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Research Article

Construction and Optimization of Transboundary Business Financial Credit Network in the Era of 5G Communication

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The e-commerce industry has broken through the original geographical restrictions, successfully integrated with world trade, and evolved new e-commerce model. The e-commerce model, that is, e-commerce transactions across international trade, has been rapidly expanded. However, e-commerce transactions across international trade have innate virtuality and information imbalance. These problems have caused many credibility problems and, at the same time, restrict and hinder the healthy and sustainable evolution of transactions across international trade. Credit evaluation of transaction entities through credit evaluation models is an effective way to restrict the behavior of transaction entities. However, the existing credit evaluation models lack pertinence and effectiveness when applied in the context of cross-border e-commerce. In the era of 5G communication, building a complete credit evaluation system through 5G-related technologies will certainly become a new way for the stable evolution of transactions across international trade. This not only can effectively control the risks of cross-border trade and improve efficiency but also properly resolve the uncertainty caused by information imbalance. In order to better promote the development of e-commerce, this article establishes an e-business evaluation module based on integrated fusion performance rating. The weight and the membership of each factor are determined by AHP. Finally, the model was verified by an example. The results show that the evaluation system and the method proposed in this paper are feasible and effective for solving practical problems and provide a solid foundation for the construction of the network of my country's e-commerce credit rating system. Establishing a scientific and reasonable e-commerce integrity evaluation system has very good practical significance.

1. Introduction

Driven by the economic measures of the "China's Silk Way and the Maritime Silk Route in the 21 Century," some countries have successively issued a series of policies and statute to promote the promotion of transborder enterprises [1–3]. In March 2015, the State Council agreed to build Hangzhou into a comprehensive driving force for cross-border trade [4]. At the 2016 State Council executive meeting, it plans to build a comprehensive driving community for cross-border e-commerce in 12 cities [5, 6]. In the same year, China's first e-commerce conference was held in Shenzhen, marking the beginning of a new era in China's cross-border e-commerce development [7]. In November 2017, the State Council adjusted the import and export tariffs of some consumer products and plans to reduce the import tax rate [8]; trends also take a series of steps to ensure rapid e-commerce cross-border development [9–11].

In the latest trends, with the accelerated progress of networking technologies, we have been able to achieve the following goals: the Internet shopping network has become increasingly mature [12]. The fast rise of electronic trade in China has become an important pillar of the Internet economy today [13–15]. With the further popularization of the Internet and people's familiarity with e-commerce such as online shopping, more and more people are now chasing e-commerce, shopping on the Internet, and visiting major website stores, and e-commerce is convenient and fast. The characteristics completely broke people's past lifestyles [16]. In addition, e-commerce, driven by economic globalization and liberalization, not only promotes the rapid development of China's economy but also brings about

tremendous changes in global economic trade [17]. In contrast to the background of 5G communication, transboundary electronic trade has undergone a transition from "quantity" to "quality." As the e-commerce development becomes more mature, the hidden trust problems become more and more prominent. Therefore, the e-commerce credit evaluation system is established. The establishment is imminent [18, 19].

There are many studies on e-commerce credit evaluation. Liu et al. proposed an e-commerce credit model based on cloud technology. It converts quantitative data into quality data by converting cloud and cloud compilers and matching legal indexes through cloud computing. If you use this model to explain the results of the assessment, the results will be easier to understand [20]. Yin and Zhang have established an improved C2C e-commerce credit rating model. Based on the advanced model, a new weight rate algorithm is proposed to reflect the credit effect of rating providers, and the impact of transaction scale on credit changes the assessment target. A new credit update algorithm [21] is proposed. Miao et al. combined the characteristics of B2B e-commerce enterprises, using organizational research method and AHP to comprehensively evaluate the credit rating of SMB electronic business enterprises, and established 30 small and medium e-commerce enterprises. The e-commerce credit evaluation model provides a scientific and convenient credit evaluation method for B2B small and medium e-commerce enterprises [22]. Shao et al. analyzed the shortcomings of the existing credit evaluation system, proposed modified model of credit assessment for problematic issues, and introduced the evaluation of the user's own credit weight, transaction volume weight, and multidimensional credit calculation algorithm. To ensure that the credit rating is more valuable in the improved evaluation model, the credit evaluation index and its weight level are redesigned in the improved credit evaluation model [23]. Piao et al. used AHP to establish a hierarchical model and explored how to effectively establish a C2C electronic trade credential evaluation pattern. Through the comparison of the functions of C2C electronic trade system, it provides a theoretical basis for improving the research of C2C credit evaluation system. This provides a reference for trade decisions of enterprises and users [24].

Due to the anonymity of the network and the diversity of users, it is more difficult to identify and punish malicious users. Credit issues will become an important obstacle to the well-ordered growth of transborder e-businesses. To solve the credit issue, all major e-commerce podiums are actively improving the credit system and strengthening the supervision. This article will improve on the existing credit evaluation model, hoping that the seller's credit score can truly reflect the seller's credit and restrict the seller's behavior, to perfect the present trust mechanism and facilitate the growth of transborder electron commerce. In order to better promote the development of e-commerce, this paper establishes a network-based e-commerce credit assessment pattern on the basis of integrated vague rating. The size and potential member of each factor are determined by the hierarchical process. Finally, the model is recommended by example. The results show that the evaluation system and the method proposed in this paper are feasible and effective for solving practical problems and provide a solid foundation for the construction of the network of my country's e-commerce credit rating system. Establishing a scientific and reasonable e-commerce integrity evaluation system has very good practical significance.

2. Proposed Method

2.1. 5G Communication Technology Architecture and Key Technologies. 5G mobile communication technology is a very new type of science and technology. It is the symbol of the most high-end communication technology. It uses the most advanced network technology in the world so far, which has greatly improved the spectrum utilization rate. The requirements of speed and the experience of higher requirements for communication technology can greatly change people's way of life and make people's life more convenient. Understanding the status of 5G communication technology system primarily includes four sections: data collection and preamplification, data storage and management, data analysis, and data representation:

2.1.1. Statistics Acquisition and Pretreating. The knowledge of 5G communication types is complex and the data sources are different. 5G communication technology first collects data from data sources and performs previous operations. For the data collected, a good preliminary analysis can provide a good basis for subsequent data analysis. Due to unobtrusive noise and interference during data collection and transfer, data errors, even closures, and inaccuracies can occur. Especially when the data sources of 5G communication are different, type, copy, or incompatibility data may appear. Therefore, it is necessary to write the data and restore the lost data, that is, to clean the data. Cooking is the most common noise reduction method, such as Wiener cooking and Kalman cooking. Interpolation technology can always recover lost data efficiently.

