Research Article

Design and Application of e-Commerce Platform System Based on Blockchain Technology on the Internet of Things

Bin Zhao,1 Xue Jiang,2 Na Zhang,1 Qian Guo,1 and RongRong Song3

1School of Economics and Management, Bengbu University, Bengbu, Anhui 233030, China
2Graduate School, Semyung University, Jecheon-si, Chungcheongbuk-do 27136, Republic of Korea
3Hefei Branch, Anhui Radio and Television University, Hefei, Anhui 230001, China

Correspondence should be addressed to RongRong Song; srr@ahou.edu.cn

Received 12 July 2022; Revised 10 August 2022; Accepted 16 August 2022; Published 13 September 2022

1. Introduction

After more than 20 years of rapid development, the Internet has been greatly developed in the world. The emergence of diversified new forms of business in Internet industry does not only bring great convenience to people's life but also change the era significantly [1].

Among them, e-commerce is one of the most important sectors in Internet business. In the field of e-commerce, no matter in China or United States, tycoon enterprises have been born. E-commerce, social communication, and search constitute the most significant three business forms in Internet territory. However, while e-commerce has achieved a great development, it has also exposed a series of major problems to be solved urgently. The main points are as follows.

As platforms grow into giants, they have gained comprehensive advantages in flow, capital, and brand, and then use these advantages to suppress new competitors, thus hindering competition and innovation and ultimately damaging the interests of buyers, sellers, and entire business.

Since the orderly operation of e-commerce platform relies on a set of complete and complex rules, many of which are subjectively determined by persons, as a result, to give e-commerce platform workers a great deal of power, and many of them misuse these powers to undermine the principle of fairness and justice and seek personal gains to hurt the interests of buyers and sellers consequently.

E-commerce platform is an ecosystem, aggregating a large number of sellers, tremendous buyers, and diversified goods. Such aggregation forms a huge network effect, which leads to both buyers and sellers becoming heavily dependent on the platform, further losing their bargaining and discourse powers. E-commerce platforms can take advantage of their position to continuously raise commissions and advertising costs. This often results in the continuous rapid...
growth of platform revenue, while the seller’s income stagnates or even declines yearly [2]. This is the cost problem of Internet e-commerce. In view of these problems, this paper hopes to use new technologies to propose a new approach and paradigm for the construction of a new e-commerce platform system, which can effectively remove the three problems of platform monopoly, power rent-seeking, and high cost.

The method introduced in this paper is to apply the blockchain technology, treatment, and token incentive to build a leading e-commerce platform system that is completely different from the conventional Internet e-commerce platform. This method can realize a decentralized and open-type sharing platform to keep e-commerce fully opening and competitive, and reduce the possibility of monopoly. At the same time, with the autonomous characteristics of blockchain, the rules of e-commerce can be realized by smart contracts to avoid subjective decision-making and power rent-seeking due to the high transaction cost and many problems of transaction security in the transaction process of e-commerce platform. In order to realize the development of related information technology, adopting blockchain technology can realize transaction security and reduce costs, which is to realize fair and equitable transaction and security of e-commerce platform.

In addition, the platform itself has neither company entity nor shareholder identity to avoid the problem that the company constantly pursues excess profits and greatly increases the operating cost of the platform after monopoly, that is, to replace the company with code and substitute monopoly windfall profits with tiny profits.

2. General Implement Approach Based on Blockchain e-Commerce Platform System

Different from Internet-based e-commerce platform system, the blockchain e-commerce platform system has the essential differences from the underlying foundation of system architecture. The respective technical characteristics of Internet and blockchain enable blockchain e-commerce platform to possess new characteristics and advantages.

2.1. From Internet to Blockchain. From centralization to decentralization: the Internet is controlled by central node, which has all rights to do any operation in the system. From the man ruling to autonomy: the Internet system is controlled by administrator, and the business rules are formulated by the business personnel and can be modified unilaterally at any time. Blockchain does not have administrators but runs automatically between nodes with business rules enforced by smart contracts [3]. From opaque to transparent: data on the Internet is opaque, yet that on the blockchain is transparent, which everyone can query through the blockchain browser. From information network to value network: what the internet is good at is the transmission and circulation of information. Blockchain can do both jobs that the internet does and things that the internet cannot do, such as value circulation. From shareholders to community: the internet has company entities and shareholders, while the blockchain system belongs to the community, where there is no shareholder nor company entity, but it is cobuilt, cogoverned, and coshared by the community.

