Analysis of Factors Affecting the Operational Efficiency of Cross-Border E-Commerce Platforms Using AIGC

Jin Kuang[1*], Yiwen Ding[1a], Tse-Chen Chang[2b]

[1]Zhejiang International Studies University, Hangzhou, Zhejiang, 310023, China
[2]Sun Yat-sen University, Zhuhai, Guangdong, 519000, China

*Corresponding author's email: kj@zisu.edu.cn

a18721187008@163.com, bbobchang1982@gmail.com

Abstract. With the release of chatGPT by OpenAI on November 30, 2022, the topic of artificial intelligence has once again become a global hotspot. AIGC (Artificial Intelligence Generated Content), as one of the contents of artificial intelligence, has begun to be widely used in all walks of life. As a frontier for the trial of high-tech, the cross-border e-commerce industry has become more closely integrated with AIGC in recent years, and many cross-border companies have invested in the research and development of AIGC functions. The emergence of technologies such as digital humans, AI customer service, and AI website building has enabled more efficient and intelligent trade. In this paper, it took AIGC as the research object, and through distributing questionnaires to cross-border operation workers, explore the factors that affect the use of AIGC on the operational efficiency of cross-border e-commerce platforms, so as to put forward some reasonable suggestions for cross-border e-commerce companies that are using AIGC.

Keywords: AIGC, Cross-border e-commerce, Operational efficiency, Influencing factors

1 Introduction

With the continuous development of internet technology, the application scope of artificial intelligence has become more and more extensive, covering almost all industries. According to the artificial intelligence technology maturity curve released by Gartner in 2023, among the many artificial intelligence technologies, technologies such as generative AI, synthetic data and edge AI, which are in the expectation expansion period, are expected to reach their peak in the next 2-5 years[1]. This means that in the future, we can expect further breakthroughs and maturity of artificial intelligence technologies in these fields. Under this trend, AIGC has gradually become a new form of leading content production. By using artificial intelligence technology, especially generative AI, we can generate diversified content such as text, images, audio and video in a more efficient way. The application of this technology makes the content creation process

G. M. Lee et al. (eds.), *Proceedings of the 2025 4th International Conference on Bigdata Blockchain and Economy Management (ICBBEM 2025)*, Advances in Intelligent Systems Research 195,
https://doi.org/10.2991/978-94-6463-742-7_32

more automated and intelligent, while also improving the quality and diversity of content. In addition, with the continuous penetration and application of general large models, the innovation will extend from content to new tools and new needs[2]. This will bring more opportunities and possibilities to people, promote the integration of creativity and technology, and create a richer and more diverse content field.

In the field of cross-border e-commerce, the trend of combining artificial intelligence technology with the cross-border e-commerce industry is becoming increasingly obvious. In recent years, many artificial intelligence companies have begun to conduct large-scale financing in the cross-border field and invested huge resources in the research and development of artificial intelligence technology. This makes cross-border transactions more frequent and convenient. With the help of artificial intelligence technology, cross-border e-commerce platforms can achieve more efficient supply chain management, intelligent customer service and personalized recommendations, to improve user experience and operational efficiency. With the continuous development and application of artificial intelligence technology, the cross-border e-commerce industry will have more innovations and opportunities[3][4].

This study will start from a practical perspective, integrate the application forms of AIGC in the field of cross-border e-commerce, use questionnaires to understand the relationship between AIGC and cross-border e-commerce platform operations, and explore the factors affecting the use of AIGC on the operational efficiency of cross-border e-commerce platforms. Finally, some reasonable suggestions are put forward for cross-border e-commerce companies. This study promotes the in-depth integration of AIGC technology and the cross-border e-commerce industry, bringing new thinking and development directions to cross-border e-commerce companies.

2 Research Design

2.1 Methods

Literature Review. This study has sorted out and summarized the connotation of AIGC, research on AIGC-related application fields, and research on cross-border e-commerce operations by reading relevant literature at home and abroad[5]. It not only provides a theoretical basis and thinking perspective for the questionnaire design in this article, but also provides a certain theoretical basis for subsequent researchers in related fields.

Questionnaire Survey. Through the induction and conclusion of relevant domestic and foreign literature, a questionnaire on "the influencing factors of the use of AIGC on the operation of cross-border e-commerce platforms" was designed. The platform operators of cross-border e-commerce companies were taken as the main interviewee group[6]. According to the collected questionnaire data, the application of AIGC in the field of cross-border e-commerce operations and the specific impact it produced were analyzed and summarized.

Quantitative Analysis. Quantitative analysis refers to an observation method and approach to analyzing the characteristics, relationships, and changes between the quantities of social phenomena, which can effectively reveal the relationships between phenomena and the development trends of phenomena. In this paper, relevant data through questionnaire surveys was collected, then organized the data into groups to draw relevant conclusions.

