An Empirical Study on the Development Environment of Cross-border E-commerce Logistics in the Global Trade Context: Exploring the Digital Marketing Landscape

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Abstract. With the rapid development of cross-border e-commerce and logistics, the problems of price suppression and product homogeneity in the marketing process of cross-border e-commerce enterprises have intensified, and how to use artificial intelligence technology to precisely market the required goods to consumers is an urgent problem for cross-border e-commerce and logistics enterprises to solve. Establishing a demand-oriented intelligent marketing model, using the data stored in the cross-border e-commerce and logistics platforms such as consumers' browsing information and purchase records to dig out different consumers' demand preference information, which can help cross-border e-commerce enterprises precisely locate the target market while also targeting consumers with different needs to take personalized and precise marketing, and maximize the cross-border e-commerce transactions. In addition, in the process of intelligent marketing, cross-border e-commerce enterprises should create their own brands based on the full integration of local culture, improve the recognition and loyalty of local consumers to the enterprise brand, promote the localization of cross-border e-commerce enterprise brands, and finally form the "intelligent marketing to lay the foundation for brand building, the brand effect to promote product sales". Intelligent marketing model. Through the study of the logistics efficiency of cross-border e-commerce, we can have a clearer understanding of the difficulties faced by cross-border e-commerce in China, so as to provide certain reference for cross-border e-commerce business and better improve its logistics efficiency. A comprehensive evaluation model based on neural network is proposed, and the feasibility of the network model for the analysis of cross-border e-commerce logistics development environment is verified through practical application.

1   INTRODUCTION

With the popularity and integration of the Internet, people no longer rely on the traditional way of life, but start to adopt the mode of online shopping, breaking the geographical limitations. With the development of globalized economy, its cross-border e-commerce has also been developed, which provides people with convenient living needs. Therefore, in the future development, we should pay attention to the laws and regulations of transnational e-commerce logistics, improve the relevant supporting policies, and make the logistics more professional [3],[6],[7].

The only way to ensure effective cooperation between the suppliers and the logistics industry is through continuous integration within the logistics industry. In general, transnational logistics is based on transnational e-commerce, and based on the increasing level of network technology, transnational e-commerce and transnational logistics can achieve integration and continuous access to hardware resources and technology to transnational logistics internal development. Among them, the application of mobile network is the concrete embodiment of this idea, the application of mobile network not only enhances the fit between transnational e-commerce and transnational logistics, but also realizes the synergistic development between transnational logistics and transnational e-commerce, and improves the internal supply chain management mode of the logistics industry, which is constantly optimized in terms of storage, packaging and transportation, thus achieving the purpose of reducing logistics time and logistics. In this way, not only can the efficiency of Cross-Country logistics be improved, but also can avoid excessive losses in the process of transportation, thus achieving win-win benefits between Cross-Country e-commerce and Cross-Country logistics. The schematic diagram of cross-border e-commerce logistics development environment is shown in Figure 1.
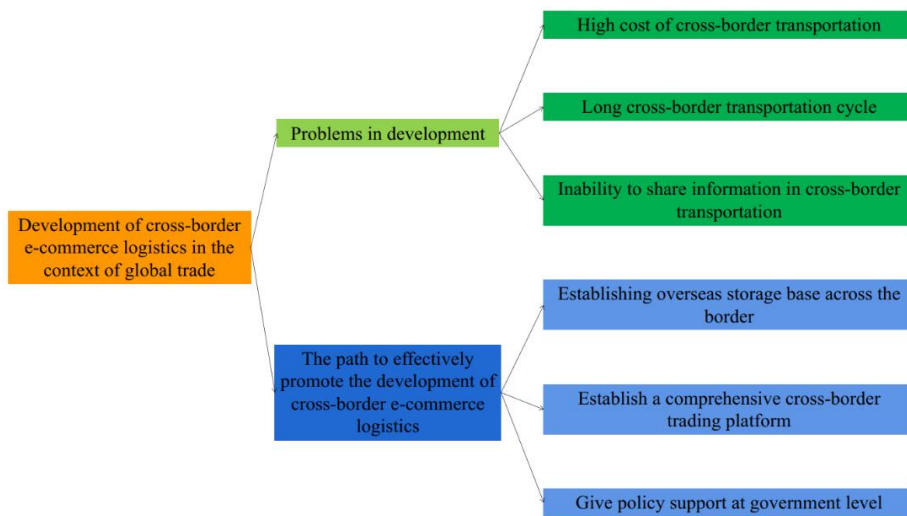
Figure 1: Cross-border e-commerce logistics development environment diagram.

