Research on Optimal Model Combination of Cross-Border E-Commerce Platform Operation Relying on Robot Hybrid Algorithm

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Cross-Border E-Commerce (CBEC) has evolved significantly due to the global growth of the Internet, becoming a crucial global market. As e-commerce integrates into daily life and work, the market has transitioned from incremental growth to a more sophisticated landscape. Enhancing user conversion rates is pivotal for retail E-commerce, setting the stage for intense competition among enterprises. The swift evolution of EC has empowered users with information production and self-dissemination capabilities, reshaping traditional production and market response norms. CBEC platforms focus on user-centric operations to align with societal development. This paper explores hybrid algorithms, ultimately selecting the fuzzy analytic hierarchy process for assessing operational performance in CBEC platforms. Finally, this paper conducts empirical research, and the fuzzy comprehensive evaluation score is [82.71 79.95 78.84 79.42 83.35 82.68]. Through the mining and prediction of user consumption behavior data, we can scientifically analyze the platform operation performance, which can find high potential users and conduct accurate operation.

Povzetek: Predlagan je nov model za upravljanje čezmejnih e-trgovinskih platform, ki uporablja robotski hibridni algoritem. Model izboljšuje analizo uporabniškega vedenja ter povečuje konverzijske stopnje in operativno učinkovitost platform.

1 Introduction

Considering the fast proliferation of online users, Internet products emerge in endlessly, which has caused more and more fierce market competition. With the gradual transparency and informatization of business information, CBEC's profit space has been difficult to compare with the original, which requires CBEC to gradually establish a win-win cooperation mechanism [1-3]. Therefore, CBEC needs to continuously improve the optimal combination under different operation modes. With the gradual disappearance of the Internet traffic dividend, the user group needs to be more and more subdivided, which requires improving the user transformation stock market. Therefore, CBEC platforms must establish user thinking, which is a user centered model [4-6]. Through data driven, CBEC platforms can track user needs, which will enable refined user operations.

Pan Yong (2017) has published a paper clearly pointing out that China's CBEC has shown an oligopoly consequence, which is no longer in accordance with the needs of conventional development. Among them, the logistics mode of CBEC in China is mainly "bonded warehouse" and "direct mail", which has also been important expenditure and evidence in many regional practices. However, in practice, some regions still have some unavoidable problems, which are common problems based on China's national conditions, including high dependence on policies, lack of industry norms, lack of competitiveness, etc.

2 Related works

Extensive study has been undertaken in the field of CBEC to better understand the different aspects that influence the industry, including digital technology and customer perceptions, as well as supply chain capabilities and regulatory consequences. This section examines important studies, emphasizing their objectives, techniques, findings, and acknowledged limitations. Examining previous works highlights the strengths and flaws that the proposed study attempts to solve.

Table 1: Overview of related research at CBEC

Reference No	Objective	Methodology	Result	Limitations
[7]	Analyze the role of digital technologies and their abilities in CBEC from an RBV standpoint.	Assessment of 102 Italian enterprises in the design and furniture, fashion, and food and beverage industries.	SMEs efficiently utilize digital technology, and enterprises utilizing an e-commerce manager exhibit a stronger digital export propensity.	Restricted to enterprises in Italy and certain sectors; may not generalize to other environments.
[8]	Assess the effect of customer opinion on intention to buy in CBEC.	Structural equation modeling and intermediate impact assessment	Customer perception, confidence, and attitude have a substantial impact on intent to purchase, with risk impacting these interactions.	Concentrates mainly on customer behavior, without consideration of supply chain factors.
[9]	Determine how CBEC enterprises develop supply chain service skills to enhance the quality of relationships.	Several case study approaches using 41 semi-structured interviews, field visits, and secondary data.	Supply chain resources (data, logistics, and finance) have a vital impact on service capacity and the quality of relationships.	Data is confined to four Chinese CBEC enterprises, with the potential for differing outcomes in different areas or circumstances.
[10]	Examine the impact of the dual circulation policy on CBEC B2B export commerce during COVID-19.	System dynamics modeling and simulation of various policies and combinations.	The regulatory environment is critical for encouraging CBEC B2B exports; infrastructure, government oversight, and enterprise operation are most impacted by policy delays.	Mainly concentrates on the policy impacts in China during COVID-19; may not apply to the post-pandemic setting or other locations.
[11]	Determine key success elements for airports in CBEC logistics.	Literature review, structured interviews with industry actors, and AHP assessment.	Key factors include the capability to pre-clear e-commerce items, high airlift and land capacity, and smooth data sharing.	Particular to the air cargo industry, does not address the broader logistics concerns in CBEC.
[12]	Create an appropriate transportation path model for CBEC during COVID-19 prevention and management.	Evaluation of e-commerce logistics, environmental model, and Dijkstra algorithm for route optimization.	Compared to conventional models, this model offers shorter transportation times and improved search effectiveness.	Concentrates on transportation logistics, without considering other functional components of CBEC.
[13]	Investigate the action method and model of the CBEC	Neural network training on 24 secondary	The green supply chain model greatly enhances	Mainly investigates green supply networks in China's

	green supply chain using customer behavior.	indicators, confirmatory factor evaluation, and assessment of variance.	operational effectiveness and guides efficient profit distribution.	industrial industry, which may not apply to various CBEC scenarios.
[14]	Investigate the balance between supply chain resiliency and susceptibility in CBEC.	Empirical research on the integration of fuzzy AHP and TOPSIS algorithms.	The balance between vulnerability and resilience is crucial for optimum supply chain effectiveness.	Concentrates on the balance state without suggesting specific measures for advancement.