2.1.2. Storing and Administering Statistics. Gathered 5G communications need to be stored in a database in an easy-to-process way. Custom-related databases cannot store unorganized data and are in poor quality, and it is difficult to handle large amounts of data. 5G communication storage and management technology must ensure the reliability and readability of documents, meet real-time and efficient data processing, and reduce costs and system overhead. 5G communication storage and control technology is primarily divided into two modes: streaming and non-streaming. Stream editing mode is ideal for projects with high-time requirements such as online monitoring. In some cases, level mode is used for database to support analysis and subsequent processing. In the 5G communication environment, storage and management technologies are distributed. Typical 5G communication storage management technologies include distributed multifunctional databases (MPP) and shared file storage systems such as GFS, HDFS, and NoSQL data sharing systems (bii Big Table, H Base, Mongodb).

2.1.3. Statistical Profiling. Data mining, mathematical calculations, machine learning, etc. are common data analysis techniques. Due to the inconsistency and uncertainty of information security systems and attack payloads, data analysis problems are increasing, requiring research into the use of reliable data analysis techniques. Using this technology, people can make value data, extract incorrect terms and results, and make more scientific decisions. Among them, data mining technology, such as proxy data analysis method, can extract useful information and insights from a large amount of incomplete and confusing data. It covers many aspects of statistics, analytics, and data technologies, which can cluster, group, isolate, and implement algorithms such as sort analysis, division finding, predictive analysis, model simulation mining, and analysis recession. In order to meet the needs of high-speed analysis and processing of 5G communications, most 5G communication analytic technologies adopt parallelization techniques, and many comparable distribution algorithms reduce the computing time. Cloud computing technology distributes 5G communications over a large number of computers, integrates computing and physical resources, and makes the use of 5G communications possible. It is the first platform of 5G communication analysis technology and provides network support for 5G communication analysis. Among them, GFS and HDFS are distributed database technologies, and Map Reduce is the primary programming model.

2.1.4. Data Presentation. In order to help users understand the results of data analysis easily and intelligently, the data needs to be presented to users in a logical way. The presentation of 5G communication results is more interactive and visible than traditional text form, so visual technology is introduced. Currently, visual technology is widely used in the understanding of information security systems. Location information is complex and large, making it difficult to visualize. Location observation results are presented in the form of real-time location maps, historical status maps, and location forecast charts for a given period of time, combined with different perspectives. This improves data observation, enables users to quickly and completely understand the operation of the system, and helps users make accurate decisions.

2.2. Financial Loans for CBEC Optimization Plan. In e-trade in transit, payment and distribution is the most basic and important link. Relying on e-trade in transit and foreign currency payment solutions, it can help cross-border payment companies provide suppliers and e-trade vendors with a foreign exchange destination simple and easy selling and receiving foreign exchange and payment services. Relying on the idea of e-commerce returns, it helps e-commerce companies to solve the situation that cross-border e-commerce partners and overseas e-commerce are restricted and cannot enter the country. The related business process is shown in Figure 1.

The credit process reconstruction of cross-border e-commerce based on financial technology can greatly meet the high-frequency capital needs of cross-border e-commerce. Using data to empower risk control can better obtain authorized data, verify credit, and risk preview, and become a positive boost to cross-border e-commerce credit business.

2.3. Transborder Electric Business Credit Evaluation

2.3.1. The Connotation of Transborder Electric Business Credit. The market economy is a credit economy. A good transborder electric business environment helps the net attract amounts of transborder electric business participants to trade, save transaction time and transaction costs, improve transaction efficiency, achieve economies of scale, and make e-commerce profits a reality. The credibility of the transborder electric business virtual market also plays a vital part in the good operation of the market. However, relying on human conscious behavior cannot unilaterally establish a transborder electric business credit pattern. Instead, it should establish behavioral constraints on multiparty trading institutions and the establishment and improvement of corresponding systems. E-commerce credit plays a certain role in maintaining the economic interests and social reputation of trading entities. Otherwise, the rights of both parties to the transaction will be difficult to guarantee and will pay a higher price in future profits. At present, fraudulent acts between trading entities, raising transaction prices, selling inferior and counterfeit goods, failing to deliver goods on time, and infringing on the legitimate interests of consumers occur from time to time. The most obvious manifestation of the transaction subject credit problem is the issue of corporate-to-consumer credit fraud. This has severely influenced the lawful benefits of consumption. It also undermines the efficacy of online business deals of transborder enterprises and obstructs the progress of transborder electronic business.

2.3.2. Electronic Business Enterprise Trust Appraisal Service. The trust rating scheme is an integrated entity consisting of a range of rating standards, rating metrics, evaluation approaches, and criteria associated with risk valuations. It includes six elements of credit assessment, indicators, grades, standards, methods, and weights. Specific to cross-border e-commerce, the credit evaluation system refers to the supervision and management of the management network. During a certain period of time after the transaction is completed, foreign traders will consider transactions and other information for evaluation, and the credit evaluation database also collects cross-border e-commerce enterprises. All of the above information is submitted back to the information processing company. Information processing companies convert them into referrals and analyze them into company credit statistics (group) in a way and use this score to reflect credit status and provide a reference for other overseas users' transactions.

Three problems need to be solved to develop a cross-border e-commerce credit rating system: first, how to choose appropriate rating indicators based on the definition and related concepts of e-commerce; second, how to determine the weight and size of the evaluation indicators; and third,

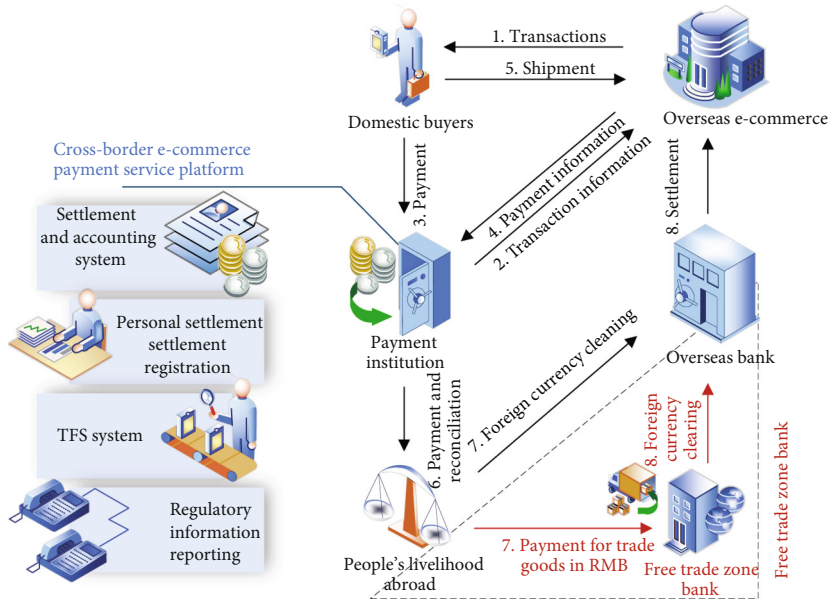

Figure 1: Cross-border e-commerce business process.

how to comprehensively evaluate cross-border e-commerce seller credit rating. Finally, information processing is performed and converted into credit evaluation indicators in some way.