2.2. Construction of e-Commerce Platform System from the Perspective of Blockchain. The construction of e-commerce platform system under the perspective of blockchain refers to Figure 1, which is constituted with the following basic parts: From a blockchain perspective, e-commerce from a blockchain perspective only takes a few minutes, and most importantly, they do not close at any time, and transactions can happen almost at any time and in an instant. Reduce fraud blockchain-based currency transactions are very secure. Peer-to-peer technology makes hacking and fraud very difficult. Therefore, it becomes one of the safest ways to trade.

Node: hardware part consists of a number of peer computers

Public chain: in order to meet the needs of e-commerce, a public chain ECC for e-commerce business is designed to meet the needs of decentralization, security, and 100,000-class TPS

Data sharing: user data, transaction data, commodity data, and etc. are stored on the chain and shared for all DAPP

Smart contract: it is used to carry all kinds of business rules so as to achieve the customization and operation with the rule without subjectivity and artificiality

Oracle machine (predictor): used to obtain external data

API: the connection of the standardized interface between smart contract and DAPP

DAPP: every decentralized shopping DAPP is independently developed by community, which is used for various applications of e-commerce or can be homogeneous shopping DAPP. All DAPP share data are based on ECC public chain

Blockchain is a decentralized system that is not regulated by any central authority, which means that buyers and sellers have complete control over transactions without the need for third parties to intervene or manipulate them. By using blockchain technology, the identities of both parties of the transaction can also be kept secret. Standard payment methods have maximum or minimum amount limits and even geographic limits, while blockchain technology has no such limits.

3. e-Commerce Platform Technical Approach Realized under the Perspective of Blockchain

Technical methods are the technical support of e-commerce platform from the perspective of blockchain including hardware nodes, public chains, smart contracts, oracle machine, distributed storage, and API.

3.1. Hardware Node. Nodes are the hardware foundation of the public chain, providing data storage and computing power for public chain, and the systems that run on it just as clusters of computers in cloud computing provide the hardware foundation for Internet. Compared with cloud
computing cluster, nodes of public chain have two essential differences. The cloud computing, no matter how many machines, its authority in essence belongs to the same super administrator and same set of authority management system, whose authority is controlled artificially. In theory, as long as you control this set of permissions, you control all the permissions of the entire system, including adding, deleting, changing, and checking. Therefore, essentially the cloud computing of a system is a centralized node with full authority. However, the hardware layer of blockchain is composed of hundreds or even tens of thousands of nodes with the same authority, same status and no control over each other. No node has full authority, and no single node can make any modification to the public chain, even merely the confirmation of transactions requires a certain percentage of nodes to confirm together. More common is 51% decisions, or two-thirds decisions.

Since the nodes are not under the control of each other, there is no problem of who unifies the command and coordination. All collaborations are the automatic activities based on consensus mechanism. All nodes have the same status, the same permissions, and abide by same rules, therefore they do the automatic operation and automatic coordination under the premise [5].

So there is no person who dominates all the permission, is able to intervene, and access any data at any time at his will. This will ensure the objective and fair operation of public chain without artificial intervention.

By contrast, the Internet is totally controlled by people, and the operations team has all the authority. This makes it impossible for the Internet to build an objective, impartial, transparent, and trustworthy system.

3.2. Public Chain. The e-commerce platform system has targeted technical requirements towards public chain. In terms of technical design, the public chain needs to break through the impossible triangle problem of blockchain and achieve high TPS (transaction per second), high security, and decentralization.

According to the current concurrency of Internet e-commerce platforms, the concurrency peak value of blockchain e-commerce platforms may reach 100,000 transactions per second. Therefore, the public chain layer needs to achieve 100,000-level TPS to meet the requirements of e-commerce for high concurrency.

