

Supply Chain Innovation Research Trends: A Bibliometric Network Analysis

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Abstract – In a fast-changing business world where everything is connected, supply chain innovation has become important for organizational success and competitive advantage. This study uses bibliometric network analysis to explore important aspects of supply chain innovation. It focuses on four areas: the impact of pandemics on supply chains, the use of blockchain in supply chain management, the role of information and communication technologies (ICTs) in logistics services, and how short supply chains contribute to climate agriculture and food security. The analysis uncovers trends and research topics within these domains while identifying knowledge gaps. The findings emphasize the role of supply chain innovation in addressing challenges. The substantial increase in research on related supply chains after the COVID-19 outbreak underscores the need for strategies and resilience. The study recognizes technology as a tool for enhancing supply chain transparency, traceability, and security. It also highlights ICTs' role in improving logistics services' efficiency, accuracy, and customer satisfaction. Furthermore, it identifies short supply chains to support climate agriculture practices and ensure food security. This research provides insights for researchers, practitioners, and policymakers alike, paving the way for studies and innovations in the ever-evolving field of supply chain management.

Keywords – Supply Chain Innovation, Blockchain, Big Data Analytics, Inventory Management, Digital Supply Chain

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1 Introduction

This article offers a comprehensive and innovative perspective on the field of supply chain innovation. Innovations in supply chains encompass a broad spectrum of strategies and practices, from technological advancements to novel processes and management approaches (Malacina & Teplov, 2022; Ouédraogo, Houessionon, Zougmore, & Partey, 2019). Supply chain management has evolved from linear processes into complicated systems involving various stakeholders and technologies, all connected globally (Bhat, Huang, Sofi, & Sultan, 2022). Firms operate technologically, continually evolving and quickly altering long-established business structures and procedures (Malacina & Teplov, 2022). This means coming up with new ideas and ways of doing things has been proven to be a transformative force in optimising supply chain processes, reducing costs, and enhancing customer satisfaction (Ngo, Nguyen, Pham, Nguyen, & Truong, 2023). Everyone agrees that supply chain innovation is essential. However, because there has been so much study in the field, it has grown significantly and requires careful organisation and summarisation of all the data. In conclusion, the evolution of supply chain management from its linear origins to the complex interconnected systems of today underscores the significance of innovation in optimising these processes (Folke et al., 2021). The benefits of enhanced speed, cost-effectiveness, and improved customer satisfaction have made innovation a cornerstone of successful supply chain strategies (Kareska, 2023). However, much research and information in this field necessitate a systematic and organised approach to distilling insights. The systematic collection and integration of supply chain knowledge will help advance future advances and maintain organisations' resilience and competitiveness on a global scale as international trade continues to change (Negri, Cagno, Colicchia, & Sarkis, 2021).

Understanding the depth and breadth of research in this domain is essential for scholars and practitioners seeking to navigate the complexities of modern supply chain management (Majumdar, Agrawal, Raut, & Narkhede, 2023). In a fast-changing business world where everything is connected, supply chain innovation has become important for organisational success and a competitive advantage. According to Zhu, Bai, & Sarkis (2022), the supply chain innovation research field has witnessed remarkable growth and transformation, fuelled by dynamic technological shifts (Chen, Sinha, Hu, K., & Shah, 2021), consumer expectations, environmental concerns, and global disruptions such as the COVID-19 pandemic. As different industries deal with new problems and opportunities, being able to use innovation in how they manage their supply chains is crucial (Pietrobelli & Rabellotti, 2011). This article takes a deep look at the topic of supply chain innovation. It reviews information and other experts' writings (Sánchez-Flores, Cruz-Sotelo, Ojeda-Benitez & Ramírez-Barreto, 2020).

2 Literature Review

According to Swanson & Santamaria (2021), about 84 percent of all research on pandemic supply chains was done in the first ten months of 2020. This dramatic surge in research interest is understandable, given the significant disruptions that the COVID-19 pandemic has caused to global supply chains (Cagri Gurbuz, Yurt, Ozdemir, Sena & Yu, 2023). The pandemic has forced businesses to quickly adapt their supply chains to new challenges, such as lockdowns, border closures, and worker shortages (Pujawan & Bah, 2022). As a result, there is a growing need to understand and summarise the existing research on pandemic supply chains to inform future studies and decision-making. To address this need, a team of researchers has recently conducted a comprehensive review of the literature on pandemic supply chains. The review summarises research dating back to 1997, focusing on the research done during the COVID-19 pandemic. The researchers used various research tools to collect information from these studies and categorise them based on crucial factors, such as the research methodology, key findings, and implications for practice. The researchers also used bibliometric co-citation analysis to group the research by authors, journals, and articles.

The review identifies several critical themes in the research on pandemic supply chains. These themes include the impact of pandemics on supply chain performance, strategies for mitigating the risks of pandemics (Sombultawee et al., 2022), the role of information technology in managing pandemic supply chains, and the importance of collaboration and resilience in pandemic supply chains. In addition, the review also highlights several gaps in the research, which suggest opportunities for future studies. For example, the researchers note that there is a need for more research on the impact of pandemics on specific industries and supply chains. They also call for more research on the long-term effects of pandemics on supply chains. Moreover, Swanson & Santamaria (2021) found that research before COVID-19 focused on influenza and healthcare supply chains.