Cross-border e-commerce has shown huge market potential and vitality in recent years. By analyzing the current situation and problems of cross-border e-commerce development, this paper proposes four countermeasures to establish a credit supervision and evaluation system, a cross-border logistics and warehousing system, an electronic payment service system, and a new tax policy for cross-border e-commerce, in order to help my country's cross-border e-commerce. E-commerce entered the road of standardized development as soon as possible.

2.4. Comprehensive Assessment Approach Based on Modelling and Fuzzy. The basic idea of the comprehensive evaluation method is to measure the perception of energy by eating. The index system of fuzzy comprehensive analysis is shown in Figure 2.

The primary method is to decide on a list of elements to be used to estimate the topics to be examined.

In the next phase, the respective weighing of the individual factors and their respective components are established, and the fuzzy assessment ratio is based on this.

The third step is to use fuzzy evaluation matrix and factor weight vector to perform fuzzy evaluation and obtain fuzzy comprehensive evaluation results.

In addition, there is a significant feature of the fuzzy comprehensive evaluation method: each indicator is evaluated one by one, so it gets an evaluation value, which is unique and is not affected by the object set. The fuzzy comprehensive analysis index system is shown in Figure 1. The steps to construct a model using the fusion synthesis estimation method are as follows:

2.4.1. Determining the Set of Indicators for Cross-Border E-Commerce Credit Evaluation Targets. Formula (1) is the m evaluation indicators in the object to be evaluated, where m represents the number of evaluation indicators, depending on the different indicator systems. In order to obtain more accurate rating results, it can be divided into several categories according to the characteristics of the rating indicators, and each category can be used as a separate rating reference, that is, the first-level rating indicator. The first-level indicators can be divided into second-level indicators, and the second-level indicators can be divided into three-level rating indicators.

$$U = \{u_1, u_2, \cdots, u_m\}, \tag{1}$$

$$Ie \cdot U = U_1 \cup U_2 \cup \cdots \cup U_s, \tag{2}$$

where,

$$U_l = \{u_{i1}, u_{i2}, \cdots, u_{im}\}, U_i \cap U_j = \phi, i \neq j, i, j = 1, 2, \cdots s. \tag{3}$$

2.4.2. Confirmation of the Series of Reviews for Cross-Border E-Commerce Credit Evaluation Objects. If formula (4) is a set of comment layers consisting of composite assessment findings of different kinds that may be made by the credit evaluation object, each level has a one-to-one correspondence with the fuzzy subset, where V_j is the jth assessment findings., $j = 1, 2, \cdots, n$, and n represents the sum of the number of evaluation results.

$$V = \{v_1, v_2, \cdots, v_n\}. \tag{4}$$

2.4.3. Determine the Weight Vector of Credit Evaluation Indicators. Assume that equation (5) is a weight assignment fuzzy vector, where a_i is the weight of the ith indicator and

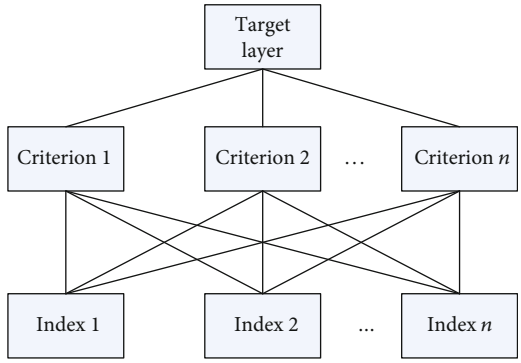

Figure 2: Fuzzy comprehensive analysis index system.

specifies the $0 < <a_i, \sum i = 1$. A represents the important level of each indicator. This important level (that is, weight) is vital in the whole process. Usually, the weights are different, and the conclusions obtained will vary widely. Usually, the weight is determined by experience and there is a very large subjectivity.

$$A = (a_i, a_2, \cdots, a_m). \tag{5}$$

2.4.4. Determination of Fuzzy Relation Matrix R. After the hierarchical fuzzy subset is established, the evaluated objects are quantized one by one from each indicator u_i, thereby obtaining a fuzzy relation matrix:

$$R = \begin{pmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{pmatrix}. \tag{6}$$

In formula (6), r_{ij} represents the degree of membership of the graded fuzzy subset v_j from an indicator u_i. The fuzzy vector r_i represents the performance of the evaluated object on a certain index u_i. Therefore, r_i is also called a single indicator matrix, which is a fuzzy relationship between U and V.

When determining the membership degree of a factor of the evaluated object on the comment set, experts and scholars in the field generally score, then count all scoring results, and then calculate r_{ij} according to the absolute value subtraction method, that is,

$$r_{ij} = \begin{cases} 1, (i = j), \\ 1 - a\sum_{k=1} \left| r_{ik} - r_{jk} \right|, (i \neq j). \end{cases} \tag{7}$$

Finally, the membership result of the evaluated object is obtained, and the result is improved into a numerical form. We can calculate the comprehensive score of each evaluated object more accurately. Therefore, the final comprehensive score S of the evaluated object can be expressed as follows:

$$S = a_1 * c_1 + a_2 * c_2 + a_3 * c_3 + \cdots a * c_n. \tag{8}$$

2.4.5. Comprehensive Evaluation of Multiple Indicators. Based on the above four steps, the weight vector A and the relation matrix are calculated by an appropriate method to obtain a comprehensive evaluation vector B of each evaluated object, which is represented by the following:

$$B = A \cdot R = (a_1, a_2, \cdots, a_m) \begin{pmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{pmatrix} = (b_1, b_2, \cdots, b_n). \tag{9}$$

In formula (7), b_j denotes the affiliation level of the subject fuzzy multiset of the appraised object element v_j from a global perspective.

2.5. Analytic Hierarchy Process. Analytic hierarchy process (AHP) is a hierarchical weight analysis method for solving multiobjective complex problems. This method combines qualitative analysis and quantitative analysis. It first relies on the policy decisions' judgment of the significance of the lessons learned from the measurement targets under the decision-making plan and then calculates the right of each measurement target under the decision-making plan through reasonable methods. The number can solve the problem that it is difficult to directly solve it by quantitative methods.

2.5.1. Build a Schematic Model of the Cascading Structure. First, the goals, considerations, and objects in the decision-making scheme include the top layer, middle layer, and bottom layer into top layer, center layer, and bottom layer according to the partner layer and draw a layered result image.

(i) Higher level: the purpose of a decision or problem to solve

(ii) Middle layer: the factors considered or the criteria for decision asset

(iii) The lowest level: alternatives to decision-making or more subfactors

For the two adjacent levels, the highest level is called the mass, and the lower level is called the factor layer.

2.5.2. Construction of the Matrix Judgment. For the density determination of each factor at each level, obtained only by force analysis, it is difficult to convince the others, so Saty proposed a matrix compatibility method, namely:

(a) A qualitative comparison of any two factors in place of a qualitative comparison of all factors

(b) Adopt a certain standard scale in qualitative comparison to improve the accuracy of comparison

Through the judgment matrix, the weight value of each factor of the layer for a certain factor of the upper layer can be obtained. The element α_{ij} of the judgment matrix A is given by the scale method, as shown in Table 1.