There are many factors that can affect the synergistic effect of logistics network, such as the development strategy of enterprises, or the management problems in the operation of supply chain within logistics, which will affect the synergistic efficiency of logistics network, so only by realizing the effective control of internal management of multinational logistics can we avoid the deviation of opinions among various network members, or the problem of The problem that the work content is difficult to be connected. Before the official start of transnational logistics, the internal logistics transportation should be optimized [4],[8],[17]. After the official start of transnational logistics, the national customs should solve all problems that may be encountered in transnational logistics, especially the relevant control conditions in the national logistics transportation, and when the transnational goods enter the destination country, the customs should also inspect the goods. If further specified, it needs to carry out logistics receiving orders, goods receiving, goods storage, effective classification and coding of goods, then cargo handling, sorting, and then into transit, packaging, labeling, loading and unloading, etc., and at the same time need to involve payment work, product customs clearance and taxation, etc., and the subsequent after-sales service, return logistics and other procedures; and these processes will involve many countries, involving multiple Logistics enterprises, and therefore its complexity is higher compared to domestic logistics. Therefore, to ensure a smooth delivery of express delivery to the hands of buyers, it is necessary to ensure the coordination and cooperation between the entire transnational logistics system, when the transnational logistics cooperation is completed by different countries or between different enterprises, we must first solve the problems caused by the different views of these countries and enterprises may exist in the packaging of goods, transportation methods, etc., and only then be able to carry out the next step The transnational logistics and transportation activities [2]. A variety of logistics mode between the coordinated development, resource sharing, to achieve the convergence effect of transnational logistics contains a very complex logistics content, including not only domestic logistics, but also international logistics, because it involves international logistics, so it will involve some issues related to customs, such as entry and exit issues and commodity inspection issues, so the transnational logistics industry chain becomes longer, and its content is more complex, with the logistics The distance increases, the required transportation methods will also increase.

With the advent of the technological era, artificial intelligence and transnational e-commerce are simultaneously developing without interruption, and the combination of artificial intelligence and e-commerce logistics will become the trend of future development. The development of transnational e-commerce has driven the development of transnational e-commerce logistics business, and the two complement each other. Logistics, as a bridge connecting buyers and sellers, is an important part of e-commerce transactions. Compared with domestic e-commerce activities, transnational e-commerce has characteristics such as large time span, long spatial distance and wide range coverage, etc. These characteristics will increase the risk of transnational e-commerce logistics [14].

2 RELATED WORK

### 2.1 Cross-Border E-Commerce and Logistics

Innovative service model to ensure high quality, high efficiency and low cost courier operation. The relationship and development status between Cross-Country e-commerce and Cross-Country e-courier. The relationship between transnational e-commerce and transnational e-courier. Transnational e-commerce refers to the process of allowing counterparties under different customs borders to carry out their settlement, payment, and transactions through e-commerce, mainly through transnational express delivery of goods, the goods from the consignor to the consignee of the transaction mode. Since 2008, the scale of Cross-Country e-commerce in China has become increasingly large, and the transaction value has also climbed, which means that the demand for e-commerce express delivery in China is also increasing. The development of transnational e-

commerce also brings a potential market for the express industry that cannot be underestimated, but according to the current form, China's third-party courier, and is not able to provide sufficient specialized knowledge and special courier services for transnational express. Through the survey from 2011 to 2016, we know that the transnational e-commerce in this phase of the transaction volume is increasing, the development speed is rapid, but the relevant express delivery enterprises are relatively few. Most of them go through the operation mode of international express to complete the delivery, and it is difficult to meet their huge online shopping demand due to the less relevant express companies, especially during the peak shopping season and festivals, which causes the phenomenon of bursting and backlog of express shipments due to the huge order volume, resulting in the decline in their satisfaction. The embodiment of transnational e-commerce express delivery mode of operation. At present, for the study of transnational e-commerce express, respectively, embodied in the international express, international postal parcels, overseas warehouses, international express line, set express these aspects of express delivery, the specific circumstances are: 1. In transnational e-commerce express, international express is relatively frequent use, it is distributed through the courier company. 2. Under the premise of international postal all over the world, the transport channel of the huge let people breathtaking. So often in Cross-Country transactions through the international postal parcels in this form to transport. 3. overseas warehouse refers to the construction of storage warehouses in the place of sale, you can send the goods to this place directly in the warehouse for packaging, sorting and delivery. Can also set up overseas warehouses, through the network sales of goods, directly from overseas warehouses for delivery. 4. international express special line refers to a specific express starting point and end point when the transport for special country regions, its route and delivery time is also fixed. 5. when the goods in the storage warehouse to the specified number, through the international express delivery of goods in bulk, which is the collection of goods express [15],[10],[13].

Cross-Country e-commerce is a further innovation in the development of e-commerce, it is a more advanced form of embodiment, so that trade exchanges in different countries and regions through the network platform to achieve up, so that the trade between the interconnections. Compared with ordinary e-commerce, its express operation is relatively complex, such as import and export customs clearance, international settlement, international express and transportation insurance. But their mode of operation also has certain commonalities such as: B2B, B2C, C2C, etc.. The following points are specific optimization strategies for transnational e-commerce on the mode of operation of the express. Improve the relevant policy support. At present, China should improve the corresponding international courier policy to achieve efficient mode of operation of transnational e-commerce courier. Through the improvement of the original legal provisions and legal system, so that the courier industry in the system under continuous improvement to get better development. In the current mode of operation, from customs clearance procedures, operational specifications, storage management, taxation and related business management of the law in the binding aspects of the relatively poor, resulting in the express mode of operation is constrained, which is an important factor affecting the development of Cross-Country express transport. So should be restrained by and with the help of the improved legal provisions to restrain the behavior of courier enterprises to ensure its reasonableness and standardization. Create a perfect service system. In the process of operation mode should strengthen the importance of service work, to create a more standardized and efficient service system, improve the service reputation of enterprises, to provide effective help for the future development prospects of enterprises. For the service system, in order to strengthen the rationality of multinational express, a unified and scientific service system should be created to provide supporting infrastructure, so as to improve the quality of the final service. At the same time, should also strengthen the awareness of the construction of the service team, to avoid bad competition between courier companies and teams, to avoid the occurrence of "package change", "lost package", "unpacking "and other bad phenomena, must maintain a good image for the enterprise [11].

