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Makale Adı/Article Name

E-Commerce Logistics in the Grip of Digital Transformation: A Review of the Literature from the Perspective of Technology Management

Dijital Dönüşüm Kıskacında E-Ticaret Lojistiği: Teknoloji Yönetimi Perspektifinden Bir Literatür Haritalaması

ABSTRACT

Changes and developments in the global order have brought about a significant differentiation in companies' sales strategies and consumers' purchasing behavior. This differentiation has also increased the strategic importance of e-commerce logistics and technology management. The limited number of bibliometric studies that address e-commerce logistics and technology management together forms the starting point of this study. Although numerous studies have examined e-commerce, logistics, and technology separately, bibliometric studies that address e-commerce logistics and technology management together remain limited in the literature. This study aims to fill this gap by providing a comprehensive bibliometric analysis of academic publications produced in this field. To this end, a detailed search was conducted in the Web of Science database on December 31, 2025. The keywords selected for searching the database were "e-commerce logistics", "technology management", "technology", and "logistics". The selected keywords were searched in the database with a limitation applied to all fields. As a result of the search, data from 824 studies published between 2015 and 2025 were obtained. After detailed examination, the obtained data were transferred to the Vosviewer bibliographic analysis program and various analyses were performed. In this study, network mapping, co-authorship analysis, country citation analysis, country citation matching, keyword analysis, and bibliographic matching analysis of texts were performed on the concepts of e-commerce logistics and technology management. The findings reveal that publication output in the field showed a significant upward trend, particularly after 2021, reaching its peak in 2025 with 125 publications. China emerged as the most productive and influential country in terms of both publication volume and citation impact, while the most frequently used keywords were "e-commerce," "logistics," "cross-border e-commerce," and "sustainability." This study contributes to the literature by mapping the intellectual framework, thematic evolution, and global research trends in the fields of e-commerce logistics and technology management. Furthermore, it offers a guiding conceptual and analytical framework for future researchers who wish to investigate developments emerging in this interdisciplinary field.

Keywords: E-commerce, e-commerce logistics, technology management,technology, bibliometric analysis, Vosviewer.

ÖZ

Dünya düzeninde ortaya çıkan değişimler ve gelişmeler şirketlerin satış stratejileri ile tüketicilerin satın alma davranışlarında belirgin bir farklılaşmayı da beraberinde getirmiştir. Bu farklılaşma e-ticaret lojistiği ve teknoloji yönetiminin stratejik önemini de artırmıştır. E-ticaret lojistiği ile teknoloji yönetimini birlikte ele alan bibliyometrik çalışmaların sınırlı olması bu çalışmanın çıkış noktasını oluşturmaktadır. Çok sayıda çalışma e-ticaret, lojistik ve teknolojiyi ayrı ayrı incelemiş olsa da, e-ticaret lojistiği ve teknoloji yönetimini birlikte ele alan bibliyometrik çalışmalar literatürde sınırlı kalmıştır. Bu çalışma, bu alanda üretilen akademik yayınların kapsamlı bir bibliyometrik analizini sağlayarak bu boşluğu doldurmayı amaçlamaktadır. Bu amaç doğrultusunda 31.12.2025 tarihinde Web of Science veri tabanında detaylı bir araştırma yapılmıştır. Veri tabanında araştırma yapmak için kullanılan anahtar kelimeleri "e-commerce logistics" ve "technology management" ve "technology" ve "logistics" olarak seçilmiştir. Seçilen anahtar kelimeler veri tabanında bütün alanlar sınırlaması yapılarak aratılmıştır. Tarama sonucunda, 2015-2025 yılları arasında yayınlanan 824 çalışma verisi elde edilmiş, detaylı inceleme sonrası elde edilen veriler Vosviewer bibliyografik analiz programına aktarılmış ve çeşitli analizler yapılmıştır. Çalışmada E- ticaret lojistiği ve teknoloji yönetimi kavramlarının ağ haritalaması, ortak yazarlık analizi, ülkelerin atıf analizi, ülke atıf eşleştirmesi, anahtar sözcük analizi ve metinlerin bibliyografik eşleşme analizi yapılmıştır. Bulgular, alandaki yayın çıktısının özellikle 2021'den sonra önemli bir yükseliş trendi gösterdiğini ve 2025'te 125 yayınla en yüksek seviyesine ulaştığını ortaya koymaktadır. Çin, hem yayın hacmi hem de atıf etkisi açısından en üretken ve etkili ülke olarak öne çıkarken, en sık kullanılan anahtar kelimeler "e-ticaret", "lojistik", "sınır ötesi e-ticaret" ve "sürdürülebilirlik" olmuştur. Bu çalışma, e-ticaret lojistiği ve teknoloji yönetimi alanındaki entelektüel yapıyı, tematik evrimi ve küresel araştırma trendlerini haritalandırarak literatüre katkıda bulunmaktadır. Dahası, bu disiplinlerarası alanda ortaya çıkan gelişmeleri araştırmak isteyen gelecekteki araştırmacılar için yol gösterici bir kavramsal ve analitik çerçeve sunmaktadır.

