

Knowledge Mapping of CBEC Research: A Visual Analysis using CiteSpace

Yi Shi ¹
Yi Cui ^{2,*}
Jie Li ^{1,3}

*Corresponding author

¹ Student, Communication University of China, Beijing, China, shiyi11@cuc.edu.cn

² Professor, Communication University of China, Beijing, China, timon@cuc.edu.cn

³ Professor, Hangzhou Dianzi University Information Engineering College, Hangzhou, Zhejiang, China

ABSTRACT

Driven by economic globalization and technological advancements, cross-border e-commerce has been flourishing. It has drawn extensive scholarly attention, resulting in a proliferation of fragmented research within the CBEC field. Traditional literature review methods struggle to provide a comprehensive and objective analysis. This study quantitatively examines the knowledge structure, development, and evolution of CBEC to offer a systematic overview of current research. Based on the WOS database, this study collects 914 references related to cross-border e-commerce from 2015 to 2024. It briefly introduces the current status and development trends of cross-border e-commerce, visually analyzes and refines key information such as publication distribution, authors, research institutions, countries and keywords in this field. This study summarizes the development trends and pathways of CBEC in existing research, aiding researchers in addressing current research gaps, understanding future directions and establishing a rigorous knowledge framework to provide theoretical guidance.

Keywords: Cross-border e-commerce, knowledge mapping, research trends, bibliometric analysis.

INTRODUCTION

In recent years, global economic integration and advancements in e-commerce technology have rapidly made cross-border e-commerce a critical pillar of international trade (UNCTAD, 2016). Additionally, the COVID-19 pandemic has accelerated its growth, significantly impacting global trade dynamics (Tolstoy et al., 2023). The signing of the Regional Comprehensive Economic Partnership (RCEP) in 2020 has reduced uncertainties for cross-border e-commerce, integrated resources, and improved customs clearance efficiency. According to eMarketer, the global retail e-commerce market almost tripled from 2014 to 2022, reaching \$5.8 trillion in 2023. Projections indicate that this market will grow to \$7.9 trillion by 2027 (eMarketer, 2024). The prosperity of cross-border e-commerce has garnered significant scholarly attention. Researchers have investigated a wide range of topics, including strategic analysis, supply-demand matching, consumer behavior, exchange rates, SME specialization, and marketing (Sun et al., 2021; Chen & Yang, 2021; Tolstoy et al., 2023; Du, 2024). Moreover, areas such as the efficiency of last-mile delivery in B2C e-commerce, the dynamics of C2C e-commerce, and sustainable logistics practices have also been major focal points in the field (Manjarachina et al., 2019; Yuan et al., 2021; Cano et al., 2022).

Despite extensive literature on various factors influencing CBEC development, systematic and macro-level studies on development trends and keyword integration remain insufficient. Research indicates that CBEC studies are predominantly fragmented and still in the early stages, lacking a coherent knowledge framework (Hazarika & Mousavi, 2021). Therefore, summarizing cross-border e-commerce development trends is essential to promote its growth and provide valuable insights for new researchers in the CBEC field.

This study systematically investigates the development trends, structural patterns, and knowledge evolution in CBEC research by analyzing 914 publications from the Web of Science database between 2015 and 2024 using CiteSpace bibliometric analysis. By examining the development trends and pathways of CBEC, this study aids researchers in addressing current research gaps, understanding future directions, and establishing a rigorous knowledge framework to provide theoretical guidance.

METHODOLOGY AND DATA

Methodology

In this study, we used CiteSpace.6.3.R1 for research collaboration network analysis, co-citation analysis, and cluster analysis. By generating knowledge maps of authors, institutions, countries, keywords and research frontiers, we facilitated data interpretation.

Data

We collected data from the Web of Science Core Collection, targeting the SCI-EXPANDED, SSCI, A&HCI, and ESCI indices. Given the first CBEC article was published in 2015, our time frame is 2015 to 2024. Following the methodology outlined in related studies (Giuffrida et al., 2017; Hazarika & Mousavi, 2021), we determined our search terms. The search query included

three keywords relevant to CBEC: “cross-border”, “e-commerce” and “international”. To ensure reliability, we focused on the professional term “e-commerce” and its abbreviation. “International” was used as an alternative to “cross-border” in our search scope. Based on these keywords, we conducted a search using the terms shown in Table 1. We limited the search to articles and review articles, retrieving 966 records. After formatting and deduplication using CiteSpace, we obtained 914 documents.

Table 1: Summary of searching details.

