



Bibliometric Study of Emerging Technology Trends in E-Commerce

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Abstract

In recent years, the interest of electronic commerce (E-commerce) has emerged among researchers. However, a comprehensive synthesis of the pertinent literature in this domain remains lacking. To achieve this objective, an approach in bibliometric analysis was employed. The bibliometric analysis identified a dataset comprising 1219 documents, revealing an insight into the research landscape concerning technology trends in e-commerce. The findings from the bibliometric analysis reveals that the core research themes are business & user behavior, computer science & cybernetics, mathematics, and interdisciplinary applications. As a result, this research also gives the prominence of China-based institutions as leaders in this area. Additionally, most research papers concerning technology in augmented reality, blockchain, and artificial intelligence are the top emerging technology trends in e-commerce. Overall, this research aspires to empower researchers and practitioners with actionable insights and pave the way forward for fruitful advancements in the dynamic field of technology in e-commerce.

Keywords: e-commerce, technology trends, business, bibliometrics

1. Introduction

The e-commerce industry has emerged, fundamentally reshaping consumer behavior and business operations. This transformative influence has been driven by a several factors, including the pervasive used of the internet and the widespread adoption of mobile devices. Over the past few years, these technological advancements have engendered profound changes in the e-commerce and retail sectors, leading to heightened access to information and increased consumer satisfaction.

Moreover, the impact of technology extends beyond the customer experience, such as the implementation of advanced technology in e-commerce application. The rise of mobile devices has facilitated a surge in mobile commerce, enabling customers to engage in transactions

conveniently and securely while on the move. Previous research conducted by Alimamy & Gnoth (2022) and Barta et al. (2023) have substantiated the profound impact of Augmented Reality (AR) adoption on users' shopping behaviors and overall shopping experiences. The empirical evidence from these studies underscores the considerable advantages AR technology provides users, empowering them to make well-informed decisions and heightening their overall satisfaction during the shopping journey. Additionally, the automatic shopping has emerged as another noteworthy innovation in the e-commerce domain, drawing attention in the extant literature (Li & Wang, 2023; Odeh & Direkoglu, 2020). The advent of Virtual Reality (VR) introduces promising and novel prospects for the e-commerce industry, particularly concerning creating and implementing shopping services (Hsu et al., 2020). On the other side, the shop with the look by visual search also being a new trend in finding a product (Dagan et al., 2023; Nurrosyidah & Wang, 2023). The e-commerce sector navigates a complex and dynamic terrain in light of these developments. Despite the exponential proliferation and widespread dissemination of information on the topic at hand, a comprehensive synthesis of knowledge remains conspicuously absent in the scientific literature. Previous literature study on e-commerce mainly discussed the research on e-commerce in general with a single keyword (Chen et al., 2022; Mahendra & Yoshiki, 2015; Mou et al., 2019). Notwithstanding the rapid advancement of research and the substantial increase in scholarly publications about emerging technology in e-commerce, a coherent and integrated overview that consolidates the diverse spectrum of findings and insights is notably lacking.

The synthesis of research about technology trends in e-commerce is an indispensable prerequisite for advancing knowledge, as it furnishes the foundational context necessary for describing, comprehending, and explaining various phenomena (Cram et al., 2020). Consequently, the primary objective of this study is to comprehensively synthesize existing research on technology trends in e-commerce while also providing valuable insights to guide future research endeavors within the domain of management. To achieve this goal, an approach of bibliometric analysis has been employed, offering an innovative and rigorous means to address the research question in the current landscape of technology trends in e-commerce research. This paper delves into the multifaceted impacts of technology on the e-commerce industry, drawing insights from various scholarly sources and empirical studies. Through a comprehensive literature review, we aim to elucidate the pivotal role of technology in shaping the e-commerce landscape and discuss its implications for businesses and consumers alike. As technology continues to evolve, e-commerce is poised to undergo further transformation, and this paper contributes to a deeper understanding of the intricate relationship between technology and the e-commerce ecosystem.

2. Methodology

The utilization of bibliometric analysis has become a growing trend in academic research as an entire discipline. This approach is employed to assess the influence and impact of authors, journals, and institutions within a particular area of research, including the field of management and information system (Hassan & Loebbecke, 2017). This study employs a bibliometric methodology using CiteSpace software, which encompasses three fundamental phases: data collection, data analysis, and data visualization. In the data collection phase, we queried,

selected, and extracted data from designated databases. Specifically, our data sample was obtained by querying the Web of Science (WoS) core databases to identify publications from the most recent five-year period, encompassing the years 2018 to 2023, during which e-commerce exhibited significant development. WoS was chosen as the primary database due to its ability to provide high-quality bibliometric information, given its extensive coverage of impactful journals, as substantiated by previous research (Chadegani et al., 2013). The search string utilized for querying the titles, keywords, and abstracts of all documents within the WoS collection is as follows:

(“Electronic Commerce” OR “Internet Commerce” OR “e-commerce” OR “e-business” OR “ecommerce” OR “ebusiness” OR “online shopping” OR “internet shopping” OR “virtual shopping” OR “livestream shopping” OR “electronic wallet” OR “e-wallet” OR “ewallet”)

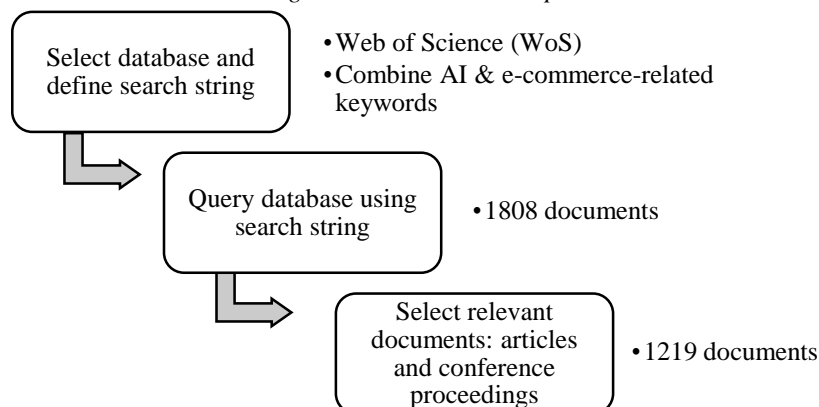
AND

(“Artificial intelligence” OR “Augmented Reality” OR “Visual Search” OR “Voice Search” OR “metaverse” OR “chatbot” OR “Internet of Things” OR “IoT” OR “Autonomous” OR “Predictive Analytics” OR “Virtual Reality” OR “Blockchain”)

The subsequent stages of data analysis and visualization are vital components of this study’s bibliometric methodology using CiteSpace software from WoS database result, enabling us to draw valuable insights and patterns from the collected data. Through this rigorous approach, we aim to contribute to the existing body of knowledge in the field of management and information system, fostering a deeper understanding of the trends and advancements in e-commerce research during the specified timeframe.

Implementing the specified search string yielded a total of 1808 documents, forming the initial dataset for this research endeavor. To ensure the integrity and validity of the dataset, a filtering process was undertaken, wherein only document types classified as articles and proceeding papers were retained for inclusion in the study. This selection criterion was predicated on the understanding that articles and proceeding papers generally undergo rigorous peer-review before being accepted for publication, thereby ensuring a higher level of scholarly rigor and credibility (Milian et al., 2019). Consequently, after the rigorous filtering procedure, 1219 documents remained in the final dataset, constituting the corpus employed for our comprehensive bibliometric analysis. The data collection phase is summarized in Figure 1.

Figure 1: Data collection phase



3. Findings

Content analysis in bibliometric research are valuable methodologies to gain a deeper understanding of the knowledge clusters (Bhandari, 2022). In this study, content analysis has been utilized to discern prevailing trends in the realms of e-commerce and technology and anticipate potential future research directions. During five years, there are 1219 publication papers between 2018-2023, averaging 240 publications per year. The highest number of publications was 367 documents in 2022 and expected to increase significantly at the end of 2023. Figure 2 presents the top country publishing on emerging technology in e-commerce. The graph represents the geographical dispersion of the publication on technology trends in e-commerce. As expected, China appears the most frequently in publications, with the highest citation count of 513. They have over two times as many appearances as USA-based affiliations in the second position. India placed in third position with a citation count of 117.

Figure 2: Top countries contributing to research on emerging technology in e-commerce



Table 1 list the top three emerging technology in e-commerce based on the keyword on the total publication within five years. Analyzing the most keyword in the dataset reveals that AR is the main topic of interest in the e-commerce technology trend research area. AR also has investigated many aspects related to e-commerce and the industry, with the top topic from Masood & Egger (2019) being the top-cited article on AR implementation. Thus, research focusing on blockchain technology placed number two, most used in the logistic aspects for supporting e-commerce circulation with the top cited article from Kamble et al. (2019). The trend in AI also being the third top interest.