Anahtar Kelimeler: E-ticaret, e-ticaret lojistiği, teknoloji yönetimi, teknoloji, bibliyometrik analiz, Vosviewer.

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Introduction

Change processes are unconventional, often difficult to accept, and time-consuming. Every transformation has been triggered by a powerful force. While this force was steam during the first industrial revolution, it is the internet and cyber-physical systems that are driving the technological transformation we are witnessing today (Gerekli et al., 2021). Rising inflation, climate change, population growth, and wars around the world have forced people and organizations to think differently, reconsider their consumption habits, and diversify their purchasing behavior. This process has forced people to live more cautiously. For a very long time, technology has been evolving from a mechanical world to a digital world. Computers, the internet, social media, and mobile phones are fundamentally changing producer and consumer behavior. This transformation also makes technology management crucial. The use of these technologies in organizations has encouraged both consumers and suppliers to think more intelligently. Throughout the supply chain, this technological transformation has made a significant contribution to meeting the increasing expectations of the end consumer and improving and managing transportation processes on the supply side (Sandhaus, 2019). In the context of purchasing behavior, specific factors such as delivery tracking, ease of returns, convenient delivery location, and delivery time positively influence customer satisfaction. In the evolving environment of e-commerce, effective logistics have been shown to play a critical role (Zia et al., 2024), contributing to the sustainability of businesses and repeat purchases. Research has shown that effective logistics activities, such as on-time and reliable delivery, improve customer experiences and shape purchasing decisions. Therefore, logistics quality is vital for developing long-term customer relationships in the online shopping sector (Choi et al., 2019).

As digital transformation re-differentiates business operations, the relationship between e-commerce logistics and technology management has become increasingly important. With the recent growth of e-commerce and the development of the delivery and logistics sector, different solutions have emerged in this field (Yu et al, 2016).Given its dynamic and interactive structure, e-commerce, and its crucial sales strategies, utilizes advanced technology management for logistics management to increase efficiency, optimize distribution processes, and improve resource utilization. The rapid increase in e-commerce sales in recent years has significantly reduced the rate at which professional managers in the global market can meet consumer demands (Rejeb et al, 2020). Traditional logistics methods are struggling significantly to meet the dynamic requirements of e-commerce. Traditional logistics methods pose a significant obstacle to the growth of e-commerce because they cause substantial costs and delays that customers cannot accept (Kalkha et al, 2023). While a considerable number of people still shop using traditional methods, the number of consumers who want everything delivered to their doorstep without stepping outside their comfort zone is increasing exponentially every day. Many global organizations, unable to ignore this change in their customer portfolios, have also invested in this transformation. Companies' perception of customer satisfaction has also transformed in line with evolving demand. In today's highly competitive market conditions with strong customer demands, adapting to this consumer behavior has become even more important for all stakeholders (Moriuchi & Takahashi, 2016).

This study aims to provide a comprehensive framework to guide future scientific research by systematically identifying the development trends, prominent themes, and research gaps in academic work produced in the fields of e-commerce logistics and technology management. A detailed literature review revealed that there are a limited number of studies that bibliometrically examine the relationship between e-commerce logistics and technology management. In this context, the study will conduct a bibliometric analysis of publications on the concepts of e-commerce logistics and technology management to identify prominent trends in research on these concepts.It is believed that bringing this concept to the attention of researchers working in the social sciences and other fields will be important for future research in this area. This study, which presents a quantitative overview of the literature, also aims to offer a methodological perspective based on the findings that emerged from the conceptual framework for future researchers.

1. Conceptual Framework

This section of the study theoretically explains the concepts of e-commerce, e-commerce logistics, and technology management.