The examined research shed light on numerous aspects of CBEC, including digital technology adoption, customer behavior, supply chain management, legislative implications, and logistical efficiencies. Despite their contributions, many studies have limitations such as geographical focus, sector-specific assessments, and a lack of comprehensive methods to solve larger operational difficulties. The proposed study intends to build on these insights and overcome existing limits by delivering a more holistic and strong approach to improving CBEC operations, eventually establishing itself as a superior solution in the field.

2.1 Relevant theories of CBEC operation mode

2.1.1 Composition of CBEC

The industrial chain of CBEC can be divided into upstream, midstream and downstream. The CBEC platform belongs to the intermediary platform in the midstream [15-17]. Horizontally, the CBEC industry chain is composed of three parts: "operation chain, support chain and service chain" [18-20]. Each part is divided into many categories, and the whole chain tree is closely combined. The CBEC industry chain is shown in Figure 1.

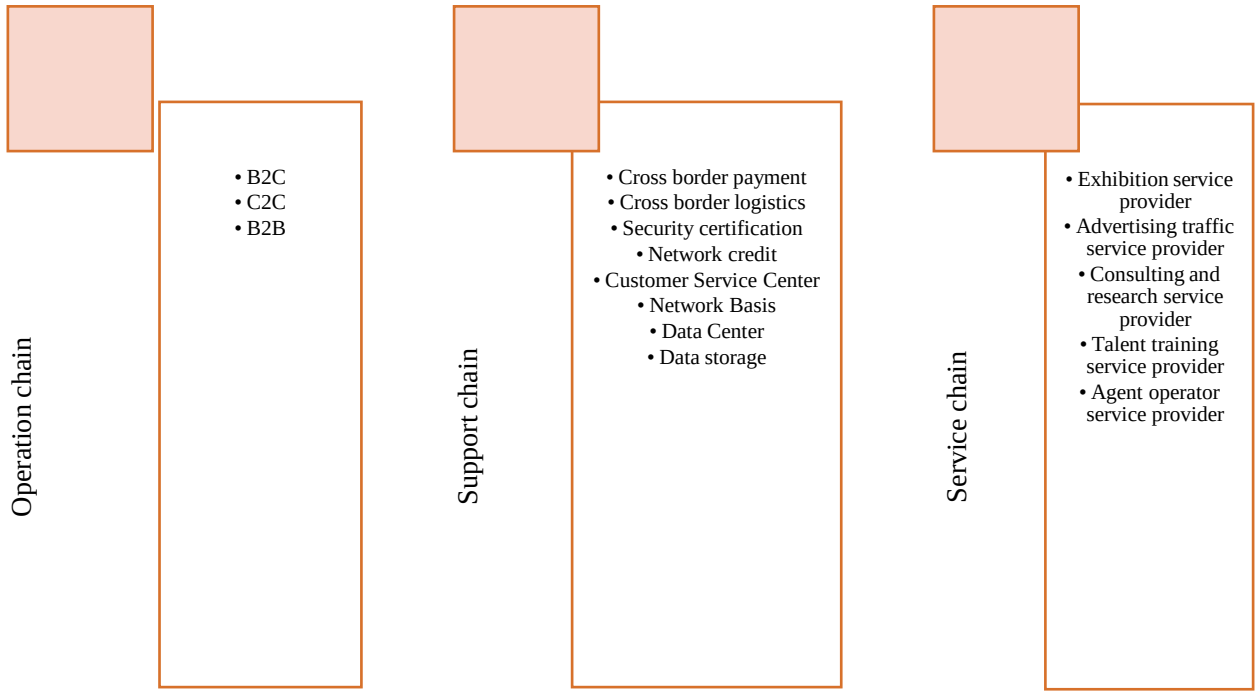

Figure 1: Cross border e-commerce industry chain

2.1.1 Elements of CBEC operation mode

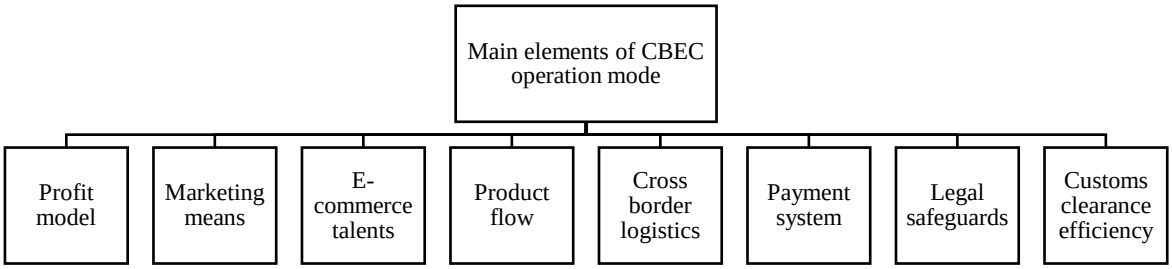

Figure 2: Elements of CBEC operation mode

The traditional operation mode is the main mode of CBEC, which is the main operation mode of EC, including operation process and operation system. Among them, the operation process is a series of business modes of input, transformation and output in CBEC's production and operation. Therefore, we can recognize the operation process of CBEC as the embodiment of labor process and value added [21-22]. However, the operation system is a means to realize CBEC's goods in the process of ownership change, which is an important way in the realization process. Because CBEC is a transnational operation mode, the requirements for the operation mode are higher than those for domestic ECs. Therefore, CBEC needs to constantly improve the level of international logistics transportation, which also needs to increase the security guarantee of payment [23-25]. At the same time, we need to build a comprehensive CBEC operation system, which will comprehensively explore the optimization strategy of CBEC operation mode. This paper constructs the elements of CBEC operation mode, as shown in Figure 2.