2.2 Cross-Border E-Commerce and Artificial Intelligence

With the changes in the internal and external environment of the economy, e-commerce trade based on the combination of Internet technology and international trade, i.e., Cross-Country e-commerce, is gradually emerging; it has become the new field with the fastest growth rate of China's foreign import and export trade. Premier Li Keqiang proposed an innovative action plan of "Internet + Foreign Trade" at the State Council Business Conference in 2015 to encourage the innovative integration of express network technology, cloud computing and big data with the support of mobile Internet, and actively promote the joint development of Internet and modern manufacturing industry. General Secretary proposed in the report of China's 19th National Congress to promote the pace of development of transnational e-commerce and become a new driving force for China's foreign trade development as soon as possible, bringing new development opportunities for Chinese e-commerce enterprises and encouraging all kinds of enterprises to join the wave of transnational e-commerce trade [18],[18],[20]. The efficiency of Cross-Country courier directly affects the customer or consumer online purchase satisfaction and potential purchase intention, while there is also an impact on the cost of sales of foreign trade enterprises. Therefore, foreign trade enterprises have begun to pay attention to the efficiency of Cross-Country express delivery and take express delivery operation as a part of business management, so as to measure the competitiveness of foreign trade enterprises' goods transactions, reduce business operation costs and maximize profits. In summary, the current e-commerce environment, whether multinational e-commerce can maximize the efficiency of express delivery is worth further study and learning in the process of development of multinational e-commerce [5],[21],[16],[9]. The government proposes to make changes to the operation of foreign trade enterprises and accelerate the transformation and upgrading of such enterprises, and transnational e-commerce, as an emerging foreign trade mode, plays an important role under the guidance of this strategic policy. By studying the express efficiency of transnational e-commerce enterprises, this paper makes up for the lack of theoretical research related to transnational e-commerce in China, enriches the research content, and at the same time has an important impact on each transnational e-commerce enterprise The paper also has important theoretical and practical significance for the effective operation of each multinational e-commerce enterprise. The current situation of artificial intelligence and logistics is shown in Figure 2.
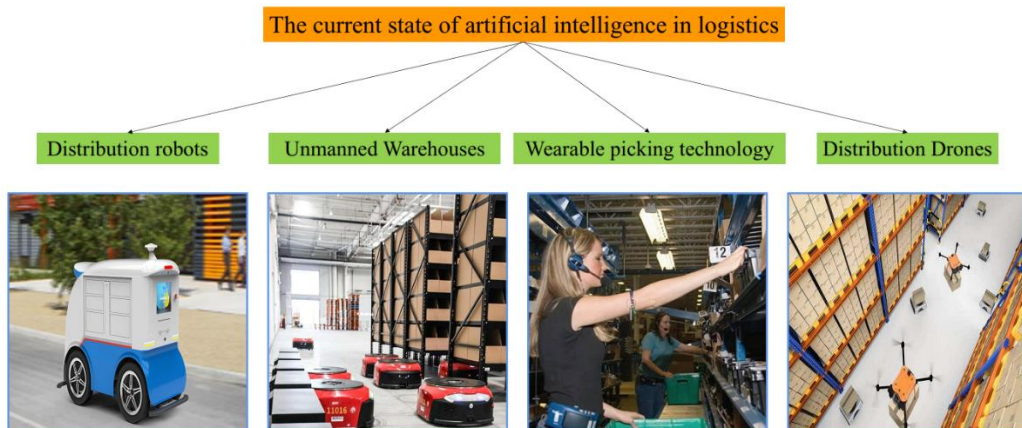
Figure 2: Artificial intelligence and the current situation of logistics.