1.1. E-Commerce and E-Commerce Logistics

Today, the ability to deliver products manufactured in the most remote corners of the world to the end consumer on the other side, through communication and supply chains and information technologies, encourages people and businesses—the most important building blocks of organizations—to make sales through this channel. E-commerce, or electronic commerce, refers to the buying and selling of goods and services over the internet, involving the transfer of money and data to complete these transactions. In other words, e-commerce is a broader concept encompassing the marketplace where goods and services are bought and sold over the Internet (Siregar et al., 2024). This type of trade, which presents advantages and disadvantages for both the seller and the buyer, has not only facilitated the emergence of new intermediaries but has also offered businesses many new and efficient solutions in today's modern market conditions thanks to its structure that simplifies transactions (Tuli et al., 2022). As people adopted and spread this consumption habit, e-commerce, along with technological innovations such as online marketplaces and mobile commerce, has added new value to vital components of the global economy. First introduced by Thomson Holidays in 1981, the type of e-commerce called Business to Business (B2B) is considered the beginning of trade between companies. Business-to-consumer (B2C) e-commerce, on the other hand, found its application area with certain technologies in the early 1990s, when online shopping became preferred in the 1980s (Diker & Varol, 2013). Mobile devices, which have become the most commonly used tools in daily routines, are also central to all consumption habits of this generation. E-commerce benefits businesses through expanded market reach and lower costs, while consumers have much easier access to final products. Consumers have increasingly preferred e-commerce due to the convenience it provides, the unavailability of desired products in physical stores, competitive pricing, and promotions offered by online retailers (Deswita et al., 2024). Perhaps its most important feature is its ability to provide 24/7 service globally (Irmak, 2023). E-commerce offers a significant competitive advantage due to its lower operating costs compared to traditional commerce. This directly leads to lower product prices, making it possible to reach a wider customer base. E-commerce logistics is a crucial element in the online retail ecosystem and has a significant impact on customer satisfaction and business success. The expected performance of the logistics process in e-commerce is less tolerant in terms of desired convenience compared to traditional commerce. In this context, managing the supply chain, transportation, warehousing, and last-mile delivery is of paramount importance to ensure that the right order is delivered to the desired delivery point at the right time. It is argued that integrating advanced technologies and strategic logistics management practices increases efficiency and customer satisfaction. In addition, timely delivery of goods, accurate execution of customer order operations, and smooth return procedures are of great importance in fostering trust and loyalty among consumers. Furthermore, the strategic integration of artificial intelligence and real-time monitoring of sustainable practices have emerged as a significant differentiating factor. The highly competitive e-commerce market has forced major players to invest in transforming their delivery and logistics departments. These departments are extremely important to the end consumer and are key to the overall success of the company. Furthermore, in the e-commerce sector, reverse logistics activities play a significant role in shaping consumer preferences and satisfaction, particularly in the fashion industry. Consumers positively differentiate companies that manage exchange and return processes well, leading to better purchasing behavior in their next purchase.

1.2. Technology Management

Businesses, whose lifespans are considered unlimited, strive to adapt to the ecosystems in which they operate in order to survive. Although organizations have legal personality, they exist for a simple purpose: to generate profit and ensure their continued existence for generations. In today's

market conditions, achieving this is fundamentally based on technology and the management of technologies. Technology management involves the development, implementation, and marketing of technological innovations (Yağcı & Çabuk, 2014). Technology management is a critical area where organizations invest to create a competitive advantage. To discuss technology management within an organization requires a deep understanding of the life cycles of technology, products, processes, and systems. Another contribution of technology management to organizations is its ability to pool financial resources. In this context, it facilitates decision-making on financial matters and promotes innovation and organizational learning within organizations (García-Camacho et al., 2024). In their 1991 study, Collins et al. defined the scope of technology management as the procedures for designing and using technology to achieve economic and social goals, including technology acquisition, new product development, project management, innovation, R&D management, and strategic technology management (Tidd & Nightingale, n.d.). In the context of supply chains, one of the most important contributions of technology management to organizations' operations is leading to innovations in logistics. In addition to all this, technology management has also increased operational efficiency and customer satisfaction (Wang, 2017). In this research, e-commerce, e-commerce logistics, and technology management are explained as complementary conceptual wholes. This conceptual unity strengthens the interdisciplinary nature of the study and systematically reveals the interaction between these fields. While e-commerce forms the main axis explaining the structural transformation of the digital commerce ecosystem, e-commerce logistics reveals the operational and procedural dimensions of this transformation. Technology management, on the other hand, provides a strategic overarching framework that explains how these operational processes are undergoing a transformation in terms of innovation, efficiency, and competitive advantage. The bibliometric analysis conducted prevents the study from remaining at a descriptive level, allowing for an analytical and critical evaluation of the findings.

2. Methodology and Method

This research aims to provide a holistic and comprehensive perspective on the field of e-commerce logistics and technology management by examining studies on these topics using bibliometric analysis methods. In addition to being a convenient way to examine and analyze large scientific data, this analytical method also sheds light on the development and innovations of a particular field or subject over time. This research, which utilized bibliometric analysis methods, sought answers to several questions. The questions prepared for the research topics are as follows:

- ✓ Countries where research on e-commerce logistics and technology management was conducted between 2015-2025,
- ✓ Web of Science indexes of research on e-commerce logistics and technology management between 2015-2025,
- ✓ Citations and citation years of research on e-commerce logistics and technology management between 2015-2025,
- ✓ Keywords of research on e-commerce logistics and technology management between 2015-2025,
- ✓ This data is prepared using the publication years of research on e-commerce logistics and technology management between 2015 and 2025.

2.1. Data Collection

The research data was obtained from the Web of Science database, which is both a high-quality and reliable source in terms of publication ethics. Studies conducted using this database are considered more reliable because it has advanced search tools for data analysis and numerous data collections from various disciplines (Dirik et al., 2023:173).

On December 31, 2025, a search was conducted in the Web of Science database using the keywords “e-commerce logistics”, “technology management”, “technology”, and “logistics”. The selected keywords were searched across all fields in the database.