This paper proposes a new public link technology approach to achieve high TPS under the promise of maintaining decentralization and security.

3.2.1. Consensus Mechanism. This paper adopts the consensus mechanism combining POR and DPOS.

POR (Proof of Random) is a new consensus mechanism proposed in this paper. The method is to calculate the time stamp of each block using random function and determine the node responsible for the block packaging according to the random function calculation result [6]. For example, for node \( n \), the condition for participating in this block packaging is \( \text{rand}(t) \geq 0.9 \).

If the number of qualified node is 0, the random function should be recalculated.

In this way, on average, only 10% of nodes participate in packaging once, which greatly reduces transaction confirmation and packaging time and improves TPS as well.

DPOS (Delegated Proof of Stake) is the share authorization proof algorithm, which is a new consensus algorithm based on POW and POS. It was proposed and applied by Dan Larimer (now EOS CTO), the leading developer of BitShares, in April 2014 [7]. DPOS cannot only solve the problem of excessive energy consumption of DPOS caused by POW in the process of mining but also avoid the possible
trouble of biased trust balance under the distribution of POS rights and interests. In the blockchain system, the consensus algorithm is the key technology of the blockchain, which maintains the characteristics of information security, immutability, and transparency. Consensus mechanism is the soul of blockchain and the basis for blockchain to establish trust.

DPOS is a block created by trusted accounts elected by the community (supernodes, as one is qualified if the top 101 votes obtained). For example, 101 supernodes, namely, 101 mining pools are selected, and the rights between the super nodes are completely equal. Ordinary coin holders are allowed to vote at any time to replace supernodes (mining pool), DPOS decentralization does not mean each coin holder will have a direct stake in rights and interests, but an indirect vote power to ensure that supernode chosen do not be evil, at the same time, it can also become supernode or standby supernode by means of canvassing for votes.

According to the method of DPOS, 101 supernodes are selected by the community as accounting and governance nodes.

3.3. Smart Contracts. Smart contracts were proposed by Nick Szabo, a legal scholar in 1995. He mentioned the idea of smart contracts in several posts on his website. Smart contracts are defined as follows. “A smart contract is a set of commitments defined digitally including an agreement on which the parties to the contract can enforce those commitments [8].”

In blockchain e-commerce platform system, all kinds of business rules, such as guaranteed transaction rules are implemented by smart contracts. This means that all of these rules, once written into a smart contract, will be automatically triggered and enforced according to conditions, regardless of human will, so that the rules can be objectively and fairly enforced.

3.4. Oracle Machine. As the blockchain e-commerce platform system inevitably needs some off-chain data, such as docking with the system of the third-party logistics service provider.

This encounters a key problem, that is, the data on the chain must be true, trusted, and immutable, but the data from outside may not be real, or has been tampered [9]. In order to solve this problem, this system introduces a mature oracle machine technology.

Currently, some mature prophecy platforms can be connected, such as Chain-link and UMA. Chain-link is the first decentralized oracle network that allows anyone to securely deliver smart contracts, access critical external data, do offline payments, and apply any other API functionality. Any user with a data feed, offline service (such as local payment), or any other API can provide it directly to smart contract in exchange for a LINK token.

A Chain-link network consists of two independent parts, i.e., on-chain and off-chain that must interact to provide services. The network is built in such a way that it can be upgraded so that its different components can be replaced as better technologies become available. The on-chain components of the network filter oracles through service-level agreements (SLA) based on condition requested by one side of the smart contract. Using these metrics, Chain-link collects and responses to SLA queries, sorts them in rank using reputation and aggregation models, and provides the final set of results for Chain-link queries that might be implemented in smart contracts.

The off-chain component of the network consists of oracle nodes connected to the Ethereum network, which independently collects the responses to offline requests. These dechain nodes can be located in any business, such as the New York Stock Exchange operated dechain node that may provide real-time accurate trading information to the Chain-link network, or the Visa Network dechain node that resolves transactions by interacting with consumers and suppliers through the Chain-link network. Chain-link technology aims to integrate nodes from all of these businesses into a common network, that itself acts as a (low-cost) middleman, interpreting and allocating data correctly as needed. The Chain-link system will ensure that results from oracle are accurate and allow oracle to remain independent to the data they provide.