However, after COVID-19, more research started looking at food supply chains, and researchers used a more comprehensive range of methods, like simulations, modelling, and real-world data analysis. In addition, Hassan, Jincai, Iftekhhar & Cui (2020) revealed that the Internet of Things (IoT) and smart contracts are the leading emerging technologies. The highly cited and co-cited articles demonstrate how blockchain technology can enhance supply chain management's transparency, traceability, efficiency, and information security (Kopyto, Lechler, von der Gracht & Hartmann, 2020). The analysis also revealed that empirical research is scarce in this field, and implementing blockchain in the real-world supply chain is a significant future research opportunity (Abideen, Sundram, Pyeman, Othman & Sorooshian, 2021). According to Xu et al. (2018), supply chain finance (SCF) has been established as an important but niche research area in supply chain management. The increasing number of publications in this area supports this argument. The bibliometric and network analysis tools were used to analyse the SCF literature and examine this research area's evolution (Rejeb et al.,

2023). In addition, a content analysis was conducted based on the co-citation and clustering analyses.

Information and communication technologies (ICTs) are increasingly vital in the logistics service industry (Zhou et al., 2019). They are used to enhance logistics efficiency, accuracy, reliability, and quality (Abideen et al., 2021). To identify current research areas related to ICTs in the logistics service industry, a literature review was conducted using the academic databases Scopus and Web of Science from 2008 to 2019. Bibliometric network analysis was utilised to identify the classification of ICTs in the logistics service industry, new trends in logistics service in terms of Industry 4.0, and the impact of current technologies on logistics service quality management (Ferrari et al., 2023; Xu et al., 2018). One example of how ICTs are used to optimise logistics services is in transportation and warehousing. Fleet management systems, warehouse automation systems, and real-time tracking technologies are just a few examples of how ICTs can enhance the efficiency of transportation and warehousing operations (Cano et al., 2021).

Further (Wohllebe, 2022) emphasised that click and collect on online shopping are identified as the most important mobile apps in retail functions in the context of the pandemic. This can lead to lower costs and improved delivery times. Additionally, order management and fulfilment processes can be streamlined through ICTs, such as e-commerce platforms, order management systems, and warehouse management systems, helping to reduce errors and improve accuracy (Kim, 2020). Additionally, ICTs can improve customer service by providing customers with real-time information about their shipments, allowing them to track their orders, and providing them with multiple channels for communication with the logistics service provider (Sahraoui et al., 2023). This can lead to increased customer satisfaction. Overall, ICTs play a critical role in the modern logistics service industry. By automating tasks, improving visibility, and enabling new technologies such as self-driving vehicles and predictive maintenance, ICTs are helping to make logistics services more efficient, accurate, reliable, and customer-centric (Ferrari et al., 2023).

Multiple researchers (Kandegama et al., 2022; Ouédraogo et al., 2019) reveal potential research possibilities for enhancing climate-smart agriculture through short supply chains. The study employed bibliographic and bibliometric coupling techniques, using data from 1990 to 2022 (Hsiao & Chen, 2019). The raw data was processed using the VOSviewer software. Bibliographic coupling is a technique that identifies relationships between documents based on their shared references. de Queiroz (2020) says bibliometric coupling is a similar technique, but it also considers the citation frequency of the shared references. Using these techniques, the researchers could identify clusters of related research on climate-smart agriculture and short supply chains. The study's results confirmed the positive effect of the systemically important relationship between short supply chains and food security (Morkūnas et al., 2022). This finding is significant because it suggests that short supply chains can play a vital role in addressing the challenges of climate change and food security. Short supply chains can help reduce greenhouse gas emissions and other environmental impacts associated with food

transportation and storage (Susitha, 2023; Collison et al., 2019). They can also help increase the availability of fresh, healthy food for consumers.

Kandegama et al. (2022) identified several potential research possibilities, which include developing new technologies and practices to improve the efficiency and productivity of short supply chains, investigating the economic and social benefits of short supply chains, and most importantly, identifying ways to support the development of short supply chains in different regions and contexts (Karmaker et al., 2021). Supply chain innovation research is important because it can help businesses improve performance, reduce environmental impact, and develop new products and services (Bag, Wood, Xu, Dhamija, & Kayikci, 2020).

Hammerl, Weber & Ton (2021) emphasised that organisational changes directly influence the innovativeness of the enterprise. Further, recommended Kaizen theory as an innovation roadmap. Martens, Fan & Clarenc (2022) applied Christensen 's Theory of Disruptive Innovation as a conceptual framework, and the study findings help companies to integrate additive manufacturing technology into their business models. A bibliometric network analysis and literature review of supply chain innovation research can clarify the field's current state and identify potential areas for further research (Rejeb et al., 2021).