The search yielded data from a total of 824 studies published over a 10-year period between 2015 and 2025. The document type options selected are: article, conference paper, book chapter, and early view study. The annotations revealed 584 journal articles from various disciplines, along with 213 conference papers, 27 review articles, and 34 early-view studies. When the study areas were examined, it was determined that the majority of the studies were in the field of business economics (311), and various studies were also conducted in fields such as engineering (244), computer science (214) and operations research (136).

Studies conducted using the Vosviewer program do not require ethical committee approval (Erer, 2023; Yeşiltaş, 2021). Since the data used in this research was obtained by examining studies already available in an online database through a program, ethical committee approval was not required.

3. Findings

This research, which utilized a bibliometric analysis method, examined studies that combined the concepts of e-commerce logistics and technology management, and concluded that 824 studies were conducted between 2015 and 2025. The distribution of these studies by year, based on the data obtained from the search, is shown in Chart 1.

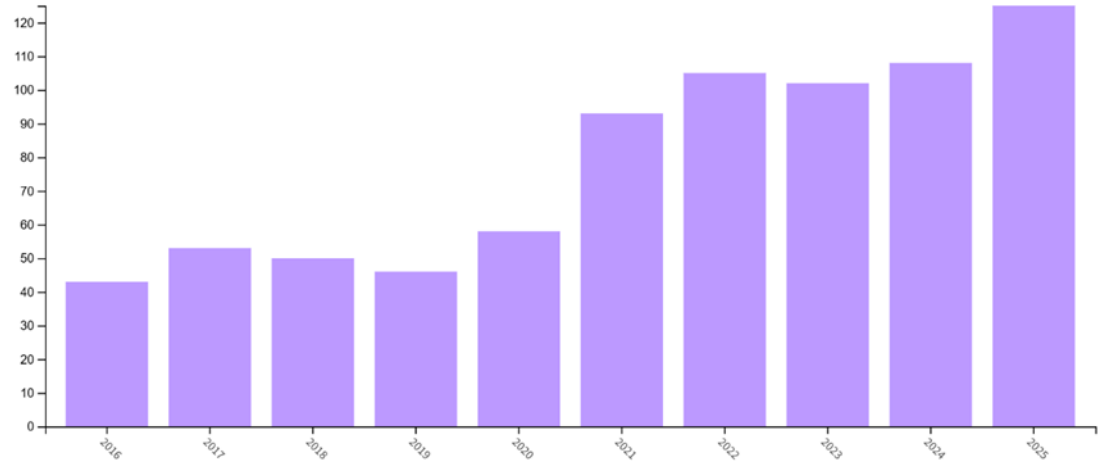

Chart 1. Distribution of Studies by Year

Graph 1 shows the distribution of studies on e-commerce logistics and technology management conducted between 2015 and 2025. According to this graph, the highest number of publications on these concepts was in 2025 with 125 publications. This was followed by 2024 with 108 publications and 2022 with 102 publications. Interest in these concepts increased significantly, particularly after 2021. This is due to an examination of studies scanned in the Web of Science, which revealed a significant shift in consumer habits following the pandemic. People adopted a more distanced lifestyle and tended to use different consumption channels to meet their needs. Businesses and organizations that adapted nimbly to this situation invested in e-commerce supply chains, the technologies they used, and their technology management.

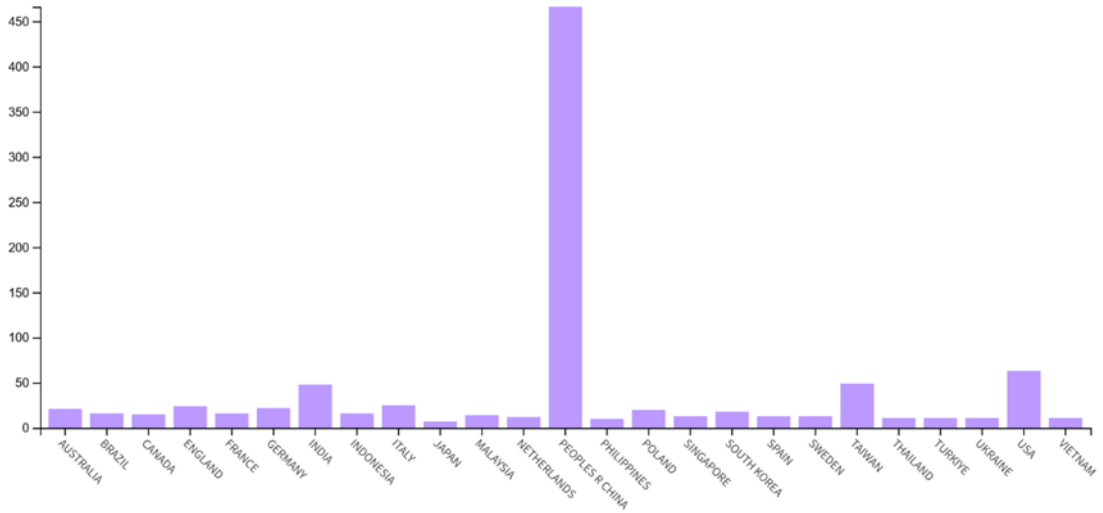

Chart 2. Distribution of Studies by Country

Figure 2 shows the distribution of studies on e-commerce logistics and technology management conducted between 2015 and 2025, categorized by country. According to the graph, China has the highest number of publications with 466 studies. China is followed by the United States with 63 studies and Taiwan with 49 studies. Turkey is represented in the graph with 11 studies.