After the economic development reaches a certain level, enterprises will start to focus on quality and efficiency. For courier enterprises, courier efficiency has a direct impact on the economic development of the courier industry. Therefore, many foreign scholars degree express efficiency has conducted in-depth research. There are many factors affecting the efficiency of enterprise express, including the utilization of express resources, productivity and transport time. The degree of perfection of the courier system will also have an impact on the enterprise courier efficiency to a certain extent. Express efficiency cannot be improved without the support of information systems, enterprises should focus on strengthening the development and rational application of information systems. The three major supports for the development environment of the express delivery industry are e-commerce, economic level and the degree of internationalization. However, the studies on these three aspects are conducted separately and cannot prove the comprehensive impact of the three on the courier industry [19]. A number of courier companies in North America are used as references to shift the research direction from the courier industry to outside the company in order to prove that there is an impact of market development on the efficiency of courier companies. All of the above studies analyze the factors affecting the efficiency of express delivery from a micro perspective. If we look at it from a macro perspective, it is mainly focused on the theoretical level. The existing literature on e-commerce express delivery provides an outlook on the future research direction of e-commerce express delivery [1]. The emergence of these studies on express efficiency provides a good reference for Chinese scholars. The establishment of network freight control centers has a positive effect on improving the efficiency of urban express delivery. The data envelopment analysis model empirically analyzes and measures the transportation efficiency of maritime express, and the results show that both service quality and express resource utilization should be considered simultaneously. The third-party express is selected as the main research object, and the evaluation index system is established to analyze the third-party express efficiency by combining its own characteristics and selecting input-output efficiency, equipment utilization rate, market competition efficiency and quality assurance rate as the specificized indexes from the perspective of efficiency. Through the empirical analysis of the regional express efficiency in China, it is proposed that the optimization of the allocation of express resources can largely improve the express efficiency. Stochastic frontier analysis was used to evaluate the courier efficiency of Chinese provinces and cities, and to analyze the gap of courier efficiency among different regions in China.

In the empirical study, four aspects of operational efficiency, economic efficiency, growth efficiency, and service efficiency are selected to construct its express efficiency evaluation system. From the perspective of enterprises, the possible impact of the effective degree of express cooperation between small enterprises and third-party courier enterprises on express efficiency is studied, and the results show that express efficiency is influenced by the management of enterprise outsourcing business, while it is inseparable from the hard strength and development level of the third-party courier industry itself. So far, domestic scholars have gradually penetrated into the field of e-commerce for the study of express efficiency. The five indicators of express timeliness, enterprise economic efficiency, internal management operations, operational quality and personnel are selected to establish an express efficiency evaluation index system to measure the express performance of distribution centers of B2C e-commerce enterprises. The actual efficiency of the express operation system is the key to the success of multinational e-commerce. Therefore, e-commerce enterprises should pay attention to the control of cost while improving express efficiency. The above literature review shows that although the current research related to express efficiency is focused on micro and macro levels, the division of measuring express efficiency indicators is not clear enough. In terms of research areas, although there is some in-depth research on express efficiency in the field of e-commerce, there are some limitations at the same time [22],[12].

The existing research on the express efficiency of multinational e-commerce mainly focuses on qualitative analysis, based on which a combination of quantitative and qualitative analysis is proposed. This provides a strong theoretical basis for the subsequent research. In addition, express

efficiency is analyzed from the perspective of transnational e-commerce, and previous studies on this area rarely combine transnational e-commerce and express efficiency together but discuss them separately. The study will provide important theoretical support for the healthy development of multinational e-commerce in China. Practical significance: Although China's transnational e-commerce is developing rapidly, it is still in the initial stage, with an unsound express infrastructure and relatively low corresponding express efficiency, and this current situation has great constraints and impacts on the normal operation of China's transnational e-commerce. Therefore, it is very necessary to study the improvement of express efficiency of multinational e-commerce enterprises. Through the study of this topic, on the one hand, enterprises will be more widely aware of the express problems that will be encountered in the operation of multinational e-commerce and provide reference for enterprises to improve express efficiency and expand business scope. On the other hand, with the government's policies on "e-commerce finance" and "e-commerce poverty alleviation", the importance of e-commerce to China's economic development has been consolidated. Based on this, while emphasizing the important role of transnational e-commerce for China's foreign trade economy, this paper also discusses the important role of the government in developing transnational e-commerce and transnational express, hoping that the government can participate in the management of transnational e-commerce enterprises and give more help and support, so that China's transnational e-commerce industry can have a good development environment.

3 METHODS

3.1 Cross-Country Logistics Risk Evaluation System

This paper establishes the evaluation system of Cross-Country e-commerce express risk indicators, which includes two levels of indicator sets, a total of 4 primary evaluation indicators and 17 secondary evaluation indicators. The following is a brief analysis of the selection basis and meaning of evaluation indicators. Environmental risk indicators. Transnational e-commerce expresses because of the transnational and national conditions vary greatly between countries, according to Porter's PEST model, the destination country political, social environment and other factors have a deep impact on the transnational express. In addition, the impact of express transport is also the degree of impact of natural disasters, countries for Cross-Country e-commerce parcels of customs clearance policy changes; in addition, in the settlement of the express capital chain, the degree of impact of macroeconomic fluctuations in various countries will also affect the cost of express to a certain extent. Market risk indicators. In the overseas market, multinational e-commerce enterprises face the impact brought by industry competitors, if the enterprise adopts the overseas warehouse express mode, it should focus on the impact of industry competitors on its market share. In addition, the shopping habits of overseas customers may also cause express risk, and the user group with low credit level may bring pressure to the enterprise express in the form of disputes. In terms of overseas warehouse management, the increase of product return rate, product life cycle fluctuation and inventory risk may bring certain risks to the overseas warehouse storage link. Customs clearance risk indicators. In the customs clearance process, it is necessary to focus on the efficiency of customs clearance in each country, the level of commodity inspection, product clearance rate, the degree of influence of product characteristics, the customs policy system of different countries will cause transit express risk. Transportation risk indicators. Transnational commodity transport often involves a variety of modes of transport and transnational multiple express nodes, its transport docking, transfer process uncertainty factors are much higher than the domestic transport. The destination country express infrastructure construction is an important factor causing the risk of transnational e-commerce express, many countries have poor express infrastructure conditions, cannot be efficient express work.