The consistency matrix is shown.

$$A = \begin{pmatrix} \frac{t_1}{t_1} & \frac{t_1}{t_2} & \cdots & \frac{t_1}{t_n} \\ \frac{t_2}{t_1} & \frac{t_2}{t_2} & \cdots & \frac{t_2}{t_n} \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & & \cdot \\ \frac{w_m}{w_1} & \frac{w_m}{w_2} & \cdots & \frac{w_m}{w_n} \end{pmatrix}. \tag{10}$$

$W_1, W_2, \cdots, W_n$ represent the factors used for comparison and the corresponding sequence numbers, and w_m/w_n represents the ratio of the relative importance factor, which is the previously mentioned scale or is the reciprocal of the scale.

Let $a_{m,n} = w_{m-1}/w_n$, and then, meet the $a_{m,n} \cdot a_{n,i} = a_{ik}$ $m, n, i = 1, 2, \cdots, i$'s positive reciprocal array A.

2.5.3. Split Singular Sequencing and Coherence Inspection. The largest eigenvalue $\lambda_{\max}$ of the pairwise comparison matrix is normalized. The normalized eigenvector is denoted as W. At this time, each element in W is the sorting weight value of a certain layer factor relative to a factor in the upper layer, and this process is called hierarchical single sorting. For the confirmation of the hierarchical ordering, it is must to inspect consistencies.

Now, a new concept is introduced to size the CI. By randomly constructing 500 paired comparison matrices A1-A500, these 500 matrices can be obtained. Then, the random consistency index is

$$\mathrm{RI} = \frac{\mathrm{BI}_1 + \mathrm{BI}_2 + \cdots \mathrm{BI}_{500}}{500} = \frac{((A_1 + A_2 + \cdots A_{500})/500) - n}{n-1}. \tag{11}$$

The calculation results of the substituted data are shown in Table 2.

At this point, this article defines the consistency ratio.

$$\mathrm{CR} = \frac{\mathrm{CI}}{\mathrm{RI}}. \tag{12}$$

2.5.4. Stratification Total Ordering and Concordance Detection. It means that for all elements of a layer, the importance of weight corresponding to the highest level is calculated. In this paper, there are three levels of credit risk assessment indicators, the highest level of the middle layer indicators is a one-to-many form, and each indicator of the middle layer is also a one-to-many form for the lowest level indicators. There are any other forms of correspondence.

The weights of the m elements of the A layer to Z are, respectively, the weights of the $a_1, a_2, \cdots, a_m$, the B layer element Bi pair and its corresponding A element. Therefore, the weight of the B layer element to Z is

$$b_i = a_i \cdot b_{ij}. \tag{13}$$

Assume that the consistency index of the B layer element to the corresponding element of the A layer is CI_j, and the random consistency indicator is the RI_j. Therefore, the consistency ratio of the layer B to the total order of the Z layers is

$$\mathrm{CR} = \frac{a_j \cdot \mathrm{CI}_j}{a_j \cdot \mathrm{RI}_j} = \frac{\mathrm{CI}_j}{\mathrm{RI}_j} = \mathrm{CR}_j. \tag{14}$$

Table 1: The range approach of a_{ij}.

Scale	Meaning
1	Subjects are equally important.
3	One ingredient is a little more vital than the others.
5	One element is much more critical than the other.
7	One parameter is more vital than the other.
9	One component is more relevant than the other.
2, 4, 6, and 8	The two adjacent decisions from above determine the median.

Table 2: Random consensus index RI.

Matrix order	RI value	Matrix order	RI value
1	0	16	4.25
2	0	17	4.81
3	0.47	18	5.09
4	0.75	19	5.58
5	1.12	20	5.72
6	1.14	21	6.26
7	1.31	22	6.7
8	1.53	23	6.81
9	2.09	24	6.85
10	2.15	25	7.29
11	2.71	26	7.61
12	3.24	27	7.7
13	3.45	28	7.75
14	3.75	29	8.13
15	4.25	30	8.65

When the comments of all three-level indicators have been selected, the following comment set result matrix is formed:

$$Ca = \begin{pmatrix} C_{11} & C_{12} & \cdots & C_{19} \\ \vdots & \vdots & \ddots & \vdots \\ C_{41} & C_{42} & \cdots & C_{49} \end{pmatrix}. \tag{15}$$

In the previous section, this article has obtained the comprehensive weight values of all three-level indicators in the entire indicator system. This article expresses the weight vector composed of these comprehensive weight values as follows:

$$Z' = Z'_{111}, Z'_{112}, Z'_{113} \cdots Z'_{314}. \tag{16}$$

Therefore, this article only needs one calculation to get the membership vector W of the third-class and nine-level comment set V of the cross-border e-commerce company, namely

$$W = Z' * Ca = \left(Z'_{111}, Z'_{112}, Z'_{113} \cdots Z'_{314}\right) * \begin{pmatrix} C_{11} & C_{12} & \cdots & C_{19} \\ \vdots & \vdots & \ddots & \vdots \\ C_{41} & C_{42} & \cdots & C_{49} \end{pmatrix}. \tag{17}$$

The matrix form of the above expression is

$$\left(Z'_{111}, Z'_{112}, Z'_{113} \cdots Z'_{314}\right) * \begin{pmatrix} C_{11} & C_{12} & \cdots & C_{19} \\ \vdots & \vdots & \ddots & \vdots \\ C_{41} & C_{42} & \cdots & C_{49} \end{pmatrix} = (W_1, W_2, W_3 \cdots W_9). \tag{18}$$

To normalize the membership degree vector, we get

$$\bar{W} = \left(\bar{W}_1, \bar{W}_2, \bar{W}_3 \cdots \bar{W}_9\right). \tag{19}$$

Combining the normalized results of the above-mentioned membership degree vectors, this paper obtains the final model S:

$$S = \left(93\bar{W}_1, 94\bar{W}_2, 95\bar{W}_3, 96\bar{W}_4, 97\bar{W}_5, 98\bar{W}_6, 97\bar{W}_7, 96\bar{W}_8, 95\bar{W}_9\right). \tag{20}$$

Combined with the indicator system of cross-border e-commerce credit risk assessment, we will further explain the model. W is the comprehensive evaluation degree generated by the calculation of the comprehensive weight value of all three-level indicators at the AAA evaluation level. AAA represents the degree of subordination of the cross-border e-commerce enterprise at this level.

3. Credit Evaluation System Based on 5G Communication

3.1. Principles for Determining Indicators Based on 5G Communication. To study credit evaluation indicators in the context of 5G communication, the following principles should be followed:

3.1.1. Legality. Regarding 5G communication privacy, the United States has a privacy law, and the United States and the European Union have signed a privacy statement, but China's relevant legislation is very vague and belongs to the gray area. For data or indicators that may involve privacy, 5G communication credits should avoid unnecessary international legal disputes and should be collected after authorization, and their traffic and usage should be strictly monitored after collection.

