Explore the research fronts of cross-border E-commerce

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Abstract. Cross border e-commerce as a trend of development in recent years has been widely concerned. The policies issued by the government and the global economic development situation have also been promoting the development of cross-border e-commerce. It is not difficult to see that cross-border e-commerce is in full swing at home and abroad, showing a high-speed development trend. In this context, in order to systematically review the relevant literature in this field, based on the scientific econometric analysis of 431 articles published from 1995 to 2020 collected from the WOS database, the author analyzes the development of cross-border e-commerce by using this database, summarizes the annual trend since 1995, publishing institutions and publications, and analyzes the author's keywords Visual integrated presentation. The purpose of this paper is to provide some reference points for researchers, managers and industry professionals.

1. Introduction
Economic globalization is an important theme in the development of Global trade. Cross-border e-commerce has become a new trend in the development of foreign trade. The executive meeting of the State Council of China (2018) decided to continue and improve the cross-border e-commerce retail import policy and expand the scope of application, expand the opening up and stimulate the consumption potential, and deploy to promote the layout and construction of logistics hub, and promote the improvement of the quality and efficiency of national economy operation. Grant et al. (2012) believe that it is more important than ever to link the informatization process with international flows and cross-border activities [1].

Mentzer (2004) and others said that the complexity of cross-border logistics services is not only due to the increase of distance and cost constraints, but also because cultural and organizational conditions will affect the effectiveness of customers to provide specific services. Finally, they proposed that enterprises should adopt the method of preference identification, which is helpful to identify cross-country and regional market details Points [2]; Rangan (2009) et al. Found that modern multinational companies use information and communication technology to reduce transaction costs, and further develop into fair transactions to encourage lower production costs [3]; Rajang (2003) et al. Proposed that cross-border trade can cause price convergence among countries [4].

In the past, independent literature can not fully show the development trend of cross-border e-commerce theme. In this paper, 431 articles in the web of Science (WOS) database are collated in order to explore the development trend of cross-border e-commerce and provide a full picture of literature research. These achievements will provide scholars with an understanding of the development of scientific research in various fields, and provide important reference basis and research direction for tracking the frontier fields.
2. Data and methods
In order to obtain relevant literature on cross-border e-commerce, this paper starts from the "advanced search" query of WOS database, and the design of keywords is as follows:

*TS = ("cross border e-commerce" or "cross border trade" or "cross border payment" or "cross border exchange" or "cross border logistics")

As of May 31, 2020, 431 articles (including SSCI and SCIE) have been collected. In this paper, python has been used to map the original data, and VOSviewer software has been used to develop the mapping of bibliometric. Van Eck & Walkman (2010) developed VOSviewer, a computer program, which pays special attention to the graphical representation of bibliometric maps. Its function is that it is particularly useful in large bibliographic maps that are easy to understand [5].

3. Research mapping results

3.1. Annual trend

![Figure 1: Annual reference](image1)

![Figure 2: Annual publication](image2)

Figure 1 shows the annual citation trend of literature since 1995. The number of citations on this topic has increased year by year. Since 2005, the number of citations on this topic has increased significantly. It shows that scholars are more and more interested in this topic, which plays an essential role in trade.

Figure 2 shows the trend of the number of cross-border e-commerce publications since 1995. We find that the number of relevant publications fluctuates and increases. In the past five years, the number of publications has increased dramatically, which shows that cross-border e-commerce is a hot topic at present.

3.2. Main organizations and publications

The annual trend chart briefly describes the development trend of cross-border e-commerce. In order to explore the frontier hot content of cross-border e-commerce, we also conducted the analysis of CO words, CO citation and bibliographic coupling (based on clustering) [6,7]. Table 1 lists the top 10 publications (starting from 11th with a decrease in number), showing that e-commerce applications cover a variety of fields: pharmacology, economics, food industry, etc. Table 2 lists the top 10 organizations and provides more detailed information. In addition to the International Monetary Fund and the National Bureau of economic research, it also includes many universities in the United States and the United Kingdom.

In order to show how top publishing organization form research fronts [8], figure 3 further visualizes the bibliographic coupling network of the top 20 publishing organizations. It can be seen from the figure that the figure consists of a green cluster with "world trade journal" as the center, a blue cluster with "e-commerce research" as the main body, a red cluster with "energy policy" as the head and a yellow cluster with "International Business Journal" as the center, among which a green cluster with "world trade journal" as the center and a blue cluster with "e-commerce research" as the main body The Yellow
cluster centered on "International Business Journal" has no relationship with the red cluster led by "energy policy".