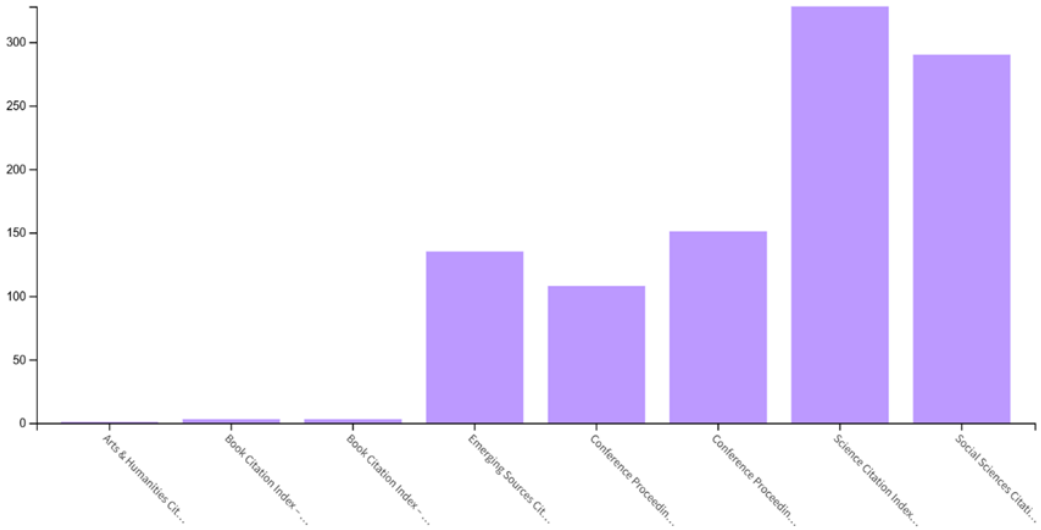

Chart 3. Distribution of Studies According to Web of Science Indexes

Figure 3 shows the distribution of studies on e-commerce logistics and technology management conducted between 2015 and 2025 according to Web of Science indexes. The graph reveals that a significant proportion of the publications, 328, are indexed in the Science Citation Index Expanded (SCI-Expanded). The Social Sciences Citation Index (SSCI) ranks second with 290 publications, and the Emerging Sources Citation Index (ESCI) ranks third with 135 publications.

3.1. Network Mapping of E-commerce Logistics and Technology Management Concepts

As a result of research conducted through the Web of Science database, data from 824 studies related to e-commerce logistics and technology management concepts were transferred to the Vosviewer analysis program. The mappings resulting from the analyses performed as a result of this transfer are given in detail below.

3.1.1. Co-authorship Analysis

According to the co-authorship analysis, a network map was created as shown in Figure 1 by selecting at least 1 publication and at least 1 citation criterion to identify the most related and collaborating authors. According to the analysis performed among the names with the highest connections, 44 names clustered in 8 groups and a total of 122 connections were observed. It was seen that the most cited authors were Pankaj Dutta (926), Tsan-Ming Choi (863), Richa Butala (822) and Surabhi Somani (822), and that they were not the most related authors.