2.1.3 Market environment of CBEC platform

In recent years, B2C cross-border EC has a good development trend. At present, China's EC is no longer limited to traditional commodity trading, which has carried out multi-industry integration based on "Internet plus". With the development of "Internet plus", traditional enterprises have gradually reformed with the market prospect, which has initially adapted to the current EC market [26-27]. Regarding the fast expansion of online technologies, short video, live broadcast, knowledge community and other industries have successfully formed typical CBEC with Taobao, JD and Pinduoduo, which has also driven the fast rise of the actual industry. With the development of CBEC, China's industry transformation and upgrading has grown into an essential factor. According to the China CBEC market data report in 2021, the scale of China's CBEC reached 14.2 trillion yuan, which has made

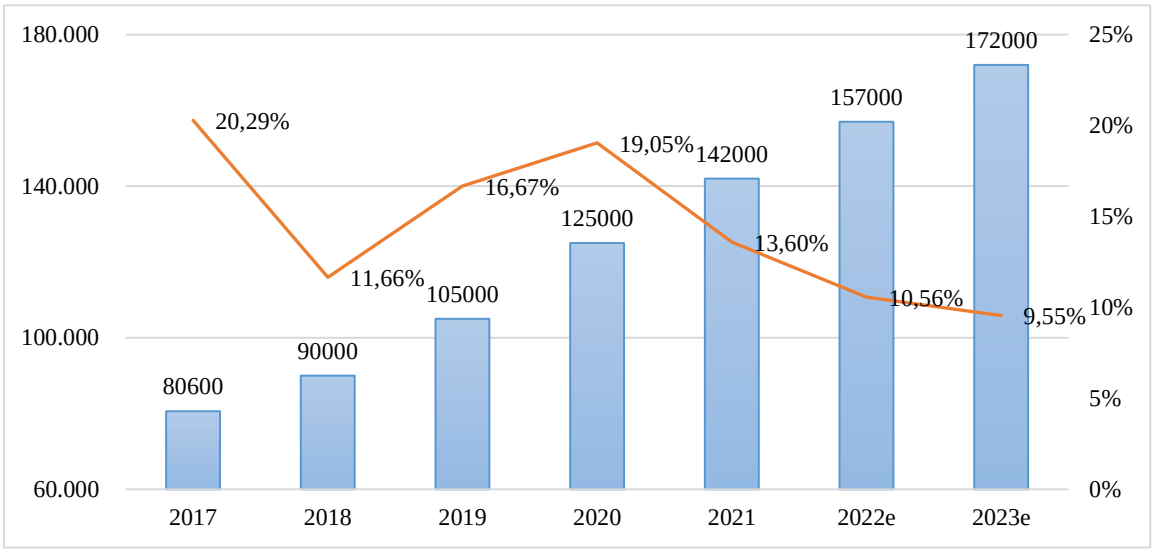

Figure 3: China's CBEC market data and forecast

important progress. In this research forecasts the data in 2022 and 2023 according to the gray prediction GM (1,1) though the Matlab, and the detailed results are shown in Figure 3.

2.2 Performance evaluation method of CBEC platform

Fuzzy analytical hierarchy process: Fuzzy Analytic Hierarchy Process (FAHP) is a new performance analysis theory formed by combining fuzzy analysis method and AHP 50. Professor Saaty's method of quantifying evaluation indicators. FAHP is an analytic hierarchy process with simple calculation and rigorous structure, which is suitable for solving structural decision-making problems. The biggest difference between the basic steps of FAHP and AHP is the improvement of reliability. By comparing the influencing factors, we can determine the importance of the two elements according to the evaluation scale. FAHP can decompose the internal analysis of the objective problem hierarchically, which will form a three-layer network structure, including the objective layer, the criterion layer and the sub criterion layer. FAHP is a way to reflect the performance of the target level through the fuzzy evaluation value of each level, which can be used as the performance evaluation of the fuzzy field.

2.2.1 FAHP model construction

Fuzzy AHP is the improvement of AHP, which can be divided into six steps.

First, determine the overall objective of performance evaluation.

Second, build a multi-level evaluation system. By determining the indicator elements, we can build a multi-level evaluation system model. The model architecture diagram is shown in Figure 4.

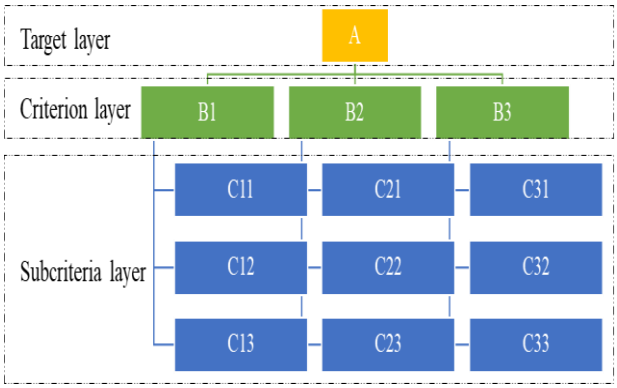

Figure 4: FAHP Model Framework

Third, form a judgment matrix. By comparing the indicator elements in pairs, we can calculate the importance of the corresponding indicator elements. According to the selected scale, we can get the corresponding judgment value. This paper analyzes the $a_1, a_2, ..., a_n$ comparison between the corresponding n elements, as shown in Table 2.