Table 1 Top 10 publications

| Publication Outlets                                      | NO. |
|--------------------------------------------------------|-----|
| Energy Policy                                          | 12  |
| Basic & Clinical Pharmacology & Toxicology             | 10  |
| Electronic Commerce Research                           | 10  |
| Journal of World Trade                                 | 8   |
| Energy Economics                                       | 8   |
| Sustainability                                         | 8   |
| World Economy                                          | 6   |
| Agro Food Industry Hi-tech                             | 5   |
| Energy Journal                                         | 5   |
| Journal of International Economics                     | 5   |

Table 2 Top 10 organizations

| Organizations                                            | NO. |
|---------------------------------------------------------|-----|
| National Bureau of Economic Research                    | 53  |
| Harvard University                                      | 35  |
| University of London                                    | 24  |
| International Monetary Fund                             | 23  |
| University of California System                         | 22  |
| New York University                                     | 20  |
| University of Chicago                                   | 20  |
| Columbia University                                     | 16  |
| University of Alberta                                   | 16  |
| University of Cambridge                                 | 16  |

Figure 3 Top 20 publications bibliography coupling network visualization

3.3. Analysis of cited authors
A total of 431 documents were searched and 12407 authors were cited, among which the European Commission was cited the most.
Table 3 Top 10 co authors

| Citation author          | NO. |
|--------------------------|-----|
| European, commission     | 52  |
| World bank               | 48  |
| Tituba K                 | 45  |
| Anderson Je              | 37  |
| Meagher K                | 36  |
| Ent so E                 | 30  |
| Gomez-Herrera e          | 23  |
| WTO                      | 22  |
| Moue J                   | 20  |
| Head K                   | 19  |

3.4. Author's key words analysis

The co-occurrence network of author's key words or keywords can help to understand the hot trends in this field. This paper discusses the co-occurrence network of the first 54 important author's key words, and divides it into nine important groups.

The co-occurrence network of author's key words or keywords can help to understand the hot trends in this field. This paper discusses the co-occurrence network of the first 54 important author's key words, and divides it into nine important groups. The co-occurrence network of the first 54 important author's key words, and divides it into nine important groups. The red group contains 11 keywords, and the total number of nodes in this group is the largest among the six groups, accounting for 19.64% of the total number of nodes in the whole picture. By studying the key words of this group, the most important one is cross-border trade. The connection with other groups is found that it is related to all groups, the most closely with the yellow group, green only with electricity, and different from the traditional trade.

There are nine key words in the green group. The distribution of this group in the figure is relatively scattered, and the internal connection is not close. The most prominent key word is trade, and the word is most closely related to the red cluster.

The blue group contains eight key words, among which the "cross border e-commerce" node is located in the sub center of the figure, and its proportion is second only to the "cross border trade" node of the red group.

Purple ethnic group contains six key words, which are related to traditional trade. The yellow group contains six key words, which are related to the integration of market management. Among them, there is the most special ethnic group - Pink ethnic group, with only one node, Australia, which is not associated with any ethnic group. The light blue ethnic group includes four key words, which is the closest to the blue and purple ethnic groups. It is in the development stage of traditional trade and e-commerce. Orange and brown ethnic groups also have relatively few keywords. Orange has 4 and Brown 2. It can be seen that orange is only related to red cross-border trade. The most prominent keyword "congestion management" has become a link between cross-border trade and its related issues. Brown is mainly related to urban trade.
4. Conclusion
This paper aims to provide a comprehensive understanding of the systematic integration of cross-border e-commerce documents, provide a reference for relevant researchers or business managers to explore the development trend of cross-border e-commerce, and contribute to the construction and improvement of the knowledge system of cross-border e-commerce. This paper visualizes keyword analysis network of key publications from WOS database.

The results show that this field has more and more importance and hot topics in research and trade through the visual integration of the number of annual references and annual releases of key publications in this field. The future research may be directed to the research direction of specific research problems or research articles. And from the annual trend chart, the annual trend generally shows an increasing trend year by year, but in 2015-2020 there is a sharp decline, which may be caused by changes in the international situation, this paper does not focus on this change, future research may be able to carry out research in this direction.

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