Any data, payment, electronic signature, or other API provider as well as individual developers, can easily join the Chain-link network by connecting their familiar API to the network. Once an API is connected to a Chain-link, the user becomes the Chain-link node operator and is responsible for connecting the API to the Chain-link network. In order to motivate operators to provide API information, they are compensated in the LINK token so as to successfully complete the online LINK request.

The blockchain e-commerce platform method proposed in this paper uses LINK as a bridge with external data.

3.5. Distributed Storage. The e-commerce platform system generates massive data every day. Meanwhile, in order to maintain the normal operation of the system, massive data needs to be queried. Therefore, it is necessary to store data efficiently and safely in blockchain environment.

The centralized data storage mode of Internet leads to two disadvantages, i.e., one is the centralized storage makes the control of data completely in the hands of e-commerce platform companies, and the second is that the system administrator may act as an inside job revealing users’ privacy, such as shopping records.

Therefore, a blockchain data storage method is introduced in this paper.

All user data, commodity data, evaluation data, logistics data, etc. are stored on the chain and open to all DAPP. The data sharing enables all DAPP to provide better services on a fair basis. Data opening and sharing is the premise of business opening and competition, and the full competition is the best guarantee for users’ interests.

When a mature e-commerce DAPP accumulates a large amount of data, it cannot take it as an advantage against new competitors.

All data is encrypted before being stored, making it difficult to read even when it is revealed.

Each piece of data is segmented in byte order and stored in two nodes, respectively. When it is read, it is also read
from the two nodes and spliced. To ensure complete data stitching, three backups of data are maintained.

4. Framework of e-Commerce Platform

4.1. Commodity API. It provides the function of searching commodities by keywords in commodity database. When entering a certain keyword, it can accurately show all commodities that buyers actually want to view. The search results are comprehensively calculated and displayed in order according to category correlation, title correlation, and attribute correlation.

You can also display a list of products by category and stores without searching.

After clicking the product, enter the detailed page of the product, which includes the main picture of the product, title, price, promotional activities, specifications, detailed introduction, and other information.

Order management allows users to manage their participated historical orders, ongoing orders, and canceled orders.

It is used to register, fill in, record, manage the buyer’s account information and preference information, etc.

It is used to register, fill in, record and manage the seller’s account information, store information, commodity list, and score information.

4.2. Evaluation API. In order to evaluate sellers on e-commerce platforms comprehensively, it is necessary to select the most appropriate evaluation dimensions to achieve a comprehensive and effective evaluation of sellers and commodities with a few dimensions. Which dimension should be to choose? The essence is to focus on the pain points that buyers care most about. The pain points that buyers pay special attention to are nothing more than those of goods, services and logistics, which are the same as the pain points of buyers on Internet e-commerce platforms. After consulting some information, this platform decides to refer to the evaluation dimensions of Internet e-commerce platform: description matching, delivery speed, and service attitude.

At the same time, the evaluation of Internet e-commerce platforms comprehensively, it is necessary to effective evaluation of sellers and commodities in order according to category correlation, title correlation, and attribute correlation.

You can also display a list of products by category and stores without searching.

After clicking the product, enter the detailed page of the product, which includes the main picture of the product, title, price, promotional activities, specifications, detailed introduction, and other information.

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It is used to register, fill in, record and manage the seller’s account information, store information, commodity list, and score information.

4.2.1. Product 3d Rating. The description matches: full five scores, the scores gained after buyer gives stars.

Description match score:

\[ M = \frac{\sum_{i=1}^{n} M_i}{n}, \]

where \( M_i \) is the star matching the description of commodity given by \( i \) buyer, \( 1 \leq M_i \leq 5 \).

Service attitude: full score 5 points, the points gained after the buyer gives stars.

Service attitude score:

\[ S = \frac{\sum_{i=1}^{n} S_i}{n}, \]

where \( S_i \) is the service attitude star awarded to the product by \( i \) buyer, \( 1 \leq S_i \leq 5 \).