2.2 Research Variables and Hypotheses

Research Variables. AIGC, as a cutting-edge artificial intelligence technology, has a wide range of functional characteristics that endow it with powerful application potential. Based on its rich functions, AIGC is defined as having four attributes: visuality, interactivity, innovation, and convenience[7]-[9]. This study started from a practical perspective and selected four key variables - AIGC visuality, AIGC interactivity, AIGC innovation, and AIGC convenience, to carry out a reasonable questionnaire design[10].

Research Hypothesis. The previous article briefly explained the four characteristics of AIGC. Each characteristic has different values in practical applications. In order to further explore the impact of these characteristics, this article proposes the following hypothesis:

H1: AIGC visuality positively affects cross-border e-commerce operational efficiency

H2: AIGC interactivity positively affects cross-border e-commerce operational efficiency

H3: AIGC innovation has a positive impact on cross-border e-commerce operational efficiency

H4: AIGC convenience positively affects cross-border e-commerce operational efficiency

The independent variables of this study include AIGC visuality, AIGC interactivity, AIGC innovation, and AIGC convenience. The dependent variable is the cross-border operation effect, based on which a targeted questionnaire was designed.

2.3 Questionnaire Design and Sample Data

Questionnaire Design. The first part of the questionnaire sets demographic-related questions, including basic questions such as the gender, age, education level, and years of work of the respondents. The second part is a scale question designed for the four variables. Each question has five levels: “strongly disagree”, “disagree”, “average”, “agree”, and “strongly agree”, corresponding to five scores of 1-5. The third part is a scale question formulated as an evaluation indicator of the application effect of AIGC, and five degree options are given for specific questions[11]-[13]. As shown in Table 1.

Table 1. Questionnaire settings.

Variable Name	Question Number	Question
AIGC Visuality	A1	The visual content (such as images, videos, charts, etc.) generated by AIGC technology significantly improves the display effect, thereby improving work efficiency.
	A2	AIGC automatically generates visual materials that help save design and production time.
	A3	Visual content generated using AIGC technology can accurately convey information and attract target audiences.
AIGC Interactivity	B1	AIGC technology is significantly effective in achieving personalized user experience (such as intelligent conversations and dynamic recommendations).
	B2	AIGC technology-driven interactive capabilities improve customer service quality and increase satisfaction.
	B3	Through AIGC technology, it can quickly respond to users' real-time needs and feedback.
AIGC Innovation	C1	AIGC technology helps break through conventional thinking in generating unique and novel content or strategies.
	C2	Using AIGC technology can quickly iterate products and services to meet the diverse needs of the market.
	C3	AIGC technology plays a key role in discovering potential business opportunities and creating new business models.
AIGC Convenience	D1	AIGC technology simplifies complex workflows and makes operations more convenient.
	D2	Through AIGC technology, it can quickly complete a large amount of repetitive work.
	D3	The application of AIGC technology enables us to obtain required information and generate content anytime and anywhere, improving flexibility.
Evaluation of the application effect of AIGC	Y1	To what extent do you think AIGC technology has improved operational efficiency overall?
	Y2	How do you think AIGC technology performs in reducing error rates and improving work quality?
	Y3	Has your workload been reduced since using AIGC technology?
	Y4	Does AIGC technology help you respond faster to market changes and customer needs?
	Y5	Would you recommend AIGC technology to other practitioners in the same industry?

Evaluation of the application effect of AIGC	Y6	Do you expect AIGC technology to develop smoothly in improving operational efficiency in the next few years?

Sample Data. The samples selected in this study are mainly people with relevant experience in cross-border e-commerce, including: college students majoring in cross-border e-commerce, college teachers majoring in cross-border e-commerce, and operating employees of cross-border e-commerce companies. By reading the relevant literature at home and abroad, the contents of the questionnaire in this study are summarized. Questionnaires are distributed and collected online. The questionnaire was generated by WJX website and distributed and collected through social media such as WeChat and QQ. The collected questionnaire can be downloaded through the WJX applet. A total of 182 questionnaires were distributed, 9 invalid questionnaires were eliminated, and a total of 173 valid questionnaires were collected, with a questionnaire efficiency of about 95.05%.

3 Data Analysis

SPSS will be selected as the data analysis tool in this chapter. Firstly, the questionnaire data is preprocessed and the incomplete questionnaire data is deleted. Then, the reliability and accuracy of the questionnaire results are measured by reliability analysis and validity analysis. Finally, the hypothesis is tested by regression analysis.