3.1.2. Integrity. 5G communication credit is conducive to the comprehensive construction of the indicator system, so that the true situation of credit can be reflected from various aspects. However, 5G communication credit faces the problem of isolated credit information islands, which is more prominent in cross-border e-commerce. The dispersion of internal credit information, the isolation of external credit information, the lack of uniform standards, and the inability to interconnect have created significant difficulties for 5G communication collection. Building a complete indicator system can mine credit information through systematic review and collaborative information exchange.

3.1.3. Effectiveness. 5G communication is not omnipotent, it is not equal to a large amount of data, and a large amount of data does not necessarily have value. The value density of 5G communication is very low, and the classic "two-eighth rule" also indicates that only 10%-20% of data in the data source may be useful. Therefore, mining direction and data cleansing are very important when absorbing raw data for cross-border e-commerce credit assessment indicators.

Participants of cross-border e-commerce, such as distributors, manufacturers, and core enterprises, are regarded as a whole economic circle. Compared with traditional corporate financing, the characteristic of cross-border e-commerce finance is to use the funds of financial institutions themselves. The advantage is transferred to the e-commerce economic circle. Therefore, the financial trust evaluation of e-commerce is no longer measured from a single financial perspective, but the overall situation of the supply chain, the situation of all transaction participants, and the situation of financing companies are integrated as the measurement dimension. On the whole, e-commerce finance focuses on the overall scale and level of core enterprises in cross-border business, the authenticity of transactions, the stability of the supply chain, the development of the industry, the degree of sustainable development of financing enterprises, and the professionalism of supply chain management. Figure 3 shows the relationship between financial institutions and customers in the traditional financing model, and Figure 4 shows their relationship in the e-commerce financial financing model.

As can be seen from Figures 3 and 4, there are many differences between traditional corporate financing and cross-border e-commerce. Among them, the most significant difference is that cross-border e-commerce finance

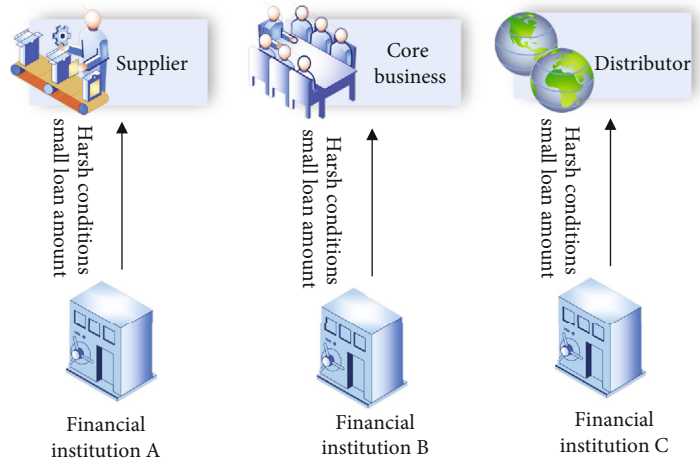

Figure 3: The relationship between financial institutions and customers under the traditional financing model.

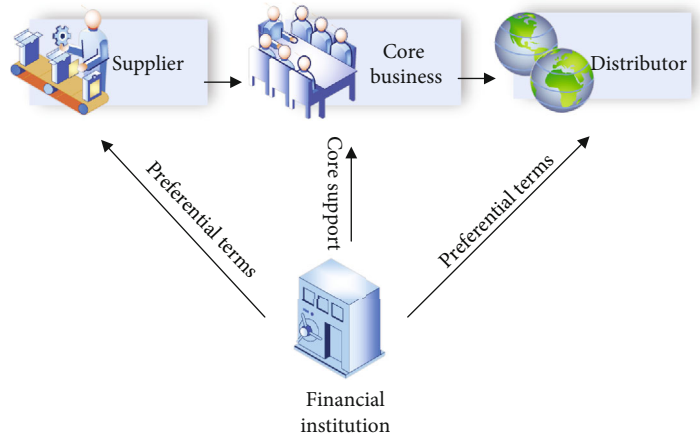

Figure 4: The relationship between financial institutions and customers under the cross-border e-commerce model.

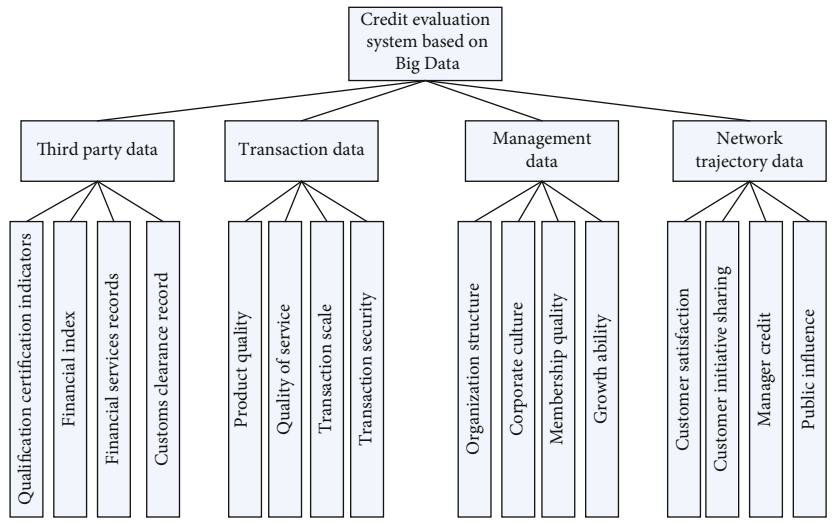

Figure 5: Cross-border e-commerce credit evaluation index system framework under the background of 5G communication.

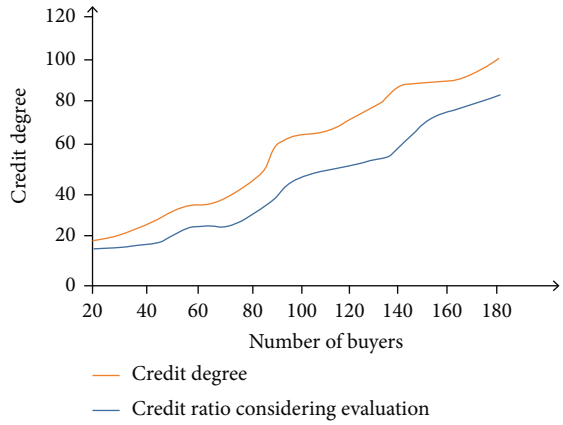

Figure 6: Relationship between credit and buyer number.