Source website	Web of science
Citation indexes	SCI-EXPANDED; SSCI; A & HCI; ESCI
Years	January, 2015–April, 2024
Searching terms	“Cross border e-commerce” or “cross border electronic commerce” or “CBEC” or “international electronic commerce” or “international e-commerce”
Document types	“Articles” or “reviews”
Sample size	914

RESULTS

Distribution of Publications

The number of publications for each year is displayed in Figure 1. The publication number on cross-border e-commerce has risen significantly, from 15 articles in 2015 to 205 articles in 2023, reflecting a steady upward trend in the field. Notably, there was a sharp increase in research output beginning in 2019, with a particularly pronounced surge in 2021 due to the heightened scholarly focus on CBEC issues driven by the COVID-19 pandemic. Following a phase of rapid growth, the field has transitioned into a stable stage. This trend underscores the escalating importance of cross-border e-commerce in global trade and its persistent appeal as a critical area of academic research.

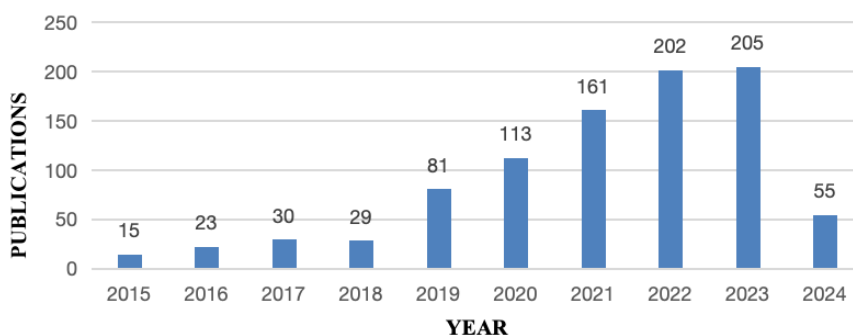


Figure 1: Number of publications.

Mapping and Analysis on Author and Cited Authors

The top 3 prolific authors in cross-border e-commerce and their primary research areas are listed in Table 2. According to Lotka's Law, a cohesive group of highly productive authors in the CBEC discipline has not yet formed, indicating relatively weak collaboration among researchers, who remain dispersed. Baozhuang Niu and Shuzhong Ma are the most prolific authors during our search period. Their research primarily focuses on logistics and supply chain management, with an emphasis on market strategies. Although there are currently no scholars with exceptionally high publication volumes in this field, Ying Wang stands out with 102 citations, focusing mainly on the supply chain service capabilities and quality improvement for cross-border e-commerce enterprises (Wang, 2018). This highlights the significant academic attention devoted to the supply chain aspect of cross-border e-commerce. Other authors and cited authors are to be further studied.

Table 2: Top 3 most productive authors.

Author	Publications	Main focuses
Shuzhong Ma	8	supply chain; logistics ; global market strategies
Baozhuang Niu	8	supply chain; logistics ; strategy optimization
Jian Mou	7	consumer satisfication; purchase intention; trust
To be further studied...	...	...

Mapping and Analysis on Institutions and Countries

Tables 3 and 4 respectively list the top 3 institutions and top 5 territories by publication number, providing more detailed insights. Overall, most CBEC publications are concentrated in Asia, followed by the United States and the European Union. Notably, China leads in cross-border e-commerce research, with six of the top 10 research institutions located there. Other collaborations and analyses are to be further studied.

Table 3: Top 3 productive institutions.

Institution	Publications	Theme	Year
Zhejiang University	17	International Trade	2018
Ministry of Education & Science of Ukraine	12	Digital trade; Sustainable development	2020
Hong Kong Polytechnic University	11	Supply Chain	2015
To be further studied...	...	...	...

Table 4: Top 5 productive territories.

Territories	Publications	Centrality
China	451	0.13
USA	98	0.38
England	61	0.19
South Korea	43	0.04
Australia	40	0.2
To be further studied...	...	...

Mapping and Analysis on Keywords

By filtering out irrelevant keywords and merging related ones, we identified the top 10 keywords, as shown in Table 5. The core high-frequency keyword "cross-border e-commerce" appeared 305 times. Keywords with high proximity and co-occurrence to "cross-border e-commerce" include "innovation", "China", "logistics" and "firms". For the second high-frequency keyword "Internet" the terms with frequent co-occurrence are "international trade", "digital economy" and "information technology". Furthermore, keywords associated with "trust" which has high centrality, include "loyalty", "purchase intention", "perceptions" and "social commerce", focusing on key consumer research perspectives. These high-frequency keywords illustrate the current research hotspots and the interconnections between key topics in the field of cross-border e-commerce from 2015 to 2024. Other keywords are to be further studied.

Table 5: Top 10 keywords.