3.2   Model Structure

A five-layer BP neural network model is used as the initial classification model, this model has the characteristics of 9 dimensions for the input layer and 3 dimensions for the output layer, and the middle-hidden layer uses 3 layers of neural network with dimensions of 400, 300 and 100 respectively. The establishment of the BP neural network-based Cross-Country e-commerce logistics risk analysis algorithm model includes the construction of BP neural network, training of BP neural network and BP neural network classification three steps, the specific algorithm flow chart, as shown in Figure 3.
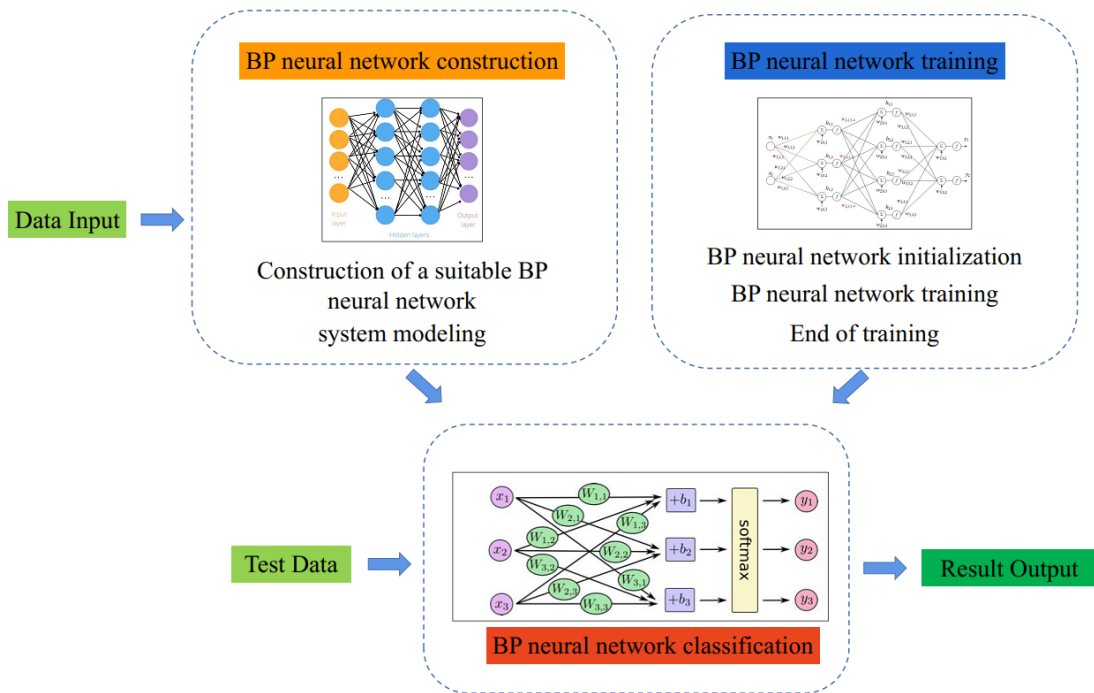
Figure 3: Model Structure.

3.3   Factor Analysis

Factor analysis is characterized using many unknown parameters, which is much larger than the number of unknown parameters of the model used in traditional multivariate analysis. The basic principle of factor analysis is to group research variables with strong correlations in the same category through the idea of dimensionality reduction, and eventually fuse all the original indicators into a common factor that can better explain the whole. The empirical principle of parsimony in factor analysis statistical model building requires that the increase in the number of parameters be stopped as soon as the fitted indicator data that cannot produce further significant effects are identified. By analyzing the factor analysis model, it is possible to reflect the main information of the original data with a less reasonable number of public factors and reduce the excessive loss of information under the premise of effective interpretation of the original information. Factor analysis has incomparable advantages of other evaluation methods in comprehensive evaluation, and the success of the method stems from its exploratory nature, and the data relationship between its various variables can be repeatedly tested and argued in the study. Firstly, assuming that the

number of research objects is p, set p variables as $X = (X_1, X_2, …, X_P)$ with F representing the common factor of multiple variables with the same explanatory cause, and the inner product of two common factors is equal to zero, i.e., two are orthogonal. ε_i represents the special factor of those special factors affecting other variables, which are independent of each other. Thus, the mathematical model of factor analysis can be expressed as follows.

$$\begin{cases} x_1 = a_{11}F_1 + a_{12}F_2 + \cdots + a_{1q}F_q + \varepsilon_1 \\ x_2 = a_{21}F_1 + a_{22}F_2 + \cdots + a_{2q}F_q + \varepsilon_2 \\ \cdots \\ x_p = a_{p1}F_1 + a_{p2}F_2 + \cdots + a_{pq}F_q + \varepsilon_p \end{cases} \tag{1}$$

It can be expressed in the following matrix form.

$$X = AF + \varepsilon \tag{2}$$

$$A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1p} \\ a_{21} & a_{22} & \cdots & a_{2p} \\ \vdots & \vdots & & \vdots \\ a_{p1} & a_{p2} & & a_{pq} \end{bmatrix} \tag{3}$$

Here $A = \left(a_{ij}\right)_{p \times q}$ is called the factor loading matrix and a_{ij} is the loading of the i-th variable on the j-th factor. If the variable Xi is considered as a point on the n-dimensional space, a_{ij} denotes its projection on the coordinate axis F. The magnitude of a_{ij} indicates the dependence of xi on the common factor Fj.

