SUSTAINABLE TRADE: EVOLUTION AND TRENDS IN DIGITAL TRADE RESEARCH IN CHINA

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ABSTRACT

Objective: This paper focuses on a review of research on digital trade, a new type of trade that has emerged in China. Chinese academics consider digital trade as one of the most important means to promote sustainable trade development.

Methods: Using Citespace, a literature visualization and analysis software, to do econometric visualization mapping of China's digital trade research field and to analyze the evolution path of China's digital trade research.

Results: The article finds that there is a lack of cooperation between institutions and scholars in the field of digital trade research in China, and the research results are insufficient; the clustering of multilayered cross-cutting hot keywords, such as digital trade, digital economy, international trade, and trade in services, suggests that the research on China's digital trade is skewed towards macro-level research; the emergence of keywords with an extraction time slice of one year, and the appearance of 20 keywords, suggests that China's digital trade research field is progressively diversifying.

Conclusion: The continuous improvement of the meaning of digital trade has led to the continuous transformation of China's trade forms, utilizing new trade connotations, enriching China's trade-related theories and practical innovation methods, and promoting the continuous development of trade-related research. Combined with the different stages of digital trade research, it is found that the intermediary effect of the digital economy and digital technology to promote cross-border e-commerce and the reform of the international trade system, as well as the platform economy, data flow, trade in services and other aspects of the practical application of the platform economy, data flow, trade in services and other aspects of the digital trade have fully proved that the digital trade can reduce the cost of trade, improve the value-added trade in services, and promote the transformation of international trade. However, there is currently a lack of research related to the sustainable development of trade in digital trade in Chinese academia.

Keywords: digital trade, digital economy, citespace, digital trade rules.

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RESUMO

Objetivo: Este artigo se concentra em uma revisão da pesquisa sobre o comércio digital, um novo tipo de comércio que surgiu na China. Acadêmicos chineses consideram o comércio digital como um dos meios mais importantes para promover o desenvolvimento comercial sustentável.

Métodos: Usando Citespace, um software de visualização e análise de literatura, para fazer o mapeamento de visualização econométrica do campo de pesquisa de comércio digital da China e analisar o caminho da evolução da pesquisa de comércio digital da China.

Resultados: O artigo constata que há uma falta de cooperação entre instituições e estudiosos no campo da pesquisa de comércio digital na China, e os resultados da pesquisa são insuficientes; o agrupamento de palavras-chave quentes transversais multicamadas, como comércio digital, economia digital, comércio internacional e comércio de serviços, sugere que a pesquisa sobre o comércio digital da China está inclinada para a pesquisa de macro nível; o surgimento de palavras-chave com uma fatia de tempo de extração de um ano, e o aparecimento de 20 palavras-chave, sugere que o campo de pesquisa de comércio digital da China está progressivamente se diversificando.

Conclusão: A melhoria contínua do significado do comércio digital levou à transformação contínua das formas comerciais da China, utilizando novas conotações comerciais, enriquecendo as teorias relacionadas ao comércio e métodos práticos de inovação da China, e promovendo o desenvolvimento contínuo da pesquisa relacionada ao comércio. Combinado com as diferentes fases da investigação sobre o comércio digital, conclui-se que o efeito intermediário da economia digital e da tecnologia digital para promover o comércio eletrônico transfronteiras e a reforma do sistema de comércio internacional, bem como a economia de plataformas, o fluxo de dados, o comércio de serviços e outros aspectos da aplicação prática da economia de plataformas, o fluxo de dados, o comércio de serviços e outros aspectos do comércio digital demonstraram plenamente que o comércio digital pode reduzir o custo do comércio, melhorar o comércio de serviços de valor acrescentado e promover a transformação do comércio internacional. No entanto, existe atualmente uma falta de pesquisa relacionada ao desenvolvimento sustentável do comércio digital no meio acadêmico chinês.


1 INTRODUCTION

Nowadays, the world is entering an era of global development with data as the driving factor, led by the digital economy. With the continuous penetration of digital technology, international finance, trade, and other activities have undergone a huge transformation. It has changed how traditional trade is transacted, providing more online orders, more delivery services, and more "smart" and interconnected goods, moving trade activities from the physical to the digital world (OECD, 2023).