Keywords	Freq	Centrality	Year	Keywords	Freq	Centrality	Year
cross-border e-commerce	305	0.03	2017	international trade	43	0.02	2017
internet	97	0	2015	technology	43	0.03	2016
impact	96	0.02	2017	management	39	0.04	2016
trust	64	0.16	2015	strategy	37	0.04	2016
performance	61	0.12	2016	innovation	33	0.13	2016
To be further studied...	...	...	...	To be further studied...	...	...	...

Keyword emergence refers to a significant increase in the frequency of a particular keyword within a specific time period. As shown in Figure 2, "competition" is the earliest emerging term, followed by "innovation" and "information technology". This indicates that cross-border e-commerce is continuously addressing and overcoming innovation challenges within the industry while enhancing operational efficiency and business outcomes through the application of information technology. The keyword "integration" has the longest duration, reflecting the development of cross-border e-commerce in integrating key subfields such as digital marketing, corporate performance, big data analytics, risk management, and logistics management. The emergence of "word of mouth" and "social commerce" highlights the central role of users in market communication and brand building.

Based on predictions of emerging keywords, future research is expected to focus on "China", "perceptions" and "supply chain". This reflects China's significant position and influence in cross-border e-commerce, as well as the importance of studying consumer perception differences and new supply chain technologies. Other keyword bursts are to be further studied.



Figure 2: Map of Keyword Emergence.

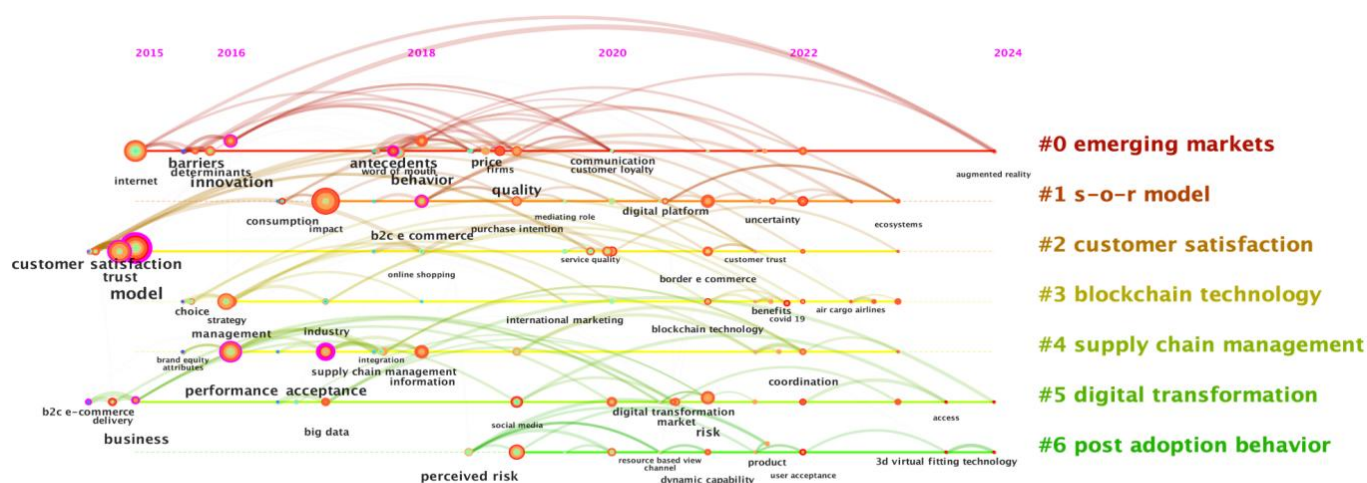


Figure 3: Map of keywords timeline.

The timeline view provides an overall perspective on the span of clusters and their interconnections, as shown in Figure 3. This study identifies seven main clusters. After analysis, we found that current research hotspots focus on three key areas: cross-border e-commerce from the consumer perspective, supply chain management and international logistics, and the exploration of new models based on digital transformation. In the initial exploration phase, research topics primarily centered on constructing basic concepts and frameworks. Subsequently, the focus shifted towards specific policies, applications, and technological innovations. At the current stage, research themes have further deepened, with greater attention on digital transformation and the continuous enhancement of customer experience. Notably, "Digital Transformation" and "Post Adoption Behavior" indicate an expanded focus on leveraging advanced technologies such as big data, artificial intelligence, and the Internet of Things to automate and optimize business processes, improving overall operational efficiency and market responsiveness. Additionally, consumer satisfaction has consistently been a prominent topic in studying cross-border e-commerce purchase intentions. Research on post-adoption behavior emphasizes users' continued usage and satisfaction after adopting new technologies or services. This is crucial for enterprises to develop more effective user retention strategies, enhancing customer loyalty and satisfaction. Other detailed cluster analyses are to be further studied.