Delivery speed: full score 5 points, the points gained after buyer gives stars.

Delivery speed score:

\[ D = \frac{\sum_{i=1}^{n} D_i}{n}, \]

where \( D_i \) is the star of the delivery speed of the commodity awarded by \( i \) buyer, \( 1 \leq D_i \leq 5 \).

4.2.2. Overall Product Rating. The percentage system is adopted, and set the overall product score is \( MS \), then

\[ MS = \frac{(M + S + D)}{3} \times 20\%. \]

4.2.3. Store Rating. Store Score Rating, store score (SS), is gained with the score of all goods in the store calculated.

\[ SS = \frac{\sum_{i=1}^{m} M_S \times R_j}{\sum_{i=1}^{m} R_j}. \]

where \( M_S \) is the overall rating of goods \( j \) and \( R_j \) is the sales revenue of goods \( j \).

4.3. Payment API. The payment API provides all DAPP with the ability to invoke smart contracts to complete various scenarios and functions related to payment, such as guaranteed transaction, refund, and cashback.

In Internet e-commerce platform system, guaranteed transactions are completed through third-party payment platforms such as Alipay [10]. In essence, the purpose of guaranteed transaction is to solve the problem of mutual distrust between buyers and sellers. The third-party payment company acts as the intermediary guarantee and becomes the trusted supplier. But obviously, this trust provision is expensive. In the method of blockchain e-commerce platform proposed in this paper, smart contract is used to mediate guarantee and become trust supplier, because blockchain-based smart contracts are natural trust machines, and the code is trust.

In terms of business processes, the secured transactions on the Internet are the same as secured transactions on blockchain.

But the secured transactions made by smart contracts demonstrate two major benefits: first, the cost is much lower than third-party payment companies; and second, it is objective, fair, safe, and credible.

The method proposed in this paper, all payment and settlement currencies adopt the Digital Currency DCEP (Digital Currency Electronic Payment) of RMB launched by the
People’s Bank of China. DCEP is equivalent to RMB, which is RMB on blockchain.

4.4. Customer Service API. In the process of e-commerce business development, there will always be transaction disputes and transaction questions, so customer service is indispensable. In Internet e-commerce platform system, there are often companies which belong to the platform to recruit customer service personnel to provide online answering services for buyers and sellers [11].

Since there is no company entity in blockchain e-commerce platform system, a decentralized and crowd-sourced customer service method is introduced in this paper.

Details are as follows: first, the third-party institutions develop customer service DAPP based on the platform; then individuals or institutions with the intention and ability to answer questions for buyers and sellers through the customer service DAPP; then obtain token rewards according to the order quantity and service score of customer service (see Chapter 5 for incentive plan); finally each crowdsourcing customer service operates independently and be responsible for its own profits and losses; and the data generated by customer service is stored on the chain for query.

4.5. Logistics API. Similar to customer service, logistics service is also an essential link. This paper proposes a decentralized, crowd sourced logistics approach.

Third-party organizations develop logistics DAPP based on the platform; then individuals or institutions with intention and ability provide delivery services for buyers and sellers through customer service DAPP; then obtain token rewards according to the order quantity and service score of logistics service (see Chapter 5 for incentive plan); finally each crowdsourcing logistics company shall operate independently and be responsible for its own profits and losses.

The data generated in logistics is stored on the chain for query.

5. Tokenomy Model

Identifying from technology, tokenomic model may form a coexisting state of many public chains, alliance chains, and centralized systems in the future. These chains will be connected into clusters, which will become the technical infrastructure for the development of blockchain applications in e-commerce platforms [12]. From the economy, each chain will form a “tokenomic entity”, and some tokenomic entities will be further connected into a larger “tokenomic community”. These tokenomics and token economic community are the economic infrastructure for the development of blockchain application [13].

Blockchain system due to its decentralized and the characteristics of community autonomy, being the company entities and shareholders unlike the Internet e-commerce platform, is able to do remuneration incentives to the personnel or institutions which participate in the construction and service. The ecological blockchain needs to implement the token incentive to those participating in the construction and service, otherwise no one is willing to make a contribution. In this system, the token has dual attributes, on the one hand, it is equivalent to the equity of blockchain e-commerce system platform; on the other hand, and it is a platform integral.