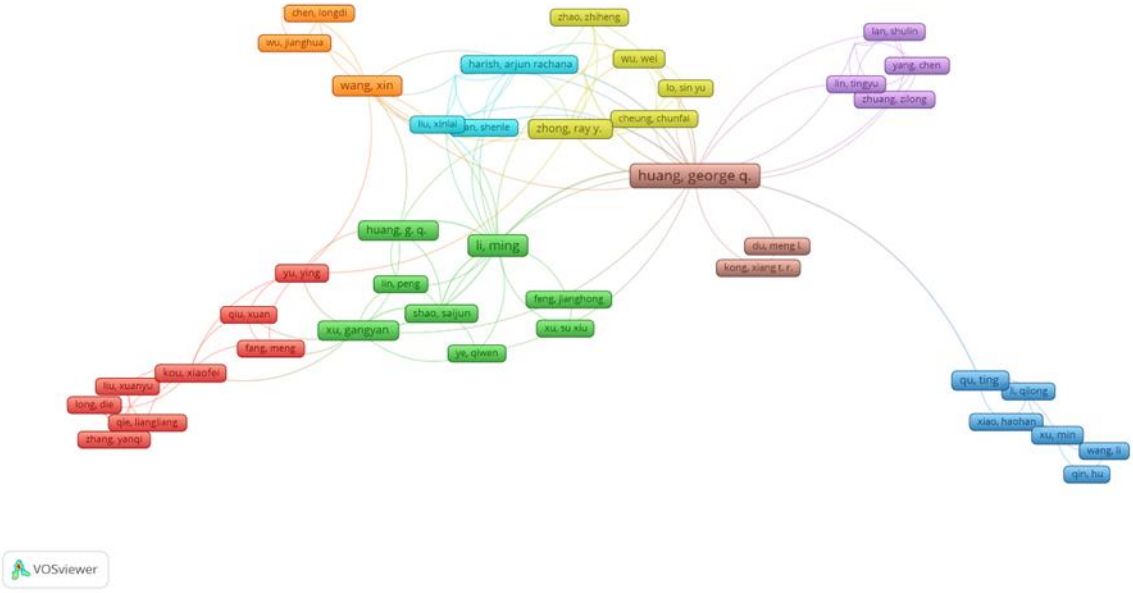

Figure 1. Co-author ties showing collaboration between authors

3.1.2. Citation Analysis of Authors

To identify author citation networks, the network map shown in Figure 2 was created with the criterion of at least 1 publication and at least 1 citation. Analysis of 573 interconnected units revealed a total of 23 clusters, 2905 connections, and a total connection strength of 3132. The most cited authors were identified as Pankaj Dutta (926), Tsan-Ming Choi (863), Richa Butala (822), and Surabhi Somani (822).

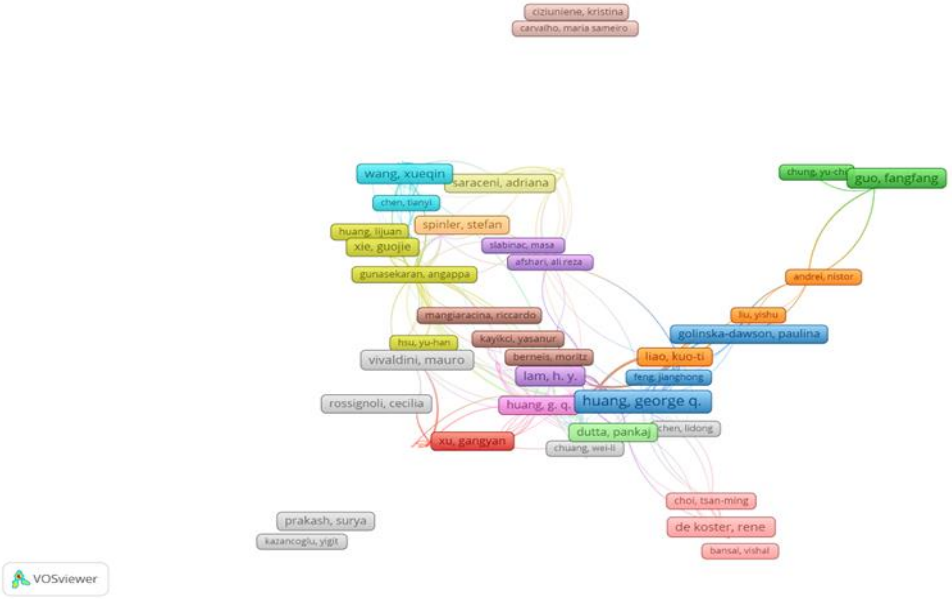

Figure 2. Authors' Citation Links

3.1.3. Citation Analysis of Countries

To create a network map of citations received by publications according to their country, an analysis was conducted on 50 observation units with interrelationships, based on the criterion of a country publishing at least one work and receiving at least one citation. The resulting mapping is shown in Figure 3. 12 clusters, 226 connections, and a total connection strength of 607 were identified. The countries with the most citations were China (6486 citations), India (2395 citations), and the USA (1977 citations). In terms of total connection strength, China, the USA, and the UK are in the top three. In terms of the number of publications, the ranking is China (466 publications), the USA (63 publications), and Taiwan (49 publications).