Table 2: Index comparison results

	a_1	a_2	…	a_n
a_1	a_{11}	a_{12}	…	a_{1n}
a_2	a_{21}	a_{22}	…	a_{2n}
…	…	…	…	…
a_n	a_{n1}	a_{n2}	…	a_{n3}

Therefore, we can get the fuzzy matrix of each index of element A, as shown in Formula 1.

$$A = \begin{bmatrix} a_{11} & a_{12} & \ldots & a_{1n} \\ a_{21} & a_{22} & \ldots & a_{2n} \\ \ldots & \ldots & \ldots & \ldots \\ a_{n1} & a_{n2} & \ldots & a_{n3} \end{bmatrix} \quad (1)$$

Among them, the importance of index element i to index element j is a_{ij} , it can be concluded that the fuzzy judgment matrix of order n is $(a_{ij})_{n\times n}$, where i and j are arbitrary integers to n.

Fourth, the weight calculation of fuzzy judgment matrix. According to the matrix, we can judge the properties of its matrix, so we can choose the weight calculation method. Among them, the least square method is the most

widely used method for weight calculation. Therefore, the weight calculation formula of the fuzzy judgment matrix is shown in Formula 2.

$$w_i = \left(\sum_{j=1}^{n} a_{ij} + n/2 - 1\right) \Big/ n(n-1) \tag{2}$$

Among them, the importance of index element i to index element j is a_{ij} , w is the weight calculation. Therefore, we can calculate the weight value $W = [w_1, w_2, ...w_n]$ of the elements of this layer relative to the elements of the upper layer. At the same time, $w_{ij} = w_i - w_j + 0.5$.

If the upper element A contains several single factor B, we can get the single factor judgment matrix, as shown in Formula 3.

$$B = \begin{bmatrix} b_{11} & b_{12} & \cdots & b_{1n} \\ b_{21} & b_{22} & \cdots & b_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ b_{n1} & b_{n2} & \cdots & b_{n3} \end{bmatrix} \tag{3}$$

Fifth, consistency inspection. The weight matrix W of fuzzy judgment matrix A shall meet the judgment of formula 4.

$$CI(A,W) = \frac{1}{n^2 \sum_{i=1}^{n} \sum_{j=1}^{n} \left| a_{ij} - w_{ij} \right|} \le a \tag{4}$$

If Formula 4 is satisfied, the consistency check can be passed. The smaller the value of a is, the higher the consistency requirement of the analysis on the fuzzy matrix is. According to the relevant literature, the value of a is usually 0.1.

Sixth, evaluation calculation. Evaluation calculation is a visual evaluation of performance evaluation, which is to find out the main factors affecting performance. If the criterion layer has i layer, the index layer is generally evaluated and calculated first. After obtaining the first level evaluation result C_i of an indicator, we can obtain the evaluation result C of each indicator of the inner layer. The specific evaluation method is shown in Formula 5.

$$Q = \begin{bmatrix} Q_1 \\ Q_2 \\ \cdots \\ Q_n \end{bmatrix} = \begin{bmatrix} q_{11} & q_{12} & \cdots & q_{1n} \\ q_{21} & q_{22} & \cdots & q_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ q_{n1} & q_{n2} & \cdots & q_{n3} \end{bmatrix} \tag{5}$$

Amongthem, $Q_i = W_i B_i$.

According to the internal evaluation results, we can evaluate the final index factors, as shown in Formula 6.

$$E = WQ = W \begin{bmatrix} W_1 B_1 \\ W_2 B_2 \\ \cdots \\ W_i B_i \end{bmatrix} = \begin{bmatrix} e_1 & e_2 & \cdots & e_n \end{bmatrix} \tag{6}$$

Among them, e_n is the final benefit value of the n-th influencing factor, which is the final basis for performance comparison of the evaluation object.

2.3 Construction of performance evaluation system and index screening

The construction of indicator evaluation system is the core part of CBEC operation performance evaluation.

Table 3: Assessment table of evaluation index importance scores

Score	Importance	sketch
1	Extremely unimportant	It will not affect the performance appraisal
2	Unimportance	Less important
3	Commonly	Average impact
4	Important	The impact is relatively large, which is used as the boundary of whether the indicators are included in the evaluation system
5	Very important	Performance appraisal is very important

In this paper, the indicator system is mainly based on the scientific, comprehensive and practical principles to choose the field research model. At the same time, this paper also uses questionnaires to consult experts in the field of CBEC research. At the same time, this paper has

formulated the score of the importance of the evaluation index, as shown in Table 3.

2.4 Screening of CBEC performance evaluation indicators

For this CBEC performance evaluation, 120 questionnaires were issued for expert confirmation, 114 were recovered, and 112 were valid.

The effective questionnaire was treated as invalid when it was sorted out.

The effective questionnaire rate was 93.33%. Through the expert confirmation questionnaire, this paper obtains the scoring statistics table, as shown in Table 4.

Table 4: Scoring statistics of experts selected for evaluation indicators

Target layer	Criterion layer	Sub standard layer	Score
Performance evaluation indicators of CBEC operation A	Basic conditions	Support CBEC policies	4.86
		Modernization level of network facilities	4.72
		Proportion of cross-border online shopping of electronic goods	4.16
		Number of online trading platforms	3.72
	Logistics Huitong	Distribution mode of overseas warehouses	4.35
		Distribution of overseas logistics outlets	4.46
		Cargo tracking capability	4.60
		Diversification of transportation modes	3.28
	Early investment	Overseas land lease investment	4.68
		Overseas channel development cost	4.49
		Overseas recruitment and training expenses	4.35
		Financing costs	3.99
	E-commerce operation	Administrative expenses	4.26
		selling expenses	4.39
		Financial expenses	4.52
		Technical improvement cost	3.14
	Sales link	Revenue growth rate	4.70
		Sales profit margin	4.58
		Return on net assets	3.80
		ROI	4.16
	After-sale service	Customer satisfaction	4.38
		Customer retention rate	4.32
		Transportation damage rate	3.87
		Market influence	4.25

According to the data in Table 4, some scores are lower than 4.00. According to the score requirements for the importance degree of the evaluation indicators in Table 3, we can think that it has not formed a significant impact on the evaluation results of CBEC operation performance. Therefore, this paper believes that relevant options should be eliminated, which can get the final filtering results, as shown in Figure 5.