5.1. Token Issuance. Token issuance details are as follows: token name: BEC, circulation amount: 100 billion; additional issuance: constant total amount, no additional issuance; storage: stored in a smart contract and released gradually; release: it is automatically released by smart contract and rewards the parties concerned according to agreed rules; release frequency: release once per minute; release quantity: \( MB = 10^{10} \times (0.9^{n-1}/1440d_n) \), among them, \( MB \) is the number of BEC pieces released per minute; \( n \) is the year in which the online blockchain e-commerce system runs, \( n \geq 1 \); and \( d \) is the total days in \( n \) year. It is shown in Figure 2.

5.2. Token Distribution. The BEC released per minute is used to motivate contributors in various scenarios of blockchain e-commerce platforms, including the following:

(a) Buyers The number of BEC shared by all buyers completing transactions per minute is \( MB \times br \)

(b) Seller: The number of BEC shared by all buyers completing transactions per minute is \( MB \times sr \)

(c) Customer service: The number of BEC shared by all buyers completing transactions per minute is \( MB \times cc \)

(d) Logistics: The number of BEC shared by all buyers completing transactions per minute is \( MB \times dl \)

(e) Public chain nodes: The number of BEC shared by all buyers completing transactions per minute is \( MB \times nd \)

If there are other roles need to be motivated, they can be added and adjusted in the annual routine governance vote or temporary vote.

5.3. Buyer Incentives. The number of BEC incentives given to buyers upon completion of each transaction is

\[
\text{Buyer} = MB \times br \times \frac{OA}{TOA},
\]

where \( MB \) is the total number of BEC releases per minute; \( Br \) is the allocation coefficients for buyers; \( OA \) is the payment amount for this order; and \( TOA \) is the total amount paid for all orders in one minute.

5.4. Sellers Incentives. The number of BEC incentives given to sellers upon completion of each transaction is

\[
\text{Sellers} = MB \times sr \times \frac{TA}{TTA},
\]

where \( MB \) is the total number of BEC releases per minute; \( Sr \) is the assigned coefficients to sellers; \( TA \) is the paying
amount of the said order; and TTA is the total paying amount of all orders in one minute.

5.5. Motivation of Customer Service. The customer service provides services, and the number of BEC incentives obtained is

\[
\text{Customer Service} = MB \times cc \times \sum SN \times \sum TSN \times r, \quad (8)
\]

where MB is the total number of BEC releases per minute; cc is the incentive coefficient of customer service; SN is the number of service times performed by an individual customer service person; TSN is the total number of service times of all customer service persons; and r is each service rating, \(1 \leq r \leq 5\).

5.6. Logistics Incentive. The number of BEC incentives obtained by logistics service providers is

\[
\text{Logistics service} = MB \times dl \times \sum DN \times \sum TDN \times r, \quad (9)
\]

where MB is the total number of BEC releases per minute; dl is logistics incentive coefficient; DN is the number of service times of logistics service; TDN is the total service number of all customer services; and r is the rating of each service, \(1 \leq r \leq 5\).

5.7. Common Chain Node Incentive. The number of BEC incentive obtained by each node per minute is

\[
\text{Each node per minute} = MB \times nd \times \frac{\sum RN}{\sum TRN}, \quad (10)
\]

where MB is the total number of BEC releases per minute; nd is the node excitation coefficient; RN is the number of bookkeeping completed by this node; and TRN is the total bookkeeping times for all nodes.

5.8. Governance. Under the DPOS consensus mechanism, 101 nodes are the administrators (governor) of the system, representing all community members to complete the governance. The main means of governance are annual polls and, in exceptional cases, provisional ballots. The set-up, deletion, and modification of the platform operation rules are done by voting.

Community voting generates 101 nodes, then vote evoked by 101 nodes; a resolution is concluded by more than half of the votes.