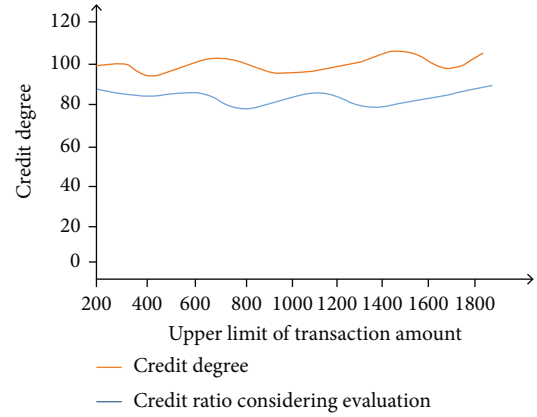

Figure 7: The relationship between maximum transaction amount and credit.

considers the support of core enterprises from the perspective of the general supply chain, so the reliability assessment of financial enterprises considers the current situation and background of the supply chain, thereby reducing the financing companies' own shortcomings. The resulting restrictions have resulted in higher financial credit ratings.

3.2. Construction of Indicator System Based on 5G Communication

3.2.1. Indicators under Third-Party Data. As can be seen from Figure 5, third-party data comes mainly from government functions such as business and industry, quality inspection, taxation, banking and other financial institutions, and cross-border e-commerce business functions. Third-party data is usually obtained publicly or through a cooperative exchange. From the information published by government functions, the qualification certification indicators for cross-border e-commerce can be obtained. Financial indicators are available through third parties and company internal information. The main factors affecting corporate credit are the asset size, profitability, operating capacity, and solvency of the company's finances. Therefore, the credit rating system should increase the proportion of financial indicators. Financial service records generated by cross-border e-commerce companies when borrowing from banks or online lending companies are also important indicators of their credit. This includes bank credit ratings, mortgage guarantees, and default records. In addition, the important difference between cross-border e-commerce and ordinary e-commerce is whether commercial activities involve customs clearance. According to the special procedures for providing services for cross-border e-commerce, some targeted indicators, such as customs clearance records, should be added.

3.2.2. Indicators under the E-Commerce Network Transaction Data. After the transaction is completed, the user will immediately evaluate the product quality and service quality on the e-commerce network, and the evaluation results will be visible to all viewers. From the perspective of transaction cost theory, due to the serious information asymmetry between overseas customers and cross-border

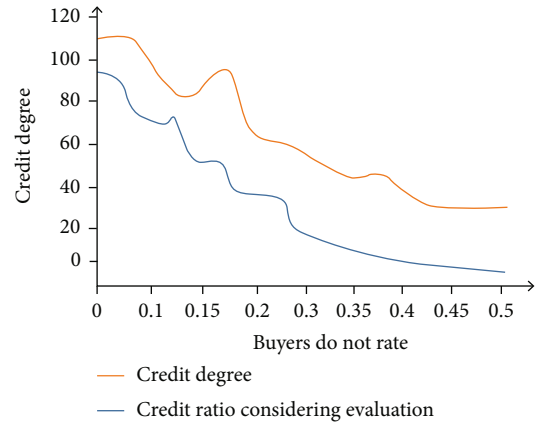

Figure 8: Relationship between credit and nonevaluation rate.

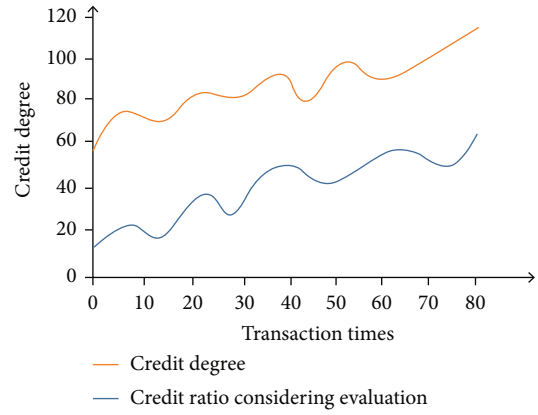

Figure 9: Curve relationship between credit and transaction times.

e-commerce, in order to make correct purchase decisions, foreign customers need to pay expensive transaction costs, including search costs, information costs, decision costs, and default costs. In old customers' assessment of cumulative transactions, the preferential interest rate will greatly reduce the transaction costs of new customers. The initial

Table 3: Performance evaluation standard value of rubber products industry.

Project	Merit	Good value	Average value	Lower value	Poor value
Sales profit margin (%)	18	13.7	8.9	4.6	-0.1
ROE (%)	13	9	6.4	3.1	0.4
Sales growth rate (%)	15	8.5	1.9	-5.4	-13.1
Profit growth rate (%)	13	7.6	2.3	-3.3	-8.3
Assets and liabilities (%)	50	55.7	60.1	65.1	70
Current ratio (%)	12	9	5.1	1.2	-2.5
Quick ratio (%)	140	101.8	60.1	10.6	-26.8
Inventory turnover rate (times)	10	8.5	6.8	4.6	3.5
Turnover rate of total assets (times)	1	0.5	0.2	-0.2	-0.7
Turnover rate of accounts receivable (times)	10	6.5	2.5	-0.7	-3.5

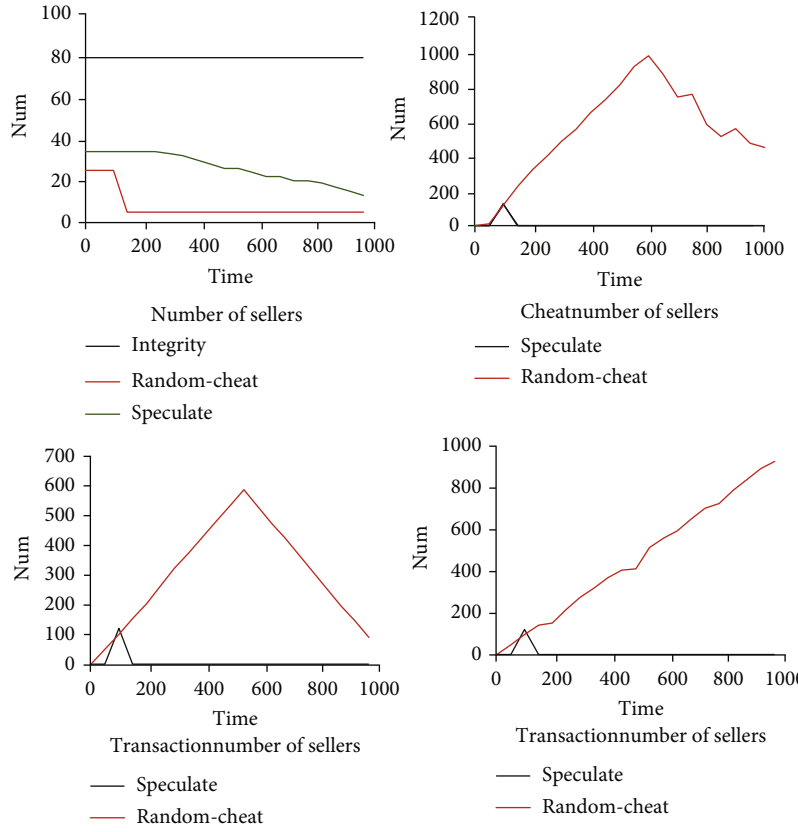

Figure 10: Simulation experiment to improve the scoring method.

judgment of new customers on cross-border e-commerce credit is largely affected by this. In general, the company's trustworthy behavior will facilitate the completion of the transaction. Conversely, the large-scale representation of the user's recognition or loyalty indicates that the company has a good reputation. The size of the transaction is reflected in many aspects, such as cumulative trading volume, transaction success rate, new customer growth rate, and old customer return rate. In addition, for cross-border e-commerce transactions, because the two parties are in different countries, various uncertainties directly or indirectly affect transaction security, such as information security and payment security. Credit risk is caused by the disclosure of user information and security breaches in cross-border payments.