Digital trade belongs to a new stage in the development of commercial and trade activities, which carries the connotative attributes of traditional trade, e-commerce, and cross-border e-commerce and upgrades and transforms through information digitization,
forming a new form of trade in today's digital economy. The emergence of digital trade has changed the traditional trade framework, reduced trade costs, optimized trade resource allocation, provided digital trade services, broken down trade information barriers, and driven the sustainable development of global trade (Hong, 2019).

According to the data of the Digital Trade Development and Cooperation Report, the scale of China's digital service trade in 2020 has reached as high as 294.76 billion U.S. dollars, accounting for 44.5% of China's total trade in services, with an average annual growth rate of about 6.7%, which is much higher than the growth rate of trade in services and trade in goods in the same period. Digital trade has gradually become the main activity of China's foreign trade, and seizing the opportunities for the development of digital trade, breaking down the barriers to digital trade, and perfecting the rules of digital trade have become important means for China to enhance the competitiveness of international trade and develop sustainable trade.

Currently, there is no uniform interpretation of the definition of digital trade, and the following is the understanding of digital trade in different countries:

- The OECD considers digital trade as the empowerment of trade in goods and services by digital technologies designed for both digital and physical transmission;
- The United States understands digital trade as "encompassing not only the sale of consumer products and the provision of services online, but also the data flows that enable global value chains, the digital services that enable manufacturing, and a myriad of other platforms and applications";
- China's report considers digital trade to be a form of trade in which ICT plays an important role, including not only trade in food commodities facilitated by online promotion, trading, and settlement based on ICT but also trade in digital services, such as trade-in data, digital products, and digitized services, transmitted through ICT networks (CAICT, 2020).

Since there is no unified view on digital trade, academics in various countries have their own opinions when conducting research. Therefore, it is significant to explore the background and development history of China's digital trade research in-depth and to analyze the trend of digital trade research according to the cutting-edge hotspots in China's digital trade research field. In order to help the sustainable development of China's trade and clarify the direction of digital trade research, this paper combines the core
journals to analyze the research history and research hotspots of China's digital trade, provide a theoretical summary of the field of digital trade research, and put forward the trend of research frontiers.

2 METHODS

In order to further clarify the research history of China's digital trade, this paper visualizes and analyzes China's digital trade research through two methods: statistical analysis of data and bibliometric analysis. The statistical analysis method is mainly based on the statistical map of China Knowledge Network, which systematically analyzes the related literature research with the theme of digital trade at the macro level. Subsequently, the collected literature was screened, processed, and visualized using Citespace, which is a bibliometric analysis software developed by Prof. Chen Chaomei and his team and which can clearly express the time course and hot trends of a certain research field through the formation of relevant maps by time operation. The following are the specific steps of the analysis (Yuan et al., 2021).

First of all, from the China Knowledge Network to search the subject term "digital trade," as of March 2022, a total of 1,311 academic journals were retrieved. Among them, the literature from 1955 to 2008 has low relevance to digital trade, and most of them are on the topic of e-commerce, which involves the scope of digitalization research, so this paper does not take the literature before 2009 as the content of the study. After 2009, Tang Hongjuan, for the first time, used digital trade as the theme of the literature; the main content of the study is the digital trade industry brought about by consumer upgrading, explaining the characteristics of digital trade. In addition, the distribution of themes retrieved from China Knowledge Network shows that removing the theme of digital trade itself, the related literature is more often researched on the themes of digital economy, digital trade rules, high-quality development, and trade in services, and the secondary theme is researched on the themes of digital economy, WTO, digital transformation, and digital trade rules, and so on.

Secondly, in order to analyze the evolution of China's digital trade research more intuitively and reflect the authority of the digital trade research field, this paper sets the search conditions as core journals, CSSCI, EI, CSCD, and retains 424 relevant documents after eliminating irrelevant documents. The Citespace time slice is set to 1 year, the Top
N level is set to 200, and the 424 pieces of related literature are processed and run to derive the keyword covariance mapping.

Finally, this paper takes keywords as research indexes and analyzes in-depth the hotspots and cross-research contents of China’s digital trade frontiers after Citespace's processing of 424 documents.