Based on the technology of blockchain, the large scale strong collaboration of people to people’s can be achieved by means of economic forward and reverse incentives with the e-commerce platform as a carrier. Token is the best application of blockchain, while blockchain is the best platform of token. Both of them are grouped and applied specifically on e-commerce platform. As shown in Figure 3. Once you understand the needs, based on that, come up with specific improvements and plans for the site to make sure it is doable. Where, research and evidence collection or analysis and statistics should be undertaken to fully assess the desirability of these proposals and options. The demand for innovation directly determines the characteristics of a website. Only a website with characteristics is more valuable and more attractive to users. Changes to site details should be based on an understanding of user needs, taking into full account the interests and needs of users.

6. Application of e-Commerce Platform from the Perspective of Blockchain

Blockchain-based e-commerce transactions are mainly composed of three parts, namely, users, e-commerce platform, and blockchain. When a user first uses the blockchain-
based account number, he needs to register his personal account, which is the unique one, his personal ID, and the sole identification of the user on this platform. When users want to sell products on the platform, they need to create relevant information about the products, including product information, price, quantity, etc., which will be distributed to the sales page of the platform, so that other users can see it. If the user wants to buy goods, they can directly search keywords, select the desired goods so as to communicate with the seller, if the two sides communicate happily, they can create a smart contracts, which will send merchandise property verification, the deal will be successful after validation is done, then all information will be stored in the node position.

If trade disputes occur between two parties in the transaction process, a notary can be introduced to solve the problem [14]. Notaries are usually the users with higher reputation rankings. In e-commerce platforms, users have experienced strict examination and real-time supervision from the beginning of registration, and they also need to pay certain maintenance fees for some large sales businesses. This is also to safeguard the rights and interests of users to establish a trust mechanism, on the other hand, to maintain the credit reputation of the platform, eliminate negative effects and prevent criminals from stealing information and tampering with data. The decentralized model removes the maintenance and transaction costs of third parties, avoids monopolistic trends, and buyers and sellers trade with each other to improve work efficiency.

The application of blockchain technology is able to save the maintenance cost of the third party, make the seller and buyer connect closely, and ensure that each user can guarantee the security of account information on the basis of possessing the right to transfer money. The construction of e-commerce platform based on the perspective of blockchain, the core lies in that both sellers and buyers can realize free transaction and protect privacy. This is also the service and corresponding obligations that e-commerce platforms can provide for customers. The application process of e-commerce platform from the perspective of blockchain is shown in Figure 4. Through the concept of blockchain, we know that blockchain is essentially a way of accounting. Of course, not human records but software records. I will call it the blockchain client for now. In the structure of blockchain software, this ability to communicate with each other is called “network routing.”

7. Advantage and Advancement of e-Commerce Platform from the Perspective of Blockchain

In the foregoing contents, the method and paradigm of e-commerce platform based on blockchain is proposed in this paper. According to this method, it can build the e-commerce platform system of next generation, which can solve the three major problems in Internet e-commerce platform system: platform monopoly, power rent-seeking, and costs since the blockchain e-commerce platform system has the characteristics in the succeeding sections.

7.1. Users and Data Sharing. The users and data of Internet e-commerce platforms are independent and undisclosed. When a platform has been established, new platforms can only acquire customers from scratch and accumulate data from zero if they want to compete. In the early period, compared with mature platforms, they encounter huge disadvantages in terms of user’s number, product types, and popularity and often failed in the competition, therefore making it difficult to challenge the mature platforms. In other words, due to the closure of data and users, Internet e-commerce platforms have incurred a huge Matthew effect, i.e., the strong are stronger, while the weak are weaker. Such characteristics lead to monopoly, which further leads to the infringement of users’ interests.
In this method, all e-commerce DAPP are based on a common public chain, and the data of all DAPP are stored in the same public chain, including commodity data, user data, transaction data, and evaluation data. The opening and sharing of core data is inconceivable in Internet e-commerce.

