

Analysis of Hot Spots of Cross-border E-commerce Research based on CiteSpace

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Abstract

In recent years, with the acceleration of globalization and the rapid development of Internet technology, cross-border e-commerce has gradually become an important part of international trade. In order to explore the development and prospects of cross-border e-commerce research, 1252 articles from core journals from 2014 to 2024 are selected as research samples, and CiteSpace 6.3.R1 is used to conduct text statistics and visual analysis on the current situation, hot spots and trends of domestic cross-border e-commerce research.

Keywords

Cross-border E-commerce; CiteSpace; Visualisation Software.

1. Introduction

Cross-border e-commerce, as a new way of trade, uses the Internet platform to realize the commodity transaction between different countries and regions, which has greatly promoted the development of global trade. In recent years, China's cross-border e-commerce has developed rapidly, becoming one of the largest cross-border e-commerce markets in the world. In-depth research on the development status and trend of cross-border e-commerce not only helps policy makers understand the industry dynamics and formulate more targeted policies and measures, but also provides guidance for enterprises' strategic layout in the field of cross-border e-commerce. At the same time, the academic research on cross-border e-commerce can also promote the development and improvement of relevant theories. Through a systematic analysis of relevant literature from 2014 to 2024, this paper aims to reveal the current situation, hot spots and future trends of cross-border e-commerce research during this period.

2. Research Methods and Data Sources

2.1. Research Methods

The research method used in this paper is bibliometric analysis, and the software used is Excel and CiteSpace. Excel is used to analyze the external characteristics of cross-border e-commerce journal literature, such as the overall research situation, the distribution of core authors, and the distribution of high-yield research institutions. CiteSpace is a popular document analysis software in recent years, which was introduced into Chinese academia in 2005 and has been gradually applied to many research fields such as natural science, sociology, medicine, education, management and economics, but rarely used in cross-border e-commerce. In this paper, the software CiteSpace version 6.3.R1 (64-bit) was used to process the samples. The software has functions such as keyword map, keyword clustering and time zone map, which can intuitively show the development path, research hot spots and research trends of domestic cross-border e-commerce research.

2.2. Data Sources

By searching the literature from 2014 to 2024 on China National Knowledge Network (CNKI) on the subject of cross-border e-commerce or cross-border e-commerce, 12,248 articles were retrieved if the journal source was selected as "all journals". If the journal source is selected as "SCI+EI+ Peking University Core +CSSCI+CSCD", a total of 1262 articles are retrieved. A sample of 1252 papers was obtained by excluding the repeated publications, as well as the exchanges of experience, reviews and conference announcements. This paper mainly makes a brief analysis and summary of the research contents, perspectives and research methods of 1252 high-level journal literatures.

3. Analysis of Research Findings

3.1. Analysis of Research Status

3.1.1. Statistics of Annual Distribution of Literature

Figure 1 shows the annual distribution of cross-border e-commerce research literature from 2014 to 2024. The fluctuation trend of the number of journal documents can be seen. Starting from 10 in 2014, the number of papers showed an upward trend in the first six years, reaching 164 in 2020. However, a clear downward trend followed in 2021, when the number of papers decreased to 133. In 2022, the number of papers started to pick up and remained at a relatively high level in 2023. This shows that cross-border e-commerce research has gradually attracted extensive attention from academia. Although the proportion of core journal literature is relatively low, it also shows an increasing trend year by year, reflecting the gradual improvement of research quality.