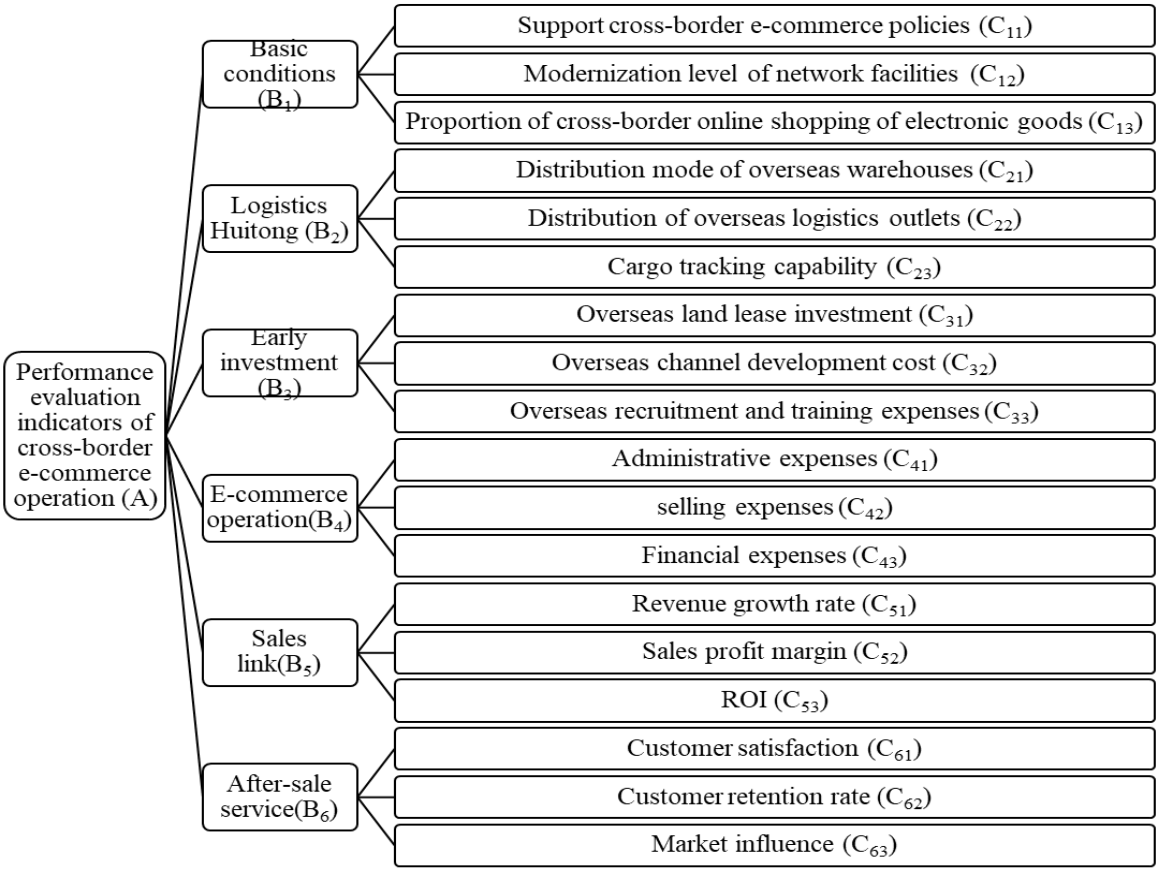

Figure 5: Screening results of CBEC performance evaluation indicators

2.5 Empirical analysis of CBEC platform performance

Data sources: The data collection of this study is divided into two parts. The first part is the construction and weight determination of each evaluation index, and the second part is the field research on CBEC.

First, through the construction of the CBEC operation performance evaluation system, this paper combines the actual research needs to design the index weight questionnaire. At the same time, this paper uses the Delphi method to invite experts to score the index weight. Through the comparison of results, the judgment matrix table is obtained in this paper, as shown below.

$$A=\begin{bmatrix} 1 & 2 & 1/2 & 1/2 & 1/3 & 1/2 \\ 1/2 & 1 & 1/2 & 1/2 & 1/2 & 1 \\ 2 & 2 & 1 & 1/2 & 1/2 & 2 \\ 2 & 2 & 2 & 1 & 1 & 2 \\ 2 & 2 & 2 & 1 & 1 & 3 \\ 2 & 1 & 1/2 & 1/2 & 1/3 & 1 \end{bmatrix} \quad (7)$$

Criterion layer index: Using MATLAB software, this paper calculates the eigenvector of matrix index. Through Formula 2, we can obtain the corresponding weights of the six indicators of this layer. At the same time, according to Formula 4, we can calculate the CI value of the consistency check of the matrix. The specific results are shown in Table 5.