Table 1: Top three emerging technology trends in e-commerce in five years

Number	Technology	Most cited article	Times cited
1	Augmented reality	Masood, T & Egger, J (2019) Augmented reality in support of Industry 4.0-Implementation challenges and success factors. <i>Robotics and Computer-Integrated Manufacturing</i> , 58 181-195	351
2	Blockchain technology	Kamble et al (2019). Understanding the Blockchain technology adoption in supply chains-Indian context. <i>International Journal of Production Research</i> , 57 (7) 2009-2033	655
3	Artificial intelligence	Adam et al (2021). AI-based chatbots in customer service and their effects on user compliance. <i>Electronic Markets</i> , 31 427-445	506

Three themes characterize research on emerging technology trends in e-commerce: business & user behavior, computer science & cybernetics, mathematics, and interdisciplinary applications. Table 2 exhibits the keyword clusters that facilitated the identification of these themes. The business and user behavior theme represents the stream of research focused on interpreting the behavior, experience, and intention due to utilization of an e-commerce platform or certain technology. Computer science and cybernetics represent the technical aspects of technology performance in e-commerce. Finally, the mathematics and interdisciplinary application represents the use of algorithm to solve optimization or make personalized recommendation for consumers in e-commerce using several techniques such as natural language processing, machine learning, or deep learning.

Table 2: Main research theme for emerging technology trends in e-commerce

Cluster	Research theme	Corresponding keywords
1	Business and user behavior	E-commerce, trust, acceptance, behavior, experience, intention, satisfaction, purchase intention, technology acceptance model, perceived risk, consumers, consumer behavior, service quality, continuance intention, information overload, engagement, structural equation models, attitude
2	Computer science, cybernetics	Technology, internet, framework, internet of things, big data, systems, blockchain technology, security, supply chain management, industry, cloud, privacy protection, decision system, integration
3	Mathematics and interdisciplinary applications	Machine learning, deep learning, networks, optimization, sentiment analysts, predictive, recommender system, neural networks, algorithm, autonomous, natural language processing,

4. Discussion

The landscape of e-commerce is currently advanced by the convergence of digitalization, artificial intelligence, and the expanding technology. The study sought to propose potential avenues for future investigations in this domain of e-commerce. Over the examined period, there has been a steady and discernible increase in research output on technological aspects within the context of e-commerce since 2018, signifying a progressive interest in exploring the several applications of technology in this field (Bawack et al., 2022). Notably, research contributions from Chinese institutions have assumed a prominent position in this domain. At the same time, affiliations from the United States have garnered comparatively higher citation rates, underlining the global impact of their contributions. Noteworthy observations reveal that the most prominent e-commerce companies on a global scale, as gauged by market capitalization, revenue, and workforce size, prominently feature Amazon Inc. (USA), JD.com (China), Alibaba Group Holding Ltd. (China), eBay (USA), and Groupon (USA), with a majority of these significant entities hailing from China and the USA. Such findings provide valuable insights into the dynamic landscape of technology-driven e-commerce and underscore the dominant influence of China and the USA in this sector.

This study reveals the top technology trends as a keyword in e-commerce research in AR, blockchain, and AI topics. Thus, researchers could use these technologies as the topic directions, and practitioners also can use them to build more preferred e-commerce systems. AR constitutes a groundbreaking technology that seamlessly amalgamates virtual elements into

the real-world environment (Barta et al., 2023). This phenomenon empowers consumers to perceive various aspects of products seamlessly integrated with their surroundings, consequently facilitating their decision-making process (Dacko, 2017). The trend in AI also being the third top interest. In precise terms, AI is revolutionizing the e-commerce domain through its remarkable capabilities in comprehending external data, learning from it, and applying it to achieve defined goals and tasks with adaptive flexibility (Kaplan & Haenlein, 2019). This transformation significantly influences how e-commerce operates, presenting novel opportunities for enhancing consumer experiences, optimizing business processes, and driving growth in the digital marketplace.

Furthermore, this study also highlights user behavior and intention as the core themes related to technology utilization in the e-commerce research area. The fundamental concept of user behavior in e-commerce pertains to how individuals employ technology to fulfill their objectives. A wealth of prior research has shed light on various facets of search behavior in the online realm, encompassing user involvement, knowledge acquisition, and experiential elements (C. Haridasan et al., 2021; Dutta & Das, 2017). Exploring user behavior in this domain is crucial as it provides valuable insights into the patterns of engagement exhibited by individuals in their interactions with e-commerce applications. Specifically, it could help researchers and practitioners to improve the quality of e-commerce.

5. Conclusion

Technology has emerged in delineating competitive advantages between rival firms operating in e-commerce environments. This study comprehensively presents the current state of emerging technology research in e-commerce through an investigation utilizing bibliometric analysis by CiteSpace software. The findings derived from the bibliometric analysis underscore the prominence of China and the USA as frontrunners in AI research in e-commerce. Notably, augmented reality has emerged as the most focal topic in e-commerce technology implementation. The primary research themes in this area encompass business & user behavior, computer science & cybernetics, mathematics, and interdisciplinary applications. Considering the insights garnered from this investigation, the paper identifies and discusses compelling opportunities for future research. Furthermore, it delves into promising directions for future inquiries into technology trends in e-commerce.

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