3.4 Construction Of Bp Neural Network

The constructed BP neural network has dimensions (9, 400, 300, 100, 3) from input to output, respectively, and the constructed neural network model, as shown in Figure 4. The hidden layer in Figure 4 contains a neural network model with 3 layers, and the constructed BP neural network consists of 1 input layer, 3 hidden layers and 1 output layer. For each neural node in the second layer of the neural network, for the input data of the first layer, after linear transformation, as shown:
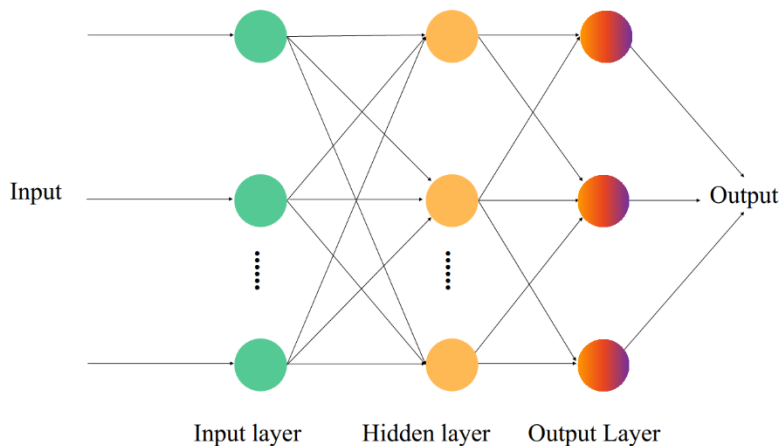
Figure 4: Neural network structure.

$$h_l^2 = \sum_{j=1}^{9} x_{ij} * w_{lj} + b_l \tag{4}$$

Where h_l^2 denotes the operation of the lth node parameter of the second layer, x_{ij} denotes the j-th feature value of the i-th training data, w_{lj} denotes the connection parameter of the j-th node of the first layer neural network to the l-th node of the second layer, and b_l denotes the bias value of the l-th node of the second layer, for the data of the third, fourth, and fifth layers are calculated. If the hidden layer does not use the activation function, the constructed BP neural network model will be a linear model, which simply can fit the data linearly and cannot have the ability to approximate the real classification function, and the activation function chosen is the Sigmoid activation function, as shown:

$$\sigma(x) = \frac{1}{1+e^{-x}} \tag{5}$$

Although there are other activation functions available, such as the Tanh and ReLU activation functions, the Sigmoid activation function is sufficient for this paper. The final output layer of the BP neural network is outputted after regression using SoftMax, as shown:

$$\text{softmax}(y_i) = \frac{e^{y_i}}{\sum_{i=0}^{3} e^{y_i}} \tag{6}$$

Where yi denotes the linear transformation value of the i-th node of the output layer of the 5th layer, and the outputs correspond to the different probability values of classifying the training data into three categories A, B and C. The BP back propagation algorithm consists of two parts. The learning method of neural network relies on exactly the above two steps. For the classification model in this paper, a training error function of the output value and the expected value needs to be defined in the forward propagation phase, and the BP neural network classification model in this paper chooses cross entropy as the cost function of the model, as shown:

$$H(p,q) = -\sum_{i=1}^{n} p(x_i)\log\left(q(x_i)\right) \tag{7}$$

For example, the correct classification target of a sample is (1, 0, 0), and the predicted answer of this model after SoftMax regression is (0.5, 0.4, 0.1), then the cross-entropy between the prediction and the correct answer is calculated as 0.3; if another model's prediction is (0.5, 0.4, 0.1), then the cross-entropy is calculated as 0.3. If the prediction of another model is (0.8, 0.1, 0.1), then the cross-entropy between this prediction and the true value is calculated to be 0.1. The smaller the value of cross-entropy, the higher the accuracy of the evaluation is proved to be. For a BP neural network with N samples, the value of the overall loss function, as shown:

$$\text{loss} = \frac{1}{N}\sum_{i=1}^{N} H(p_i, q_i)$$

$$\tag{8}$$

The goal of the BP neural network is to adjust the weight and bias values to make the loss function smaller, and to find the parameters of each neuron corresponding to the minimum value of the loss function.