3 RESULTS

According to the visualization mapping provided by China Knowledge (Figure 1), it can be seen that although the topic of digital trade appeared in scholars' research as early as 2009, the number of articles published before 2016 was extremely small, and it did not become a research hotspot at that time; the number of articles published in the field of digital trade research began to multiply after 2018, and it has become the forefront of the field of trade research in China. Combined with the research keyword emergence mapping (Figure 2) and keyword hotspots (Table 1) derived from Citespace runs, this paper analyzes the evolution of digital trade research into three stages.

Figure 2.1 2009-2022 digital trade literature China Knowledge Network (CN) Number of publications (articles)

Data source: China Knowledge Network
Research germination. At this stage, cross-border e-commerce trade is still the main activity of China's foreign trade, and it is also the initial stage of the penetration of digital technology into other industries, and scholars' attention mostly stays at the macro level of the digital economy, digital development, and so on. Research on China's digital trade has yet to be emphasized by Chinese scholars, with less published literature and no core journals focusing on digital
trade appeared before 2014. According to the keyword time zone mapping, it is found that fewer keywords appeared between 2014 and 2015, and keywords such as digital trade, digital economy, WTO, and e-commerce are mainly the research hotspots.

For example, a number of studies have examined the relationship between the digital economy and digital trade. They believe that with the rapid development of the digital economy, the breadth and depth of integration with various fields of the economy and society are expanding, giving rise to and aggregating all kinds of innovative elements, injecting new kinetic energy into the traditional trade field, and deriving digital trade (Liu Hang et al., 2019). There are also studies that, although digital trade is a derivative of the digital economy, the two are also complementary. In the category of digital economy, the part of a digital platform or carrier to realize commodity trade activities can be summarized as the category of digital trade, and the two exist in the field of digitalization with more overlap (Zhang et al., 2020).

Since the digital economy is interoperable with digital trade, there is also a certain impact of the digital economy on the development of trade. Chinese scholars have taken this as a starting point to study in depth the impact of the development of digital economy on trade. For example, Yao Zhanqi (2021) tested that digital economy has a significant impact on the competitiveness of China's foreign trade through panel data, and concluded that the higher the level of development of digital economy, the stronger the competitiveness of China's foreign trade. He Shuquan and Zhao Jingyuan measured the impact of the level of digital economy development on value-added trade in 42 countries, and the test results showed that the development of digital economy can effectively enhance the value-added of their countries' exports and reduce the cost of bilateral trade.

In addition, Chinese scholars have started their research on digital trade relatively late. However, scholars have drawn on the research on digital trade by developed countries and international organizations, analyzed the development pattern of digital trade and its role in the WTO, and explored the development path of China's digital trade. For example, Zhou Nianli and Li Yuhao (2017) take the United States and Europe as the research object, analyze the divergence points between the United States and Europe in the formulation of digital trade rules, and believe that data flow is the key research object in the global digital trade rules. Xu Hongqiang and Zhang Qi (2019) believe that the WTO system and rules need to be reformed in the new form and mode of international trade.
with the rapid growth of the digital economy and trade in services, and analyze in depth the demands of the United States, Europe, and Japan in the reform of the WTO, as well as the impact on China's participation in the WTO. There are also some scholars who analyze the connotation development and development trend of digital trade in the United States, Europe, and Japan, provide development paths and development strategies for China's digital trade, and believe that China should strengthen the top-level strategic design of digital trade, actively participate in the negotiation of the rules of digital trade, body east to support the sustainable development of line elements, and improve the construction of the domestic rules system of digital trade (Lan & Dou, 2019b; Xu & Zhang, 2019).

- Early stage of research: in the early stage of digital trade research, most scholars still favor the digital trade connotation research in international trade agreements, mainly in the TPP, international rules, trade agreements, etc. as the main research direction, and a part of the scholars according to China's trade form put forward the relevant coping strategies.