3.1 Reliability Analysis

After conducting a reliability analysis on the 173-questionnaire data, we can see that the standardized Cronback coefficient is 0.931, indicating that the overall credibility of this questionnaire is very high and that further in-depth research can be continued. See Table 2 for details .

Table 2. Reliability statistics.

Cronbach Alpha	Cronbach's Alpha based on standardized items	Number of items
.931	.931	12

3.2 Validity Analysis

This study conducted validity analysis through KMO and Bartlett tests to show that the selection of variables is effective. According to the results of the above exploratory factor analysis, Table 3 shows that the KMO test coefficient result is 0.955. The coefficient value range of the KMO test is between 0 and 1. The closer to 1, the better the validity of the questionnaire. According to the significant p-value of the spherical

test, it can also be seen that the significance of this test is infinitely close to 0, rejecting the original hypothesis, so the questionnaire has good validity.

Table 3. KMO and Bartlett test.

KMO sampling suitability measure.		.955
Bartlett's test of sphericity	Approximate Chi-Square	1140.914
	Degrees of Freedom	66
	Significance	.000

3.3 Regression Analysis

In order to further clarify the specific influence relationship and coefficients of the variables, this paper constructs four simple linear regression equations in the order of assumptions. The application effect is represented by Y, and the four variables AIGC visuality, AIGC interactivity, AIGC innovation, and AIGC convenience are represented by A, B, C, and D respectively[14][15]. According to the assumptions, the following regression model is obtained:

$$H1: Y=a1XA+C1 \quad (1)$$

$$H2: Y=a2XB+C2 \quad (2)$$

$$H3: Y=a3XC+C3 \quad (3)$$

$$H4: Y=a4XD+C4 \quad (4)$$

In formulas (1)(2)(3)(4), Y represents the dependent variable, XA, XB, XC, XD, and XE are the corresponding independent variables, a1, a2, a3, and a4 are coefficients representing the degree, and C1, C2, C3, and C4 are constants. The regression analysis results are shown in Table 4.

Table 4. Regression results analysis.

Assumptions	constant	Standardized coefficient	F-number	R2
H1	3.855	1.659	281.407	0.622
H2	4.731	1.573	422.815	0.712
H3	4.815	1.585	322.944	0.654
H4	5.397	1.53	294.61	0.633

According to the analysis results, four regression equations are obtained:

$$H1: Y = 1.659\ XA + 3.855 \quad (5)$$

$$H2: Y = 1.573\ XB + 4.731 \quad (6)$$

$$H3: Y = 1.585\ XC + 4.815 \quad (7)$$

$$H4: Y = 1.530\ XD + 5.397 \quad (8)$$

The above results are consistent with the hypothesis that the four variables of AIGC visuality, AIGC interactivity, AIGC innovation, and AIGC convenience all have a certain impact on efficiency, and the degree of impact is different.

4 Results

In summary, the research results confirmed the research hypotheses, all of which were established. The four variables all had an impact on the application effect of AIGC, as shown in the following:

Through the analysis of the results of visual items, the average score of respondents in this part is 3.94. It can be seen that the respondents generally believe that the visual content generated by AIGC can achieve the goal of reducing costs and attracting customers, thereby helping operators improve operational efficiency. Through the analysis of the results of the interactive items, the average score of the respondents in this part is 3.97. It can be seen that the respondents generally believe that the interactive features of AIGC can increase the user's personalized experience and improve service quality. At the same time, it can also help operators respond to user needs more quickly and improve operational efficiency. Through the analysis of the results of the innovative items, the average score of the respondents in this part is 3.92. It can be seen that the respondents generally believe that the content generated by AIGC is innovative to a certain extent, which helps to innovate thinking to meet the diversified needs of the market and plays a certain role in exploring new opportunities and new markets. Through the analysis of the results of the convenience items, the average score of the respondents in this part is 3.94. It can be seen that the respondents generally believe that AIGC can help operators get rid of a lot of tedious work. At the same time, because AIGC relies on real-time data from around the world, it can obtain information in a timely manner to generate the latest content, reducing the time and technical costs of collecting data. At the same time, from the four linear regression equations obtained at the end, we can see that in terms of coefficients, the visuality of AIGC has a greater impact on the application effect of AIGC than other factors. When the independent variable increases by one unit, the dependent variable increases by 1.659 units. When the convenience, which has the smallest impact, increases by one unit, the dependent variable only increases by 1.53 units. Therefore, the ranking of influencing factors is: visuality > innovation > interactivity > convenience.