3.5 Training of Neural Network

The training phase of the BP neural network is the tuning process of forward propagation process, and the gradient descent algorithm is chosen. In the gradient descent algorithm, all the training patterns are provided once, and then the corresponding weights are updated and summed up, and only then the actual weights in the network are updated. This process will be iterative until a certain stopping criterion is satisfied, and the corresponding stopping criterion is generally chosen as the number of rounds of iteration. After the derivation of the algorithm, the following equations can be used to update wi(jl), bi(l), 2 ≤ l ≤ L.

$$w^{(l)} = w^{(l)} - \alpha \frac{\partial \text{loss}}{\partial w^{(l)}} = w^{(l)} - \frac{\alpha}{N} \sum_{i=1}^{N} \frac{\partial \text{loss}_{(i)}}{\partial w^{(l)}}$$
$$b^{(l)} = b^{(l)} - \alpha \frac{\partial \text{loss}}{\partial b^{(l)}} = b^{(l)} - \frac{\alpha}{N} \sum_{i=1}^{N} \frac{\partial \text{loss}_{(i)}}{\partial b^{(l)}}$$

(9)

From equations, it is known that it is only necessary to find the bias derivatives $\frac{\partial \text{loss}}{\partial w^{(l)}}$ and $\frac{\partial \text{loss}}{\partial b^{(l)}}$ of the loss function loss(i) for each training data for the parameters to obtain the full iterative update.

4   EXPERIMENTS AND RESULTS

4.1   Experimental Setup

The experimental environment is Windows 10 operating system, the CPU model is Intel(R) Core (TM) i7-8750H@2.20GHz2.1GHz, the memory is 8G, and the algorithm is implemented by Python language based on Pytorch deep learning framework. During the experiment, 456 data were randomly selected as training data and the remaining 196 data were used as validation data in accordance with the cross-validation method, and the accuracy of the 10-validation data was taken as the average accuracy rate. The learning rate of the experimental BP neural network is set to α = 0.28, and the number of iterations is set to epochs = 1000. The reason for choosing the learning rate α = 0.28 is that under this parameter, the impact on the accuracy is low, and the iteration speed is fast, so that it can converge as soon as possible. The experimental data shows that when the number of iterations reaches roughly 800, the loss function of the model basically reaches the level of convergence, and after the model is stabilized, the model can be tested for validation data.
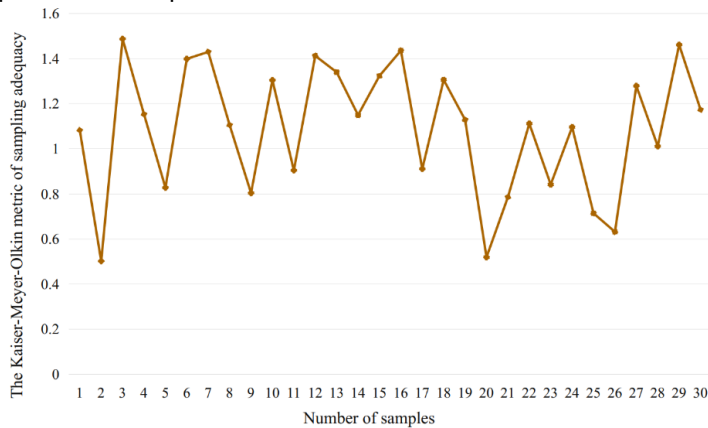
4.2   Factor Analysis Test

The prerequisite for factor analysis is a strong correlation between the variables in the original index system. KMO and Bartlett's test can effectively determine whether the 30-sample data in this paper are suitable for factor analysis. the closer the KMO statistic is to 1, the stronger the correlation of the variables, the better the factor analysis effect; the Bartlett's spherical test result can determine whether the significance is good. the SPSS The detailed results of factor analysis are shown in Table 1 and Figure 5.

KMO and Bartlett's test		
The Kaiser-Meyer-Olkin metric of sampling adequacy		0.801
Bartlett's sphericity test	Approximate cardinality	614.028
	df	153
	Sig.	0.000

Table 1: Prerequisite tests for factor analysis.

The factor analysis shows that 5.815 as the first principal component eigenvalue, 32.303% is the variance of the original variables that it can explain; 32.037% is the variance of the original variables that the second principal component can explain; the third principal component can explain 10.332%

of the variance of the original variables, and 6.889% is the variance of the original variables that the fourth principal component can explain.

**Figure 5:** Prerequisite tests for factor analysis.

In total, the first four principal components can explain 81.561% of the information of the original variables, which has good representativeness, so these four common factors are extracted.

4.3 Experimental Results

The results of the validation set test are shown in Table 2, Figure 6 and Figure 7. The comparison results with the traditional machine learning classification KNN algorithm are shown in Table 3 and Figure 8.