For example, some Chinese scholars interpret the connotation of digital trade from the macro level and put forward the situation and path of China's digital trade development. Li Zhongmin, Zhou Weiying et al. (2014) argue that digital trade is different from traditional trade methods, is an innovative business model, and provides content including digital products and digital services, and some scholars, such as Chen Liang, Xu Yuanlin, etc., mostly use the report's definition as a benchmark when conducting research related to digital trade. Ma Shuzhong, Fangchao and others (2018) believe that the U.S. version of the digital definition has great limitations, and propose that digital trade is a new type of trade activity that takes the modern information network as a carrier, efficiently exchanges traditional physical goods, digital products and services, and digitized knowledge and information through the time limit of the effective use of ICT, and then promotes the transformation of the consumer Internet to the industrial Internet and ultimately realizes the intellectualization of the manufacturing industry, which is a new trade activity. It is the expansion and extension of traditional trade in the era of digital economy.

In 2019, the China Information and Communications Technology Agency (ICTA) released the White Paper on the Development and Impact of Data Trade, which proposes that digital trade is trade in physical commodities facilitated by information technology
and trade in digital services transmitted through information networks, and this definition extends the connotation that digital trade has a service nature. Chinese scholars have extended the definition according to this definition, Liu Honggui (2020) believes that the definition given by the China Information and Communications Technology Academy is more complete and in line with reality, but the theoretical study of digital trade is still in the initial stage; Yang Xiao-juan and Li Xing-xu (2022) propose to analyze the connotation of digital trade in terms of the specific industry, which includes cross-border e-commerce based on the trade of goods, the digitized supply chain, and digital services trade, which is mainly trade of services, and supports the concept of service trade, which is mainly digital services trade, and supports the development of digital trade. They argue that digital trade includes cross-border e-commerce, digital supply chain, and digital service trade, which focuses on trade in goods, and support that the definition of the concept should be based on the nature of the transaction.

In addition, after analyzing the connotation of digital trade, Chinese academics have gradually begun to expand the research field for digital trade. It mainly analyzes the impact of digital trade in international trade. For example, most scholars believe that digital trade has increased the proportion of service trade, formed new trade barriers, trade friction in international trade, and changed the development trend of global trade (Liu Dian, 2021; Zhu, 2021; Wang, 2021). Although, at present, the meaning of digital trade barriers and the connotation of digital trade are in the same situation that has not been unified, but the existing research on digital trade barriers, are defined by the form of its barriers, more scholars believe that the form of digital trade barriers are mainly data, information flow security and other measures, and the multilateral trade agreement has not been updated still exists in the case of the regulation of digital taxes, trade in services, digital products and other regulatory dilemmas (He , 2012; Zhu, 2021; Li et al.) Based on China's current regulation on digital trade, the analysis from an industrial perspective shows that China's digital trade restrictive measures will have a dampening effect on the process of servitization of the manufacturing industry and restrictive initiatives in terms of intellectual property rights (Lan & Dou, 2019).

- Research Climax: After a relatively short initial development, China's digital trade is soon entering a climax phase. During the climax period, Chinese research literature shows a multiplying trend, and the research direction and keywords are constantly expanding. According to the keyword hotspots, it can be
seen that the keywords of Chinese academics on digital trade research tend to be micro, paying more attention to trade rules, trade friction, digital tax, data governance and other research objects.

For example, scholars to international trade regulations, agreements, and other specific institutional conditions as a research point of view, analysis of international organizations for the implementation of the relevant provisions and systems of digital trade. Yue Shumei and Xu Jun (2021) that the agreement OECD double pillar to establish a market-country-oriented tax system, the creation of new principles, and so on can highlight the sanctity of the public right of the digital economy, is conducive to promoting the standardization of global trade. Tan Guanfu (2021) believes that digital trade rules can be applied in the international trade law domain, but the WTO system can not be fully adapted, so the categorization of digital trade is an urgent need for events that should expand the applicability of digital trade rules.

Some scholars study the data circulation rulemaking as the common rules of the digital economy and digital trade and analyze the digital trade rules framework of WTO member countries. At present, countries have not yet reached a consistent consensus on the rules of cross-border data circulation, and most countries have constructed cross-border data circulation rules with local protection characteristics for the purpose of safeguarding their own interests (Zhou et al., 2017). WTO member countries also reach RTAs on the basis of bilateral, plurilateral, and inter-regional agreements to locally realize the regulation of cross-border data circulation through the enactment of relevant laws and regulations (Zhang et al., 2022). Nowadays, there is no consensus on whether the products or services that require cross-border data flow belong to trade in goods or trade in services, and academics mainly place them under the regulation of GATS to carry out research.