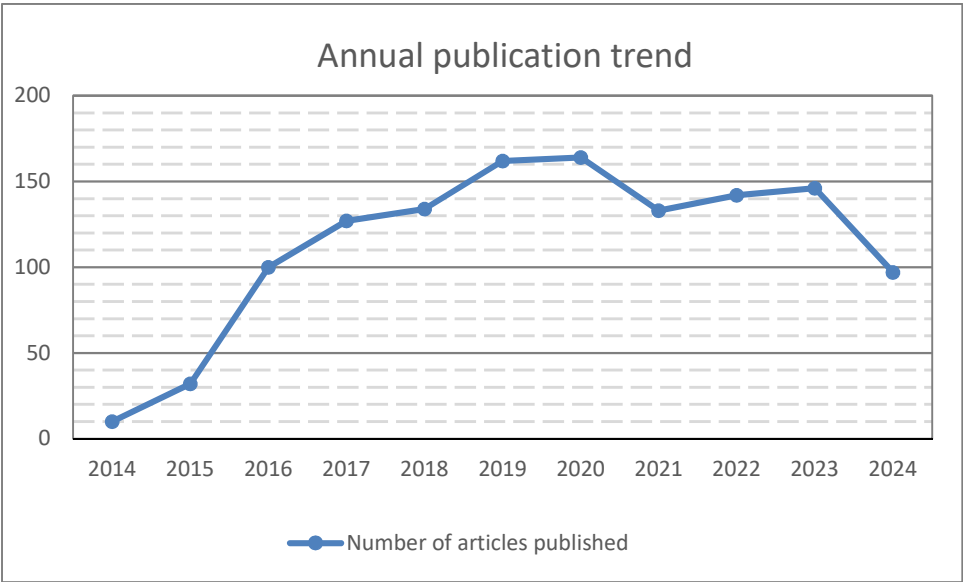


Figure 1. Annual distribution of core journal literature

3.1.2. Analysis of TOP10 Highly Cited Literatures

At present, the academic community generally evaluates the quality of papers according to the quality of journals, paper downloads and citations and other indicators. This paper makes statistics of the top ten cited literatures on cross-border e-commerce in the core journal database of CNKI from 2014 to 2024, as shown in Table 1. The most cited literature has reached 756 times, and the least cited literature has 248 times, which indicates that these papers have a high recognition and citation rate in the academic community. Five of the top ten highly cited articles are about the topic of cross-border logistics, which indicates that cross-border logistics has been a mainstream research hot spot and direction of cross-border e-commerce in the past

ten years, which is worthy of in-depth research by scholars, especially in the current society with the rapid development of digital technology. In addition, it is found that the name of scholar Zhang Xiaheng appears three times in the table, indicating that he has solid research in the field of cross-border e-commerce. In addition, most of the articles in the table were published earlier, and the articles in 2020 stand out as their research topic is trade costs.

Table 1. TOP10 highly cited articles

Article title	Author	Journal of Source	Time of Publication	Number of citations
Development forms, obstacles and next steps of cross-border e-commerce in China	Youwei Lai	Reform	20140515	756
China's cross-border e-commerce logistics dilemma and countermeasures and suggestions	Xiaheng Zhang	Contemporary Economic Management	20150415	620
What trade costs have cross-border e-commerce platforms overcome? -- Empirical evidence from "Dunhuang Network" data	XueNan Ju	Economic Research Journal	20200220	439
Restrictive factors and promoting policies of rural e-commerce development in China	HongYong	Journal of Commercial Economics	20160225	382
Our country cross - border e-commerce development pattern and strategy suggestion	JinHong	Macroeconomics	20150918	380
Research on the development and government supervision of cross-border e-commerce in China - Taking small cross-border online shopping as an example	LiangPing Shi	Shanghai Journal of Economics	20140915	378
Types and operation modes of cross-border e-commerce	Xiaheng Zhang	China Business and Market	20170110	357
The path to promote the development of cross-border e-commerce logistics	XiangYang Li	China Business and Market	20141023	355
Research on international logistics mode under cross-border e-commerce environment	PangYan	China Business and Market	20151023	279
Cross-border e-commerce and cross-border logistics synergy: mechanism and path	Xiaheng Zhang	China Business and Market	20161107	248

3.2. Research Hotspots and Trends

3.2.1. Keyword Co-occurrence Mapping Analysis

Keywords are high-level summaries of article topics, and their frequency, relevance, and prominence can reveal research hotspots, internal connections, and importance in the field. Keyword analysis can intuitively present the knowledge structure of the research field, and discuss the hot issues, theme direction and research trend^[1].

In each time slice, the nodes are filtered based on the g-index, and the network size is adjusted by modifying the proportion parameter k. A higher value of k results in a larger network. In this study, k is set to 12. The node type for the CiteSpace operational interface is designated as keywords, facilitating a visualization analysis of the scientific map to generate a keyword co-

occurrence diagram. Within this diagram, node size, color shading, inter-node link thickness, and link color represent keyword frequency, temporal occurrence (early vs late), co-occurrence intensity among keywords, and their respective early and late co-occurrence times^[2].

The number of nodes in the keyword co-occurrence map is 287, of which 329 are connection lines, the total density is 0.008, and the largest subnet members are 274 (95%). The most influential related networks are mainly "cross-border e-commerce", which has the greatest impact on external networks; The most prominent node labels are cross-border e-commerce, cross-border logistics, the Belt and Road, e-commerce, agricultural products, etc., which indicates a high frequency of occurrence in 1252 literatures. However, there are also other keywords with smaller node labels, such as cross-border e-commerce comprehensive pilot area, high-quality development, trade facilitation, double cycle, supply chain, etc., which shows that scholars still pay attention to other topics and keep up with current events.