Table 5: Criterion layer index weight result

Criterion layer	Feature vector	Weight value	CI
Basic conditions (B_1)	0.66	10.1%	0.037
Logistics Huitong (B_2)	0.63	9.6%	
Early investment (B_3)	1.12	17.1%	
E-commerce operation (B_4)	1.59	24.2%	
Sales link (B_5)	1.82	27.7%	
After-sale service (B_6)	0.74	11.3%	

When the CI value is less than 0.1, we can judge that the matrix can pass the consistency test, which can judge that the result is acceptable. Therefore, we can get the weight result, as shown in the matrix results below.

$$w = [0.101 \quad 0.096 \quad 0.171 \quad 0.242 \quad 0.277 \quad 0.113] \tag{8}$$

Through the above method, this paper can calculate the weight of each indicator in the whole CBEC operation evaluation indicator system w_i, as shown in the matrix results below.

$$\begin{aligned} w_1 &= [0.542 \quad 0.317 \quad 0.141] \\ w_2 &= [0.365 \quad 0.243 \quad 0.392] \\ w_3 &= [0.581 \quad 0.262 \quad 0.156] \\ w_4 &= [0.515 \quad 0.252 \quad 0.233] \\ w_5 &= [0.503 \quad 0.325 \quad 0.173] \\ w_6 &= [0.371 \quad 0.449 \quad 0.180] \end{aligned} \tag{9}$$

So, we ca get the corresponding weight set w, as shown in the matrix results below.

$$w = \begin{bmatrix} 0.542 & 0.317 & 0.141 \\ 0.365 & 0.243 & 0.392 \\ 0.581 & 0.262 & 0.156 \\ 0.515 & 0.252 & 0.233 \\ 0.503 & 0.325 & 0.173 \\ 0.371 & 0.449 & 0.180 \end{bmatrix} \tag{10}$$

Score of comprehensive performance evaluation: According to the fuzzy comprehensive evaluation of the sub criteria layer, the fuzzy judgment matrix Q of the above six indicators can be obtained in this paper, which can calculate the evaluation value of the single factor of the criteria layer, as shown in the matrix results below.

$$Q_1 = \begin{bmatrix} 0.341 & 0.185 & 0.236 & 0.207 & 0.031 \\ 0.283 & 0.325 & 0.223 & 0.119 & 0.050 \\ 0.113 & 0.125 & 0.173 & 0.441 & 0.147 \end{bmatrix} \tag{11}$$

$$Q_2 = \begin{bmatrix} 0.066 & 0.254 & 0.549 & 0.081 & 0.050 \\ 0.118 & 0.110 & 0.203 & 0.457 & 0.112 \\ 0.052 & 0.129 & 0.166 & 0.519 & 0.135 \end{bmatrix} \tag{12}$$

$$Q_3 = \begin{bmatrix} 0.076 & 0.227 & 0.548 & 0.093 & 0.056 \\ 0.052 & 0.172 & 0.684 & 0.077 & 0.015 \\ 0.080 & 0.138 & 0.121 & 0.471 & 0.190 \end{bmatrix} \tag{13}$$

$$Q_4 = \begin{bmatrix} 0.025 & 0.114 & 0.391 & 0.347 & 0.123 \\ 0.047 & 0.114 & 0.575 & 0.175 & 0.088 \\ 0.033 & 0.148 & 0.291 & 0.470 & 0.058 \end{bmatrix} \tag{14}$$

$$Q_5 = \begin{bmatrix} 0.196 & 0.403 & 0.305 & 0.046 & 0.050 \\ 0.234 & 0.329 & 0.310 & 0.099 & 0.029 \\ 0.028 & 0.115 & 0.470 & 0.308 & 0.078 \end{bmatrix} \tag{15}$$

$$Q_6 = \begin{bmatrix} 0.170 & 0.110 & 0.356 & 0.304 & 0.060 \\ 0.141 & 0.440 & 0.361 & 0.053 & 0.006 \\ 0.158 & 0.453 & 0.336 & 0.004 & 0.050 \end{bmatrix} \tag{16}$$

Therefore, we can calculate the fuzzy evaluation value of the single factor basic conditions of the criterion layer, as shown in the matrix below.

$$E = WQ = W\begin{bmatrix} Q_1 \\ Q_2 \\ \cdots \\ Q_n \end{bmatrix} = \begin{bmatrix} 0.235 & 0.209 & 0.210 & 0.286 & 0.061 \\ 0.075 & 0.201 & 0.418 & 0.258 & 0.048 \\ 0.055 & 0.150 & 0.498 & 0.218 & 0.079 \\ 0.038 & 0.234 & 0.396 & 0.294 & 0.037 \\ 0.146 & 0.296 & 0.345 & 0.173 & 0.040 \\ 0.114 & 0.296 & 0.364 & 0.198 & 0.028 \end{bmatrix} \quad (17)$$

According to the questionnaire, this paper develops the score of the comment set, as shown in T. Among them, T={Excellent, good, average, poor}. At the same time, we assign T, T=[100 90 80 70 60].

$$M = ET = \begin{bmatrix} E_1 \\ E_2 \\ \cdots \\ E_6 \end{bmatrix} T = \begin{bmatrix} 0.235 & 0.209 & 0.210 & 0.286 & 0.061 \\ 0.075 & 0.201 & 0.418 & 0.258 & 0.048 \\ 0.055 & 0.150 & 0.498 & 0.218 & 0.079 \\ 0.038 & 0.234 & 0.396 & 0.294 & 0.037 \\ 0.146 & 0.296 & 0.345 & 0.173 & 0.040 \\ 0.114 & 0.296 & 0.364 & 0.198 & 0.028 \end{bmatrix} \times \begin{bmatrix} 100 & 90 & 80 & 70 & 60 \end{bmatrix} = \begin{bmatrix} 82.71 \\ 79.95 \\ 78.84 \\ 79.42 \\ 83.35 \\ 82.68 \end{bmatrix} \quad (18)$$

He distribution of fuzzy comprehensive evaluation scores is relatively centralized, which indicates that all indicators are at the edge of a good state, and the development level of each stage is relatively balanced. Based on the empirical results and specific comprehensive evaluation values, this paper draws the overall performance results of the evaluation system, as shown in Figure 6.