Further explored in 2020, digital technology is an important driver for the development of digital trade. For example, Tian Yunhua, Zhou Yanping, and others (2020) believe that AI is a new technological paradigm that revolutionizes the mode of existence with new production factors such as data resources, changes the form of international division of labor, makes the comparative advantages of countries shift, and then has a transformative effect on the international trade pattern. Liu Bin and Pan Tong (2021), through the empirical analysis of the division of labor in the manufacturing value chain, confirmed that artificial intelligence reduces the cost of trade, promotes
technology innovation, optimizes the allocation of resources, and further proves that digital trade has a positive impact on the global division of labor in production. However, digital technology still has a negative impact on countries with smaller exports. Wu Zhongqing and Dai Minghui (2021) empirically test the claim through RCPE member countries, arguing that digital technology and cross-border data flow can negatively affect trade costs when they are hindered within the group.

2021-2022 is the recovery period after the market experienced the epidemic, foreign trade is also greatly hindered, scholars research is difficult to get the field research, the research content continues the direction of the previous research, to expand the research.

In summary, with the continuous enrichment of the theoretical content of digital trade research, the domestic research direction tends to be diversified, and the research hotspot is no longer a single persistent but an iterative trend of hotspot in favor of practicality. Domestic scholars put forward the development path of digital trade according to China's national conditions, and formulate China's digital trade rule system by combining the digital trade rules in the international arena. From the sudden change of the keyword "China" in recent years, it can be seen that the perspective of domestic scholars has shifted from learning the development path of foreign countries to studying the development trend of their own, which also echoes the evolution of China's digital trade research.

4 CONCLUSION

Based on the evolution of the concept of digital trade, this paper adopts the bibliometric analysis method and selects the core journal literature on China's digital trade to deeply analyze the evolution process and research hotspots in the field of China's digital trade research. According to the analysis results, the following relevant conclusions are drawn:

- The continuous improvement of the meaning of digital trade has prompted the continuous transformation of China's trade forms, utilized the new trade connotation, enriched the relevant theoretical and practical innovation methods at the Chinese trade level, and promoted the continuous development of trade-related research. Combined with the different stages of digital trade research, it is found that the intermediary effect of the digital economy and digital technology to
promote cross-border e-commerce and the reform of the international trade system, as well as the platform economy, data flow, trade in services and other aspects of the practical application of the platform economy, data flow, trade in services and other aspects of the digital trade have fully proved that the digital trade can reduce the cost of trade, improve the value-added trade in services, and promote the transformation of international trade.

- With the continuous development of digital trade, trade laws, trade forms, trade barriers, and related strategic deployment have undergone great changes. China raised the issue of digital trade development at the G20 Summit, and in recent years, relevant research has centered on digital trade, taking data flow and data security as the main object of research on trade laws, proposing data security protection and data circulation related measures as the relevant theories to solve trade barriers, and making it clear that online data flow as a factor of production nowadays leads to great changes in the form of trade, and advancing the development of China's trade law and strategy. Trade academics on key elements and strategic deployment and other research issues.

- The research period of digital trade as a research object in China is relatively short, and most of the issues still remain at the macro level. For example, digital technology promotes trade efficiency and reduces trade costs, but the consequent substitution of labor costs, labor force transfer and re-employment, and other issues have not been studied in depth; and, with digital trade as the research angle, the micro research on the development of small and medium-sized enterprises whether there is an impact on the development of the micro research has not yet been carried out in the OECD published research literature has been the impact of digital trade on the development of medium-sized enterprises in the relevant content. The impact of digital trade on the development of Chinese enterprises has already been covered in the research literature published by the OECD. Now, China should speed up the research on the micro level of digital trade, establish a relevant index system for the high-quality development of China's digital trade, combine the international trade law with the "Belt and Road" development strategy, improve the framework system for the development of China's digital trade, and put forward China's digital trade development path.
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