Intermediation centrality can reflect the influence of each keyword on the whole network graph. The greater the intermediation centrality, the more important the topic. When mediator centrality is ≥ 0.1 , its corresponding node is called a very important keyword. Keywords such as trade facilitation, cross-border logistics, big data, digital trade, cross-border e-commerce comprehensive pilot area, overseas warehouse, and trade cost have high centrality and play an important role in the knowledge network. The analysis shows that these important keywords are closely related to the content of "cross-border e-commerce" itself, and are the basic elements of "cross-border e-commerce" research. At the same time, these hot spots reflect the focus areas and directions of current research.

3.2.2. Keyword Clustering Mapping Analysis

Table 2. Keyword clustering table

Cluster ID	Cluster name	Size	S value	Mean year	High frequency keywords (take the first three)
#0	Cross-Border Electronic Commerce	63	1	2018	Difference in differences Model, Evolutionary game, Manufacturing industry
#1	Cross-border e-commerce	27	0.991	2017	International trade , Influencing factor, Comprehensive pilot area
#2	Logistics mode	23	0.967	2019	Logistics mode, High-quality development, b2b Model
#3	Trade costs	19	0.992	2021	Trade costs, Bicirculating , Cross-border e-commerce comprehensive trial area
#4	Cross-border e-commerce platform	17	0.961	2021	Quality of enterprise export products, technical innovation, commercial circulation
#5	External trade	17	0.882	2017	transformation and upgrading, business model, value chain
#6	Minor enterprises	16	0.937	2017	the Belt and Road, Supply chain finance, New infrastructure
#7	Digital trade	14	0.912	2021	digital economy, Trade facilitation, service trade
#8	E-commerce	14	1	2017	agricultural products, development tactics, Upgrading of industries
#9	Industrial cluster	13	0.96	2019	Blockchain, Big Data, Collaborative mode

To enhance the accuracy of summarizing research domains, this paper employs the keyword clustering functionality of CiteSpace to aggregate closely related keywords within the co-occurrence map using relevant algorithms for cluster formation. The cluster map emphasizes

the structural characteristics of clusters, highlighting key nodes and significant connections. CiteSpace offers two primary indicators based on network structure and clustering definitions: Modularity Q (Q value) and Mean Silhouette (S value). A Q value exceeding 0.3 indicates a significant clustering structure, while an S value greater than 0.5 suggests reasonable clustering; an S value reaching 0.7 is deemed efficient and convincing. The analysis presented in this paper reveals a Q value of 0.8429 and an S value of 0.9696, indicating that the clustering structure is highly significant and the results are compelling^[3].

Keywords after automatic clustering are roughly divided into 14 categories: #0 cross-border e-commerce, #1 cross-border e-commerce, #2 logistics mode, #3 trade cost, #4 cross-border e-commerce platform, #5 foreign trade, #6 small and medium-sized enterprises, #7 digital trade, #8 e-commerce, #9 industrial clusters, #10 talent training, #11 cross-border logistics, #12 cross-border e-commerce development, #13 overseas warehouse. The size of the number reflects the degree of concentration of the study, and a smaller number indicates a more concentrated study. In this paper, the relevant data of the first 10 clusters in CiteSpace are captured and imported into Table 2.

In Table 2, "representative keywords within clusters", this paper extracts the first three most representative keywords of each cluster, with the help of which helps to locate the research field of cross-border e-commerce in the core research circle.

4. Conclusion

By analyzing 1252 core journal literatures from January 2014 to August 2024, this paper summarizes the status quo, hot spots and trends of domestic cross-border e-commerce research, and draws the following main conclusions:

The number of literatures is increasing year by year. The number of research articles on cross-border e-commerce has increased from 10 in 2014 to a relatively high level in 2023, reflecting the continued rise in the interest of this field in academia.

Focus on research hot spots. Through the statistical analysis of highly cited literature and the keyword co-occurrence graph and keyword clustering graph analysis conducted by CiteSpace^[4], it is found that the research mainly focuses on cross-border logistics, trade cost and digital economy, etc. In particular, digital economy has become the mainstream direction of research in recent years, and the keyword clustering includes 14 categories such as cross-border e-commerce. It has good persuasiveness and clustering effect, and the S value of trade cost is large, which indicates that this topic is often studied by scholars^[5].

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