CONCLUSION

This study utilizes the WOS database and CiteSpace software for visual data analysis, systematically examining the knowledge structure, development, and evolution of cross-border e-commerce. This analysis helps researchers address current gaps, understand future directions, and establish a rigorous knowledge framework to provide theoretical guidance. Results show that cross-border e-commerce research has experienced significant growth, with a surge in 2019 and stabilizing in the past two years. However, no influential author group has formed, indicating weak collaboration and dispersed efforts. Most research hotspots and collaborative networks are concentrated in China, highlighting limited international cooperation. Keyword network analysis identifies three main focus areas: consumer-centric research, supply chain management and international logistics, and new models based on digital transformation. Consumer satisfaction has long been a key topic and will be a focus for more in-depth studies in the future. Also, Future research should focus on integrating supply chains with blockchain and AI in emerging markets.

Future full papers should further refine the analysis of nodes discussed in this study and additionally focus on cited references and cited journals. Analyzing cited references will identify influential works and authors, providing insights into foundational studies and emerging trends. Analyzing cited journals will reveal key publication venues and leading journals in the field. These analyses will enhance the understanding of the CBEC research ecosystem, offering a detailed overview of its development and collaborative networks. Additionally, future studies should explore CBEC themes in core international conferences and databases, such as ICEB and WHICEB, to provide a more comprehensive analysis.

ACKNOWLEDGMENT

This work is partially supported by the Humanities and Social Sciences of Ministry of Education Planning Fund (17YJA630050) in China and the Ministry of Science and Technology (Grant No. 108-2410-H-033-042-MY3) in Taiwan.

REFERENCES

- Cano, J. A., Londoño-Pineda, A., & Rodas, C. (2022). Sustainable logistics for e-commerce: A literature review and bibliometric analysis. *Sustainability*, 14(19), 12247. <https://doi.org/10.3390/su141912247>
- Chen, N., & Yang, Y. (2021). The impact of customer experience on consumer purchase intention in cross-border E-commerce—Taking network structural embeddedness as mediator variable. *Journal of Retailing and Consumer Services*, 59, 102344. <https://doi.org/10.1016/j.jretconser.2020.102344>
- Du, S. (2024). An evolutionary game-theoretic analysis of cooperation strategy between SMEs and cross-border e-commerce platforms considering the cross-network effect. *Kybernetes*, 53(5), 1857-1887. <https://doi.org/10.1108/K-09-2022-1316>
- e-Marketer. (2024). Worldwide retail ecommerce forecast 2024. Retrieve from <https://www.emarketer.com> (accessed 27 April, 2024).
- Giuffrida, M., Mangiaracina, R., Perego, A., & Tumino, A. (2017). Cross-border B2C e-commerce to Greater China and the role of logistics: a literature review. *International Journal of Physical Distribution & Logistics Management*, 47(9), 772-795. <https://doi.org/10.1108/IJPDLM-08-2016-0241>
- Hazarika, B. B., & Mousavi, R. (2021). Review of cross-border e-commerce and directions for future research. *Journal of Global Information Management (JGIM)*, 30(2), 1-18. <https://doi.org/10.4018/JGIM.20220301.oa1>
- Mangiaracina, R., Perego, A., Seghezzi, A., & Tumino, A. (2019). Innovative solutions to increase last-mile delivery efficiency in B2C e-commerce: a literature review. *International Journal of Physical Distribution & Logistics Management*, 49(9), 901-920. <https://doi.org/10.1108/IJPDLM-02-2019-0048>
- Sun, P., Doh, J. P., Rajwani, T., & Siegel, D. (2021). Navigating cross-border institutional complexity: A review and assessment of multinational nonmarket strategy research. *Journal of International Business Studies*, 52(9), 1818-1853. <https://doi.org/10.1057/s41267-021-00438-x>
- Tolstoy, D., Melén Hånell, S., & Özbek, N. (2023). Effectual market creation in the cross-border e-commerce of small-and medium-sized enterprises. *International Small Business Journal*, 41(1), 35-54. <https://doi.org/10.1177/02662426211072999>
- UNCTAD. (2016). Cross-border e-commerce trade data: UNCTAD technical notes on ICT for development. Retrieved from <https://unctad.org> (Accessed 2 January, 2018).
- Wang, Y., Jia, F., Schoenherr, T., & Gong, Y. (2018). Supply chain-based business model innovation: the case of a cross-border E-commerce company. *Sustainability*, 10(12), 4362. <https://doi.org/10.3390/su10124362>
- Yuan, C. H., Wu, C. H., Wang, D., Yao, S., & Feng, Y. (2021). Review of consumer-to-consumer e-commerce research collaboration. *Journal of Organizational and End User Computing (JOEUC)*, 33(4), 167-184. <https://doi.org/10.4018/JOEUC.20210701.oa8>