3.2.3. Indicators under the Network Trajectory Data. Searching and analyzing relevant texts based on 5G communication means, images (including expressions), audio, video, etc., incorporating them into the data analysis model and calculating user satisfaction will make the results more realistic and effective. Second, the soul of social networks is shared, and information is quickly spread, even viral. The

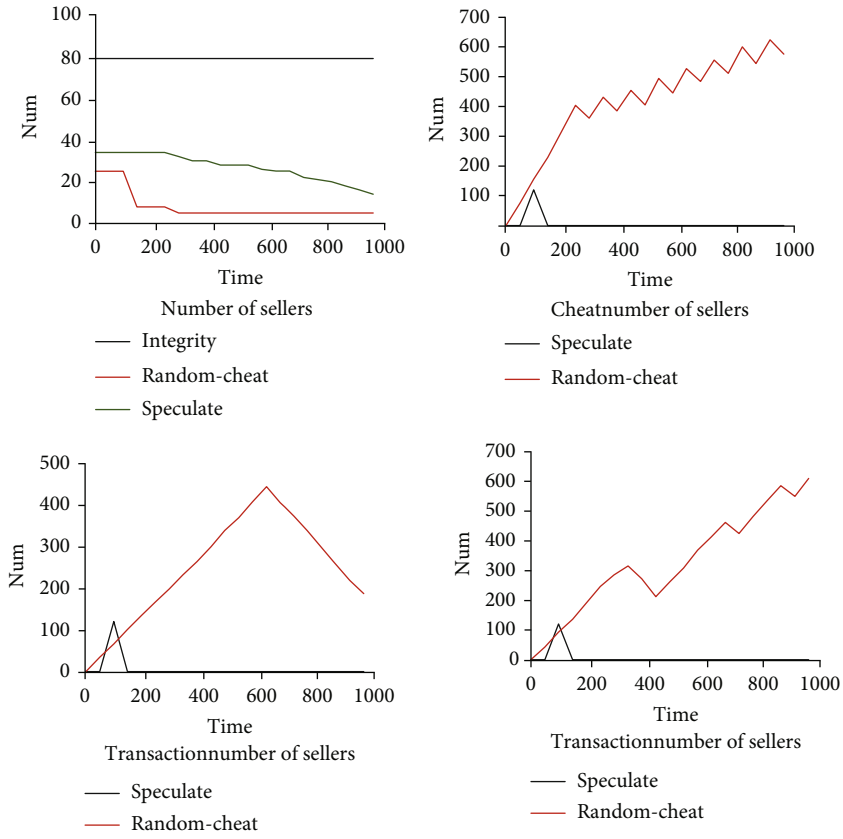

Figure 11: Simulation experiment considering the price factor.

active information sharing of cross-border e-commerce is actually a marketing promotion activity that customers unconsciously implement. Therefore, the active sharing of customers can be used as one of the indicators of credit evaluation. The breadth and depth of active sharing represent the higher credit limit of the company. The specific indicators include the forwarding frequency, the number of shared links, and the establishment of the topic group.

4. Discussion

4.1. Establishment of Financial Credit Model

4.1.1. Relationship between Credit and Number of Buyers. Figure 6 is a credit map simulated by a credit calculation method that does not limit the number of purchasers, and other factors affecting the credit calculation are set within a certain range. In the image, the solid and dashed lines are, respectively, two charts, which take into account the buyer's overall evaluation rate and do not consider the buyer's overall evaluation rate. Both curves have a linear upward trend. It is not difficult to see that, first of all, the overall trend of the two curves is rising. That is to say, the credit calculation method studied in this paper, if the number of people purchased is large, other factors are well controlled, and the seller's credit accumulation will be more and more. This is very consistent with the objective law. This also provides a limited response to the number of purchasers mentioned in the above research process. At present, the credit model studied in this paper is still beneficial to the number of buyers, in line with objective facts. Secondly, between the solid line and the dotted line, it can be clearly seen that if the buyer's evaluation rate is considered, the credit value is significantly lower than the value that does not calculate the buyer's evaluation rate.

4.1.2. Study the Relationship between Maximum Transaction Amount and Credit. Figure 7 shows that the two curves have a smooth variation but vary widely. It can be seen from this that first, the change in the upper limit of the transaction amount in the 5G communication environment studied in this paper has little effect on the credit algorithm of the cross-border e-commerce credit evaluation model. This can be seen from the very stable trend of the two curves. The ever-increasing upper limit on the amount of transactions does not have a huge impact on the trend of credit changes. The trend of the curve is also relatively consistent. This illustrates the quality of the new credit calculation model, which addresses the impact of the amount on credit calculations.

Secondly, the huge difference in credit value between the two curves of the solid line and the dotted line can also reflect that the impact of the evaluation rate on the calculation of credit value is still very large. Especially in this case, the upper limit of the transaction amount is increased instead of the stable value, which is actually closer to reality. Because of the actual transaction amount, the transaction amount is not very limited, not 1000 in this example.