In general, all four variables are helpful in improving operational efficiency, but everything has two sides. Although 75.82% of the respondents in the AIGC application effect evaluation believe that AIGC technology can improve operational efficiency overall, 24.18% of the respondents believe that the degree of improvement is poor or average. This problem may be caused by the fact that AIGC is not yet mature and has certain limitations in many technologies. At the same time, since AIGC relies on instructions to generate response content, if the instructions are not clear enough, there may be a large gap between the output content and the input instructions. In this case, it takes a lot of time to make a lot of adjustments.

5 Conclusions

In this study, it used a questionnaire survey to analyze the influencing factors of AIGC on cross-border operations. AIGC visuality, interactivity, innovation, and convenience are used as independent variables. Through data analysis, it is confirmed that the four characteristics have different effects on AIGC operational efficiency, among which visuality has a greater impact than innovation, interactivity, and convenience. From the perspective of future development, AIGC has a more far-reaching impact on cross-border operations. In this survey, 95.13% of companies have begun to use AIGC technology in their daily work. In just a few years, AIGC technology has penetrated into the cross-border field and become an indispensable part[16]. The development of cross-border operations towards intelligence will be inseparable from the promotion of AIGC. At the same time, with the popularization of 5G technology, the Internet of Things, blockchain and other technologies, the data information of cross-border e-commerce will grow exponentially[17]. In this case, the intervention of AIGC will reduce the information burden of enterprises and promote the development of cross-border operations towards digitalization. At the same time, with the diversified development of AIGC, its functions will be applied to the front, middle and back ends to form coordinated development, optimize supply chain management, reduce energy consumption, and help cross-border operations achieve sustainable development. AIGC is bound to be indispensable in the future development of cross-border e-commerce.

Acknowledgments

The Teaching Reform Program of Zhejiang international studies university (No. PX-4923469).

References

1. Yan Yiqiang, Zhao Ying. Research on problems and countermeasures of artificial intelligence generated content. Guangdong Communication Technology, 2023, 43(10): 2-6+13.
2. Wang Yu. Generative artificial intelligence reshapes the new human resources landscape. Human Resources, 2023(19):106-107.
3. Jiang Qiaolei, Chen Zonghai, Zhang Yadi. Artificial intelligence generated content from the perspective of affordance. Youth Journalist, 2023(20):84-86.
4. Liu Mingliang. Analysis of technical characteristics and application scenarios of artificial intelligence generated content (AIGC). Information Recording Materials, 2023, 24(10): 234-236.
5. Chen Jiansong. Research on multi-mode integrated operation of cross-border e-commerce for small and micro enterprises. China Business Review, 2023(21):40-43.
6. Zuo Na. Analysis of factors affecting the operation of China's cross-border e-commerce import platforms. Lanzhou University of Finance and Economics, 2019.

7. Hortacsu A, MARTINEZ-JEREZ F, DOUGLAS J. The geography of trade in online transactions: evidence from e Bay and Mercadolibre, American Economic Journal: Microeconomics, 2009: 53-74.
8. Sharkey KS&M.A. A Model for Electronic Commerce Success Telecommunications Policy, 2012. (29): 127-152
9. Shi Zhanzhong, Zheng Shimin, Jiang Yue. ChatGPT and AIGC Industry Chain. Shanghai Management Science, 2023, 45(02): 12-14.
10. Niu Jianguo, Xia Feilong. Research on the mechanism of AIGC to promote the high-quality development of cross-border e-commerce. Enterprise Economy, 2023, 42(10): 85-94.
11. Wu Qingjun, Chen Xuan, Wang Fei, Yang Weiguo. Will artificial intelligence lead to large-scale unemployment?--Estimation of artificial intelligence technology, economic benefits and employment based on e-commerce platforms. Shandong Social Sciences, 2019, (03): 73-80.
12. Zhang Xuan, Jiang Liangjun, Jiao Shiqi. The impact of artificial intelligence on e-commerce talents. Modern Enterprise, 2020(05): 129-130.
13. Sun Ke, Lu Zelin. Research on the application and development trend of artificial intelligence in e-commerce. Guizhou Social Sciences, 2019, (09): 136-143.
14. Zhu Guanghui, Wang Xiwen. Operation mode, key technologies and future prospects of ChatGPT. Journal of Xinjiang Normal University (Philosophy and Social Sciences Edition), 2023, 44(04): 113-122.
15. Jiang Qiaolei, Chen Zonghai, Zhang Yadi. Artificial intelligence generated content from the perspective of affordance. Youth Journalist, 2023, (20): 84-86.
16. Li Junbo, Zhang Jue, Qu Fei. Research on the construction and development path of cross-border e-commerce ecosystem. Science and Technology Management Research, 2019, 39(23): 207-212.
17. Tao Mei. Research on the construction of dynamic stability mechanism of cross-border e-commerce supply chain. Modern Marketing (Business Edition), 2021(11):164-168.