7.2. Cost Reduction. Blockchain e-commerce platform, due to the adoption of blockchain underlying technology and token incentive model, has stepped from centralized commerce into distributed commerce in terms of business form, thus eliminating the roles of companies and shareholders, making the whole platform no longer pursue the maximized interests of companies and shareholders. At present, the annual revenue of some e-commerce giant amounts to more than $100 billion, accounting for more than 10% of GMV, and the proportion is still increasing year by year. The $100 billion in revenue represents the excess monopoly profit for shareholders, yet the super-high cost of the transaction to buyers and sellers.

In the blockchain e-commerce platform system built according to the method in this paper, the commission standard is set by each DAPP developer. Due to the technology opening and data sharing, the monopoly as a chronic disease of Internet e-commerce has been eliminated, which will greatly reduce the cost of platform operation, thus significantly release the burden from buyers and sellers. It is expected that: the shopping cost for buyers is reduced by about 10% and seller’s operating profit increases about 20%.

7.3. Decentralization. Blockchain e-commerce platforms have no corporate principals, no shareholders, and no technical system administrators. All operations are based on 101 fully peer-to-peer nodes that automatically collaborate based on a consensus mechanism.

All important issues on the platform are voted by 101 nodes elected by the community. The 101 nodes themselves are also the biggest beneficiaries of platform’s growth, and they have enough motives to make the best choices for the platform.

From the perspective of commerce, due to technical and data reasons, the e-commerce platform built in accordance with the method of this paper eliminates the centralization of commerce and buys in a new stage of distributed commerce.

There is neither third-party payment nor other intermediary, things done by all these institutions should be completed by smart contract code to rule out contrived interference and rent-seeking power to realize the objective and impartial. Code trust has two major benefits: objective fair and low cost.

7.4. Truthful Information. All important data shall be on the chain to ensure that the real data cannot be tampered with. The data on the chain is real and cannot be tampered with, while the data outside the chain is purified through oracle machine.

Data encryption and distributed storage implemented ensure data security and prevent user privacy from
revealing. In case of need, the function of private computing can also be implanted in the system to further strengthen data security.

Eliminate the company entity and remove the role of shareholders, so that the roles of shareholders, users, and service providers are integrated to be unified as community members consequently. With opening public chain and shared data, all third-party developers can develop various DAPP based on the same circumstance to greatly lower the entry threshold, effectively avoid monopoly and high cost increase incurred accordingly. It is token incentives, not salary incentives. Communities play a same role, not managers make decisions themselves. The purpose of system testing is to realize the correctness of blockchain platform. Different modules used in this paper can show that the system has better performance and compatibility and can better reflect the advantages of blockchain e-commerce platform.

In essence, it is an objective, fair, and automatic running open ecosystem co-built, co-governed, and shared by the community. This is just the construction of the business form; distributed business based on blockchain technology, token incentive model, and data open sharing. It is the advanced e-commerce platform system.

8. Conclusion

The tokenomics model based on blockchain proposed in this paper constructs an e-commerce platform and application. The advantages and disadvantages of e-commerce platform based on blockchain are discussed. The application of blockchain technology in the field of e-commerce has been verified, and the application of security has been realized, which is practical for the proposed theory and operation.

The next step of the research work is mainly aimed at information integration and application in the multigroup service environment, and proposes the application of multi-task background, which can fully consider the fault tolerance of the network and the nonlinear operation of the platform. Make full use of big data technology and integrate the application of multiple platforms. The security of the blockchain system mainly includes the security of smart contracts, the security of encryption, and other security issues of each module of the blockchain system. At present, the information security category can pay more attention to the direction of smart contracts because the contracts on the chain cannot be modified or are difficult to modify, and the problem of contract loopholes is serious.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work.

Acknowledgments

This work was sponsored in part by the Cross Border e-Commerce for promoting the upgrading of manufacturing transformation (SK2020A0545), the Academic Quality Project of Bengbu University “Bilingual Educational Subject of Supply Chain Management” (2020SYKC4), the Anhui Provincial Manufacture High Quality Development Research under “double cycle” strategy (AHSKY2021D145), and the Research on SME’s Cross-border e-Commerce Marketing Channel and Optimization Strategy, taking Bengbu AOTE Machinery Co., Ltd., as an example (2020Sk02zD).

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