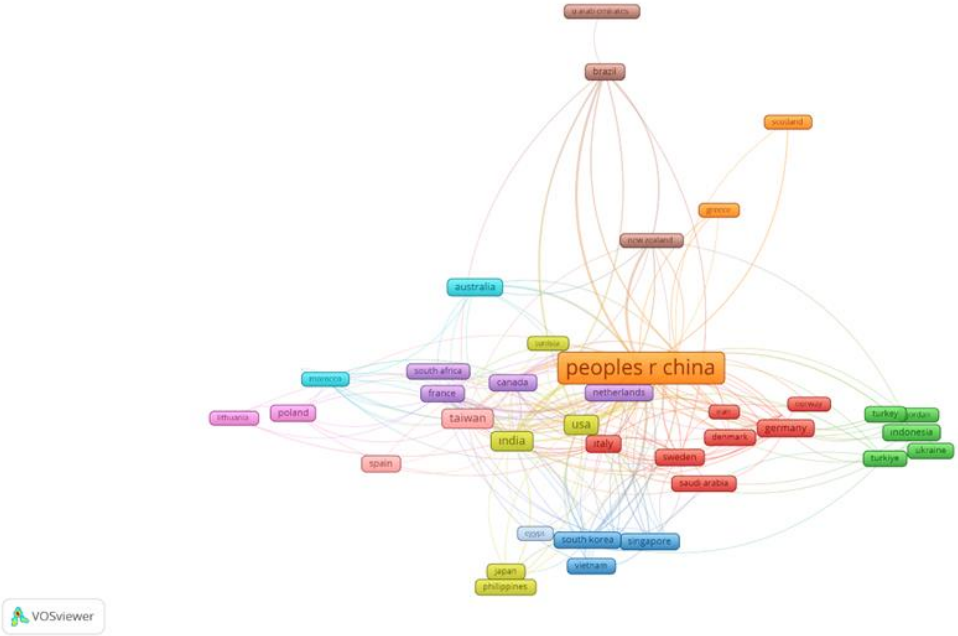

Figure 3. Countries' Citation Links

3.1.4. Keyword Analysis (Co-occurrence of All Keywords)

Figure 4 shows that the most frequently used keywords in the publications examined within the scope of the research are e-commerce (156 repetitions), logistics (61 repetitions), cross-border e-commerce (38 repetitions), sustainability (29 repetitions), and blockchain technology (18 repetitions). In terms of total connection strength, the strongest terms were e-commerce, logistics, and sustainability. Analysis of 2127 units that appeared at least once and had a relationship between them revealed a total of 102 clusters, 8499 connections, and a total connection strength of 8893.

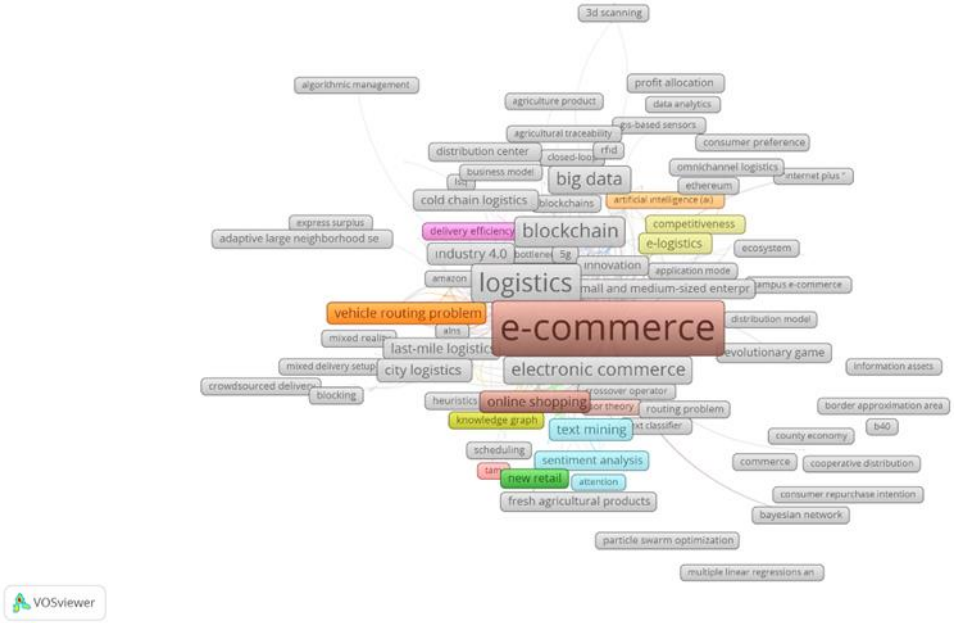

Figure 4. Most Frequently Used Keyword Links

3.1.5. Bibliographic Coupling of Documents

Bibliographic matching analysis is used to demonstrate the case of a common work being cited by two different sources. Based on an analysis of 531 publications selected with the limitation of having received at least one citation and having links between them, 14 clusters, 9430 links, and a total link strength of 17303 were obtained. The publications with the most bibliographic matches were Dutta (2020b) with 822 citations, Modgil (2022) with 313 citations, and Lim (2018) with 244 citations. The works with the highest total link strength were Al Mashalah (2022), Olsson (2019), and Liu (2024c).