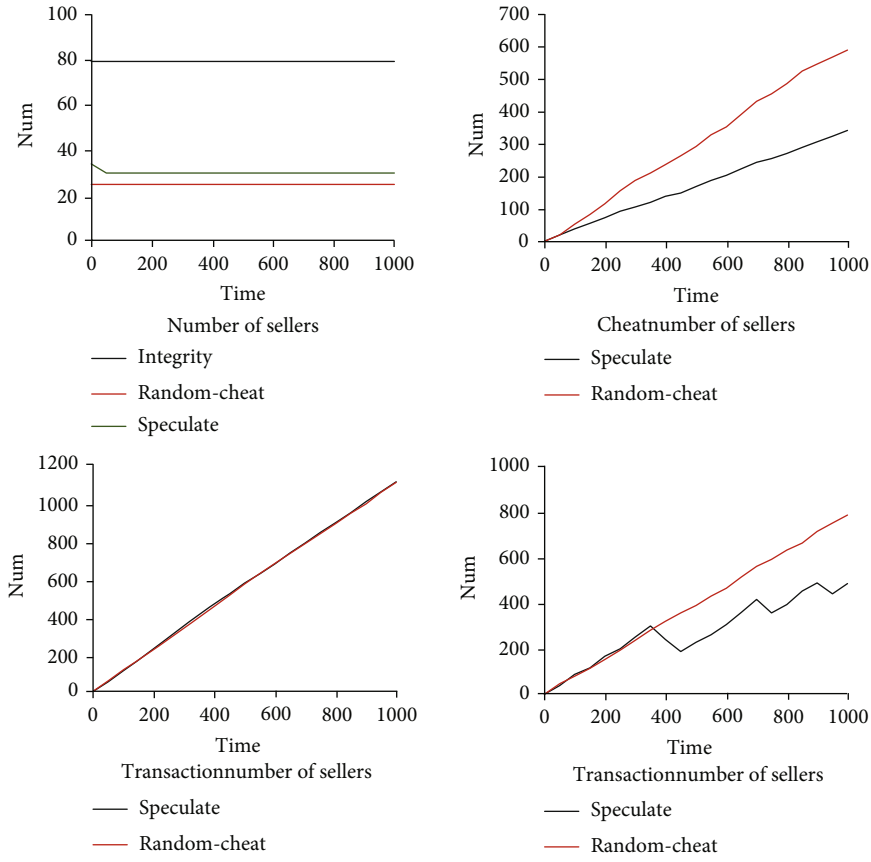

Figure 12: The simulation experiment results of the existing simple accumulation model.

Therefore, the buyer evaluation rate has a more objective impact on credit calculations.

4.1.3. Study the Relationship between Credit and Nonevaluation Rate. The credit curve changes as shown in Figure 8.

In this case, the linear trend of the two curves changes. First, the higher the buyer's nonevaluation rate, the lower the credit value. This is also a more prominent feature of the new model studied in this paper: the impact of the buyer's nonevaluation rate on credit calculations is actually very large. This also proves that the buyer's default praise is actually a shortcoming of cross-border e-commerce credit calculation. Note that the lower the evaluation rate, the lower the credit value, taking into account the buyer's evaluation rate. This is also consistent with the objective reality. Secondly, in all the simulation comparison diagrams of this paper, the evaluation rate is compared with the evaluation rate. Then, the lower curve shows that the evaluation rate is lower than the evaluation value regardless of the evaluation rate.

4.1.4. Studying the Relationship between Credit and Transaction Times. In this set of simulations, the number of transactions is set to a variable, and the trend of the credit value is observed by the change in the number of transactions. The calculated assessment rate is still compared to the uncalculated assessment rate. The credit curve is shown in Figure 9.

The trend of the two curves is still consistent. The overall evaluation of credit showed a growing trend, but the benefits were not obvious. Credit will decline during this process, which proves that the credit algorithm in this article will not increase or increase in a single way but will vary according to actual data. First, the growth of the two curves indicates that the number of transactions is increasing, the situation is becoming more complex, and the value of credit is generally increasing. For the actual situation, other factors are limited, and only when the number of transactions changes, the credit value will increase. Second, considering the assessment rate, the overall credit value is still lower than the assessment rate. This fully proves that on the real trading network, credit calculation does not consider that the evaluation rate is a huge loophole.

4.2. Enterprise Credit Calculation Case. The initial credit calculation (nonfinancing) is based on the corporate information and corporate financial report information in the background description of the financing company in the case. It is assumed that the corresponding values of the cross-border e-commerce indicators given in the corporate performance evaluation standard value are shown in Table 3.

If the corresponding evaluation result is good, the credit evaluation result of the cross-border e-commerce enterprise

has reached a good level, and it has the basis for cross-border e-commerce financial financing.

The improved scoring method allows buyers to have two evaluation opportunities in each transaction, each time using a 5-level scoring, the first time in the [-2,2] range of the seller's logistics and goods in the transaction. For the second time, evaluate the seller's performance in both after-sales services and products in the [-2,2] interval.

Use NetLogo's drawing function to create four pictures, from top to bottom and from left to right to record the number of sellers of each type in the market, the number of transactions of each type of sellers, and the total number of frauds of each type of seller and the average number of frauds of various types of sellers, since it has been set when distinguishing seller types that honest sellers always choose honest transactions; for the sake of comparison, honest sellers are not recorded when plotting the number of sellers' transactions and the number of seller's frauds.

After a period of operation, the experimental results are shown in Figure 10. The upper left figure shows the number of sellers of various types in the market. The bottom left chart records the total number of transactions of various types of sellers still in the market, the top right chart records the total number of frauds of various types of sellers still in the market, and the bottom right chart shows the average number of frauds of various types of sellers in the market, which has been increasing trend.

Comparing it with Figure 11, it can be found that the credit evaluation model that introduces the price impact factor can identify malicious sellers and drive them out of the market in a shorter time. Compare the changes in the number of sellers of the two models and introduce the price. The curve of the credit evaluation model of the impact factor is steeper, indicating that the model is more powerful in identifying and expelling malicious sellers.

After the penalty mechanism is added, the improvement of the model in this article is completed, and now it is compared with the existing simple accumulation model. The buyer and the seller in the simulation experiment are still allowed to trade according to the established behavior. The simulation experiment results are shown in Figure 12.

The total number of frauds by sellers in the market on the upper right of Figure 12 and the average number of frauds in the lower right chart continue to increase during the observed period of time, which will inevitably cause great losses to buyers in the market and interfere with the entire market order. Maintenance hinders the continued development of the market. After a successful transaction, the buyer scores the seller's credit and uses the existing credit evaluation model to calculate the seller's credit score. The credit scores of sellers are accumulated, and the number of sellers of various types in the market, the number of transactions of various types of sellers, the total number of frauds of various types of sellers, and the average number of frauds of various types of sellers are recorded.

5. Conclusions

(1) This article first investigates the development status and assessment of e-commerce cross-border credit in my country. Among them, the rapid development of cross-border e-commerce in my country is primarily reflected in three areas: the rapid development of the transaction size, the rapid increase of incentive policies, and the smooth development of information technology in relation. My country's cross-border e-commerce credit rating status is weak, which manifests itself in the following areas: in-house e-commerce credit rating system provides limited references, and inadequate social credit, and credit risk assessment business still faces severe cultural restrictions. These restrictions are imposed by local isolation and credit-based data. Combination of law, science, completeness, capabilities, and quantitative selection indicators, combined with the basics of cross-border e-commerce characteristics, and distribution of signals from cross-border e-commerce, enterprise, and company levels work to establish e-border commerce risk assessment program

(2) Combine the application of comprehensive evaluation method and analytic hierarchy, construct the factors and comment set of credit risk assessment index system, determine the weight of each index, and determine the final credit risk assessment of e-commerce small business and construct a model

(3) The first objective of this paper is the credit rating model of the C2C e-commerce cross-border trading platform. In a way, it analyzes the advantages and disadvantages of the existing e-commerce credit model; on the other hand, it can be done with reference to the user transaction behavior in the P2P network. Use the simulation area and NetLogo simulation platform to set up a C2C cross-border e-commerce platform, compare the transaction process, and evaluate the model value according to the changes in several numerical references during the transaction process

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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