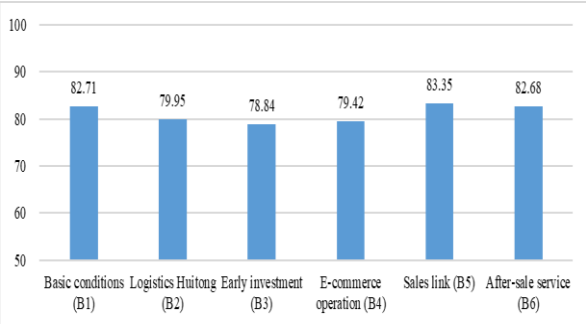

Figure 6: Overall performance results of the evaluation system

2.6 Optimization of CBEC operation mode

Expand product flow: The development of CBEC has a high demand on the product supply chain, which requires the platform to cover multiple high-quality goods. At the same time, e-commerce platforms should have various basic information about products, which will be more convenient for consumers to search. By listing the product categories and comparing the prices, the platform can provide consumers with choices, which can also standardize the launch and promotion of products. The domestic manufacturers of imported substitutes have a certain stimulating effect, which does not constitute the main factor but assists in enhancing national manufacturing structures through supply side reform. Therefore, expanding the product Circulation will be an advantageous factor in guiding and benefiting the enlargement of global free trade. At the same time, the platform should be strictly audited when merchants enter, which requires improving the basic information of commodities, including information overview, sales volume, popularity and collections. At the same time, the platform side should give more consideration to how to improve the customer price, the number of orders placed by platform users and the frequency of purchase, which become the key factors that need to be paid attention to in platform operation.

Improve platform user loyalty: In the CBEC mode, imported overseas goods reduce the cost of intermediaries to a certain extent, which is lower than the price of retail goods imported through traditional channels. Therefore, many people have become CBEC customers, which can be purchased through import platforms. Therefore, the price of imported goods is an important factor affecting the operation of CBEC import platforms, which will have far-reaching effects for owners of platforms. While doing so, the decline in the price of a single commodity will reduce the transaction amount of the platform operation, which requires the platform to consider how to improve the customer unit price, order quantity and purchase frequency. However, with the rapid development of CBEC import platform operation, competition will become increasingly fierce. Therefore, the commodity advantages of CBEC import will gradually disappear in the future, which requires accurate grasp of consumer demand. By improving consumers' loyalty to the platform, the platform can lock in loyal users. Therefore, the platform operator should strengthen the rights and interests of application platform members, which can improve the loyalty of platform users.

Improve and optimize the logistics system: The development of CBEC has had a great impact on cross-border logistics. The lagging development of logistics will greatly limit the development of CBEC, which requires us to constantly improve the cross-border logistics system. First of all, the Chinese government should support and introduce policy support to optimize logistics, which can attract more capital investment.

Through communication with foreign governments, we can jointly formulate bilateral strategies that encourage the growth of international supply chain management, which can make it easier for capital forces to build infrastructure. Second, cross-border logistics enterprises should follow the development of art and machinery, which requires the construction of cross-border logistics information based on Internet technology. Through computer technology, cross-border logistics enterprises can strengthen the development of logistics system, which can continuously transmit information in the operation process. By building an information-based logistics system, CBEC can reflect the process of receipt, transportation, warehousing, settlement, etc. in real time, which will directly reflect the operation capability of the platform. Third, CBEC develops overseas warehousing business, which can not only expand business, but also reduce transportation costs. Through the rational use of overseas warehouses, CBEC can effectively shorten the delivery time, which can not only improve customer satisfaction, but also deal with customer returns and exchange.

Strengthen the cultivation of CBEC talents: Cross border e-commerce is a new industry. Therefore, the lack of talents has emerged as a crucial method for restrict the development of CBEC. We can cultivate CBEC talents in the following ways. First, the government should strengthen the CBEC talent training program. By designating CBEC training institutions, relevant units can carry out large-scale CBEC training, which can improve talent training. Second, all kinds of training institutions should increase their investment in training CBEC talents, which can be carried out through a variety of training or activities, including knowledge, skills, business, service competitions, etc. Third, CBEC enterprises should increase publicity, which can better obtain the recognition of talents participating in CBEC. a lot of universities and colleges in China have set up e-commerce talent training courses, and these talents have mastered basic e-commerce theoretical knowledge after completing their professional studies. Targeted training of professional agricultural e-commerce talents can shorten the time of on-the-job training of enterprises, which will reduce the trial and error cost of personnel training. Fourth, relevant practitioners should strengthen the cultivation of knowledge and ability, which can continuously strengthen personal quality. The premise of talent return is to improve the follow-up security, and it can only become a reality after cutting off all the life concerns of the outflow talents.

Solve the problem of tax refund: Improving the export tax rebate policy will directly affect the operation and development of CBEC enterprises. By combining preferential tax policies with CBEC operations, CBEC enterprises can effectively reduce costs, which can also promote industrial transformation and upgrading. First, the General Administration of Customs of China should give full play to its regulatory advantages over bonded areas. Through communication and cooperation with CBEC enterprises, China can allow CBEC enterprises to import commodities in bulk into bonded warehouses for storage. Second, customs clearance is carried out after sales on the CBEC platform, which reduces the logistics cost of cross-border goods. By shortening the logistics time of goods, we can enable consumers to receive goods more quickly. Third, establish a green channel for cross-border direct purchase, which can provide consumers with a high-quality online shopping environment. Through the green channel, we can make tax collection and supervision faster.

