to improve the use of informatization and intelligent means for supervision and operation, improve the ability to obtain and analyze business cross-border e-commerce data, eliminate information islands, protect transaction data, and realize government-enterprise information sharing. It is also necessary to strengthen financial platform security supervision, strengthen information security protection mechanisms, product intellectual property rights, and consumer privacy protection, and face the challenges of existing problems with scientific, stable, and sustainable business models and innovative methods.

## Data Availability

No data were used to support this study.

## Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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