Number of times	Number of validation sets	Number of correct classifications	Classification accuracy rate
1	196	186	94.9%
2	196	189	96.4%
3	196	187	95.4%
4	196	187	95.4%
5	196	188	95.9%
6	196	176	89.8%
7	196	182	92.9%
9	196	192	98%
10	196	190	96.9%
Average accuracy rate			94.9%

Table 2: Experimental results of BP neural network on training data.
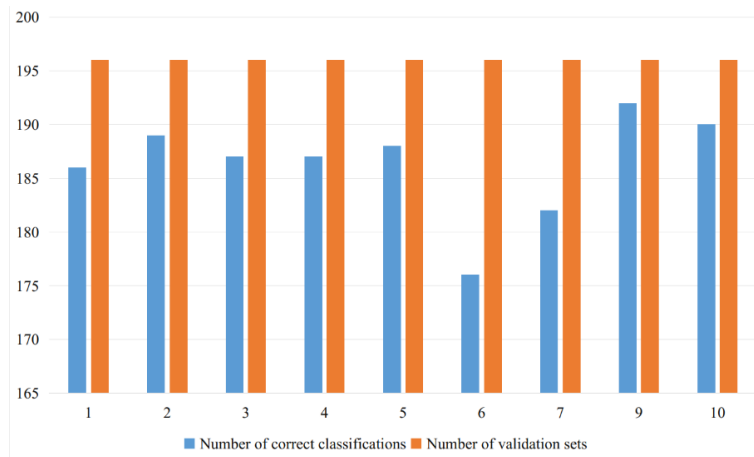
Figure 6: Number of correct classifications.
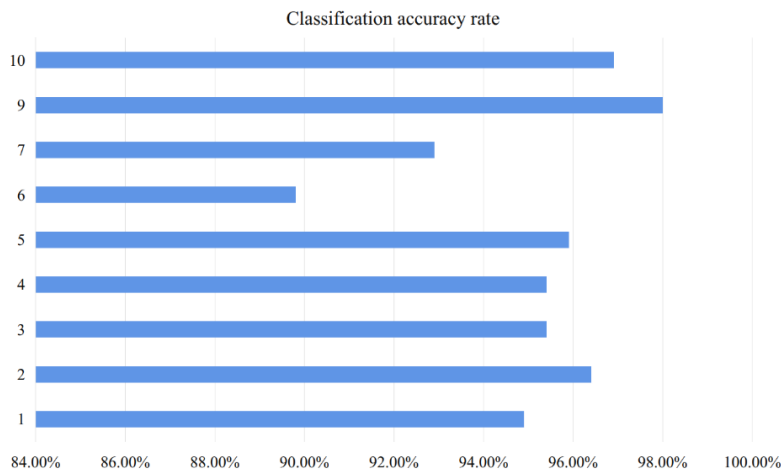
Figure 7: Classification accuracy rate.

Algorithms	Average classification accuracy
BP Neural Network	95%
KNN algorithm	86.1%

Table 3: BP neural network and KNN algorithm comparison results.

An only need to provide a small amount of expertise assistance to reach the professional level of multinational e-commerce couriers, eliminating the need for time-consuming and labor-intensive methods dedicated to assessment; on the contrary, for Class C multinational e-commerce couriers, a lot of resources are needed to cultivate foreign language, business, communication and computer levels before they can become professional multinational e-commerce couriers.

Average classification accuracy
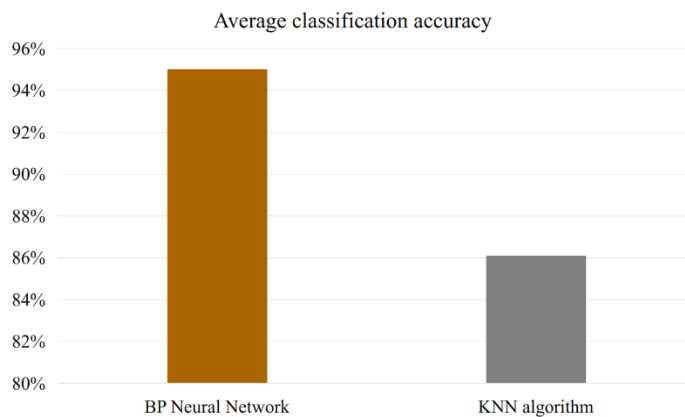
Figure 8: Algorithm flow diagram.

5   CONCLUSION

With the rapid development of China's transnational e-commerce, transnational logistics came into being in this general environment. Therefore, foreign trade enterprises have begun to pay attention to the efficiency of Cross-Country express delivery as part of business management, so as to measure the competitiveness of foreign trade enterprises' goods transactions, reduce business operating costs, and maximize profits. Through extensive literature reading and field research, this paper establishes a BP artificial neural network evaluation model to evaluate the courier risk of multinational e-commerce enterprises and provides some references and suggestions for China's multinational e-commerce enterprises after the data training and analysis process. By mining the historical data of multinational e-commerce platforms and proposing a neural network-based model and refining the rules of risk identification, as well as using hierarchical analysis to evaluate and analyze the risks faced, this paper can strengthen the control of risks of multinational e-commerce projects to a certain extent, which is conducive to the smooth implementation of the projects. In the future, we plan to carry out an empirical study on the development environment of cross-border e-commerce logistics in the context of global trade with deep neural networks.Digital marketing allows multinational e-commerce enterprises to establish and enhance their brand presence in the global market. Through effective branding strategies, including website design, content marketing, and social media management, digital marketers can help create a strong brand image and increase brand visibility. This can attract more customers and build trust, which is crucial for cross-border logistics operations.

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