Establish and improve the credit system: CBEC is a virtual shopping mode based on the Internet, which is a consumption situation based on the credit system. Therefore, CBEC's credit rating is a model based on consumers' trust in the platform, which is an important key standard for consumers to choose. Therefore, CBEC has high requirements for proprietary goods, mainly to maintain consumers' trust in the platform. Therefore, the platform will conduct credit rating on merchants, which is a mode to reduce the number of customers entering the platform. Through credit evaluation, CBEC can strengthen the construction of credit system. At the same time, CBEC will regularly maintain the development of enterprises according to the credit level of the merchants, which will regularly release blacklists, enterprise certification, payment information, etc. For the operation of CBEC import platform, government biggest influence comes from policy. Through the improvement and accumulation of experience in the pilot practice, it can be concluded that the regulatory policy is more consistent with the applicable scenario of CBEC imported goods. CBEC shall jointly establish a public information service platform to release CBEC's identity information, commodity information and commodity logistics information., Similarly, we will greatly stimulate market confidence and promote the follow-up action of the capital market. At the same time, CBEC can conduct more scientific information investigation and management system by establishing a third-party credit system. Consumers can check the credit of various businesses on CBEC, which will become an important guarantee for consumption.

Improve third-party payment: CBEC trading is a kind of commodity trading behavior based on the Internet. Therefore, online payment is an indispensable part of CBEC transactions, which is an important part of commodity exchange. Online payment is an Internet finance, which needs to ensure the security of online payment. This can be done through the following steps. First, financial institutions vigorously support third-party payment, which can make it safer for Bianjie2 to carry out cross-border payment business. Through various financial means, CBEC can enhance electronic payment for cross-border business.

Statistical analysis

The study that evaluated tailored support networks and treatments for teenage mental health in the context of the COVID-19 pandemic's educational effects included Analysis of Variance (ANOVA) techniques, which is indicative of a more general shift in research approaches. This is demonstrated by the equation (19) that governs the Research on E-Commerce Platform Operations that Leverage an Optimal Model Hybridization of Robots, where creative solutions are being investigated to adjust to the changing educational environment following the global health crisis.

$$\begin{cases} N: \mu_1 = \mu_2 = \cdots . = \mu_o \\ N_1: \mu_1 \neq \mu_2 \neq \cdots . \neq \mu_o \end{cases} \quad (19)$$

The ANOVA is used to divide the variance of all data into two groups: within-group variance and between-group variance.

$$SST = SSB + SSW \quad (20)$$

Calculating SSB involves:

$$SSB = \frac{1}{O-1} \sum_{m=1}^{O} c_m (t_m - \bar{t})^2 \quad (21)$$

Here, v_z define the number of samples of cluster z_{th}represents the cluster's mean, and $\bar{y}$ represents the cluster's average.

$$SSW = \frac{1}{(o-1)y} \sum_{m=1}^{o} \left(\sum_{a=1}^{y} \left(t_{m,a} - t_m \right)^2 \right) \quad (22)$$

Equation (23) describes how the F-statistic is created to test the hypothesis, where $y_{z,s}$denotes the s_{th} sample of the z_{th} group.

$$K = \frac{SSB}{SSW} \quad (23)$$

The two-way analysis of variance (ANOVA) was used for statistical analysis within the context of the research on the Best Models to Use Together for an E-Commerce Platform on a Global Scale a Robot Hybrid Algorithm, with the level of significance set at $P = 0.04$. Users just need to look at the mean and standard deviation (SD) values to see how effective the recommended algorithm is in forecasting the behaviour of teenagers.

3 Discussion

The study uses a robotic technology in cross-border e-commerce platforms reveals the varying opinions from international and local authors. Although 70% of respondents reported success incorporating robotic technology, 30% voiced misgivings, believing that the procedures in place are already effective without it. This highlights the need for considering diverse perspectives when assessing the collision of technology on e-commerce. International authors highlight the challenges of adjusting and the need for ongoing technological adaptability, while local authors focus on legal frameworks, data privacy, security, and potential worker displacement. A comprehensive strategy is essential for sustainable and ethical use of robotic technology, considering both technical advancements and social ramifications. The study provides valuable insights into robotic technology and the best mix of models for running an international online store using a Robot Hybrid Algorithm. However, the study's limitations, such as the need for further exploration into specific challenges and ethical considerations, warrant careful consideration in future research and policy development.

4 Conclusion

As the web evolves, we have entered a new era; the market in all directions is gradually saturated. Users have become the resources that enterprises are competing for. The importance of user growth is growing. The operation mode of CBEC serves a critical part in CBEC's growth as a company. In light of past purchasing patterns of some users of a famous domestic e-commerce platform, a set of performance algorithm for the optimal model of CBEC platform operation with robot hybrid algorithm is built. This research has developed a new e-commerce evaluation index system for new agricultural operators, and completed e-commerce performance evaluation using the index system. Finally, this paper conducts empirical research, and the score of fuzzy comprehensive evaluation is [82.71 79.95 78.84 79.42 83.35 82.68]. Through the mining and prediction of user consumption behavior data, we can scientifically analyze the platform operation performance, which can find high potential users and conduct accurate operation. The results of our study indicate that successful robotic technology integration in international online marketplaces is viewed favorably. however, the varied viewpoints and limitations highlight the need for a comprehensive and nuanced approach that takes into account both ethical and technical challenges in order to promote sustainable and ethical advancement in this ever-changing landscape.

Data availability

All data are included within the article.

Conflicts of interest

The authors declare no conflicts of interest.

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(3) Zhumadian philosophy and social science planning project, research on the path of rural e-commerce Promoting Rural Revitalization in the post poverty era, 21L007.
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