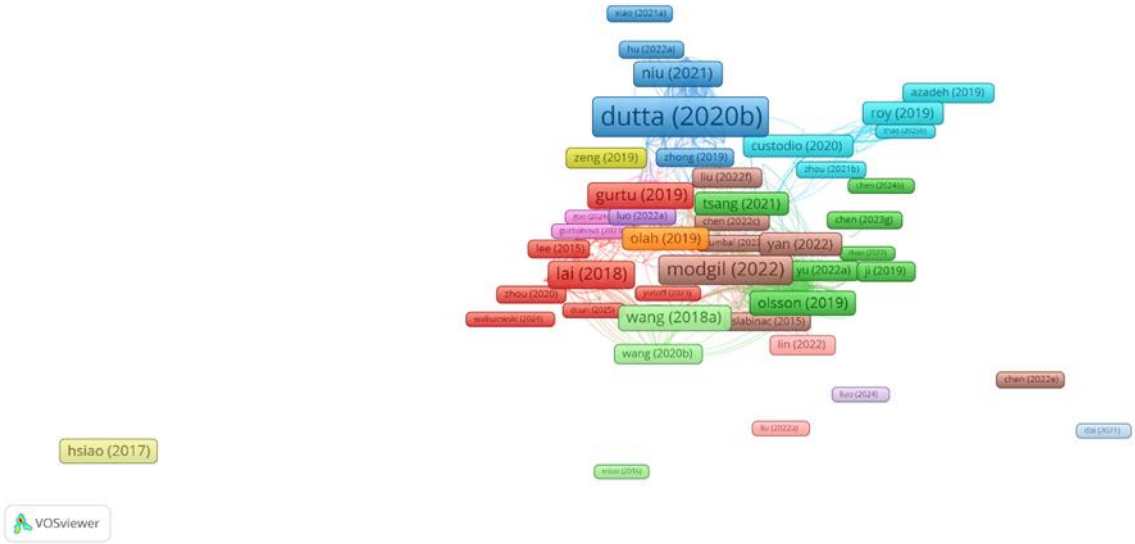

Figure 5. Bibliographic Matching Links of Works

Conclusion

Natural disasters, pandemics, and wars occurring in different parts of the world have caused people to migrate to other countries, dwindling resources and supply chain disruptions have led to unpredictability in product prices, and consequently, inflation has risen worldwide. This uncertainty has caused businesses and consumers to act more cautiously and to change their consumption habits.

On one hand, businesses seeking to increase efficiency and profit margins, and on the other hand, consumers wanting to reduce their cost of living while minimizing the impact of environmental factors, have shifted their purchasing behaviors. The recent industrial revolution, which placed the internet at the center of our lives, and the widespread use of social media by all segments of society, have led to a surge in e-commerce and e-logistics activities worldwide. Global companies, driven by increasing sales volumes, have made significant investments in these technologies and their management. The share of e-commerce and e-commerce logistics in global trade is growing day by day.

For all these reasons, this study aims to present a systematic summary of the existing literature on e-commerce logistics and technology management concepts, using bibliometric analysis within the framework of quantitative data, to the attention of researchers. The unit of analysis is based on bibliometric data from various types of works published between 2015 and December 31, 2025, and scanned in the Web of Science database. Web of Science was chosen as the database for this study due to its extensive data collection from various disciplines and its advanced search indicators for advanced data analysis. The keywords selected from the Web of Science database were “e-commerce logistics”, “technology management”, and “technology”, and “logistics”.

The selected keywords were searched in the database with a limitation of all fields. As a result of the search, data from 824 studies published between 2015-2025 were obtained. These included 584 journal articles from various disciplines, 213 conference papers, 27 review articles, and 34 early view studies. When the study areas were examined, it was seen that the majority of studies were in the field of business economics (311). It was also determined that various studies were conducted in fields such as engineering (244), computer science (214), and operations research (136).

Looking at the distribution of the scanned data by year, it is seen that the highest number of publications, 125, were made in 2025. The second highest number was in 2024 with 108 publications, followed by 2022 with 102 publications. It can be said that interest in the concepts increased especially after 2021. The reason for this, as seen from the examination of studies scanned from Web of Science, is that a significant change occurred in people's consumption habits, particularly after the pandemic. With the pandemic, people began to feel the need for a more distanced life and tended to use different consumption channels to meet these needs.

According to data from the Web of Science database, the most cited authors in the fields of e-commerce logistics and technology management are Pankaj Dutta (926), Tsan-Ming Choi (863), Richa Butala (822), and Surabhi Somani (822). The analysis revealed that the most cited countries are China (6486 citations), India (2395 citations), and the USA (1977 citations). In terms of the number of publications, the ranking is China (466 publications), the USA (63 publications), and Taiwan (49 publications). China's rise as an economic powerhouse has been accompanied by a remarkable digital revolution that has placed the country at the forefront of the global digital economy. The e-commerce industry in China has experienced explosive growth due to internet popularity and technological advancements. China is considered the world's largest e-commerce market and is driving economic rebalancing and transformation worldwide.

Considering the limitations of this study, the fact that only content indexed in Web of Science was included in the analysis, and that databases such as Ulakbim and Yök Tez in our country, as well as international databases such as PubMed and Scopus, were not included, constitutes the biggest limitation of this study. Furthermore, the fact that data was collected only from 2015 to

December 31, 2025, can also be considered a limitation. It is thought that using different databases in future studies would be beneficial.

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The authors contributed equally to the article.

Conflict of Interest Statement

The authors of this article declare that they have no financial relationships with any party that could be considered relevant to this work and therefore no conflict of interest.

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İthaf / Dedication

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