3 Methodology

This study uses Scopus and a Web of Science database with the hazing search process published. The authors extracted documents related to supply chain management using the keywords: "Business Analytics", "Supply Chain Management", "Supply Chain Innovation", or "Supply Chain Blockchain". Data were obtained from 371 articles using these keywords. Data was taken from 2008 to 2019. According to Chigbu, Atiku & Du Plessis (2023). a literature review compiles and analyses a volume of publications on a particular subject. According to Talwar et al. (2021), there is a wealth of literature on diverse supply chain innovation research topics. The full texts of chosen articles were qualitatively reviewed for the literature review component to pinpoint major themes, knowledge gaps, and theoretical frameworks.

The data-gathering process includes looking up and accessing research articles about supply chain innovation in the databases mentioned. The study utilised bibliometric and network analysis to identify critical authors, significant studies, and collaboration patterns not considered in previous publications on this aspect of supply chain management (Lahane et al., 2020). Bibliometric analysis uses VOSviewer Software (version 1.6.19) to create and visualise results by topic as information is represented and analysed graphically. Using citation and co-citation analysis, the study identified key areas in supply chain management where blockchain technology could benefit, such as finance, coordination, security, and overall management.

4 Results and Discussion

The examination of existing literature and the analysis of networks have yielded insights into the domain of supply chain innovation, specifically concerning pandemic supply chain blockchain application in supply chain management, the use of ICTs in logistics services, as well as the role played by short supply chains in fostering climate-smart agriculture and ensuring food security (Batwa & Norrman, 2021; Lahane et al., 2020; Zhu et al., 2022). This section will delve into the discoveries and their corresponding implications.

The review highlights the role played by ICTs within the logistics service industry. ICTs improve transportation efficiency, streamline order management and fulfilment processes, and enhance customer service experiences (Collison et al., 2019). ICTs are playing a role in enhancing logistics services' efficiency, reliability, and customer focus through task automation (Cano et al., 2021). Improved visibility. This emphasises the need for investment in ICTs to foster innovation within logistics services. Figure 1 shows that there has been a considerable increase in research publications in this area over time. Both datasets saw moderate expansion from 2008 to 2017. Since 2018, there has been a significant surge in study interest in this area related to the Fourth Industrial Revolution Industry 4.0.

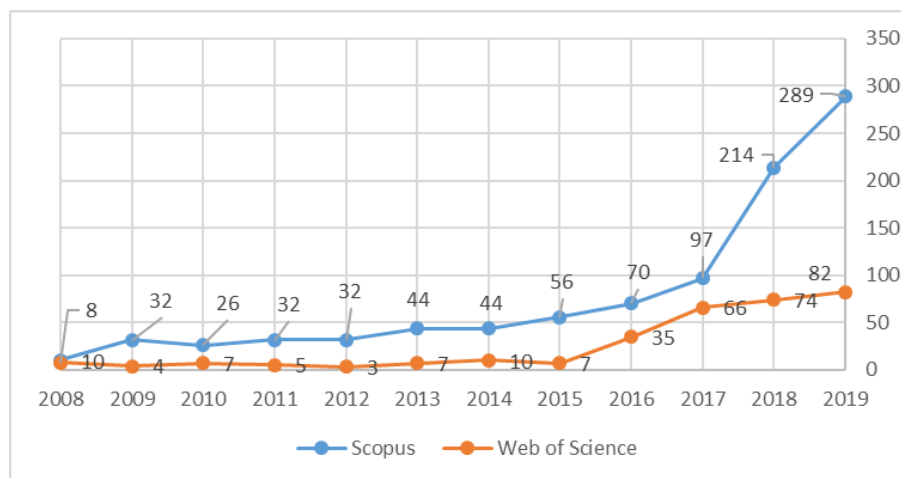


Figure 1: Total number of publications by ICT and logistics service quality

Reviewing existing literature has shown increased research interest surrounding pandemic supply chains since the COVID-19 pandemic began. This interest surge reflects the disruptions to supply chains caused by the pandemic (Pujawan & Bah, 2022). Key areas of focus in this research include understanding how pandemics impact supply chain performance, developing strategies to mitigate risks associated with pandemics, exploring the role of information technology, and highlighting the importance of collaboration and resilience (Sombultawee et al., 2022). The identified gaps in

research, such as the need for industry studies and analysis of long-term effects, provide directions for future investigations.

Supply Chain Management literature shows that blockchain can contribute to various aspects, such as supply chains, finance management, coordination efforts, and security measures (Zhu et al., 2022). Integrating Internet of Things (IoT) technology and smart contracts has emerged as a trend within this field. Blockchain technology has been found to enhance transparency, traceability, efficiency, and information security within supply chains (Batwa & Norrman, 2021). However, due to the scarcity of research studies, there is a need for more practical implementation studies, which presents an opportunity for future exploration.

5 Conclusion

The study highlights the crucial role that supply chain innovation plays nowadays in resolving problems. The report identifies significant trends and possibilities in areas such as pandemic supply chains, blockchain integration, ICT improvements in logistics services, and the significance of short supply chains in promoting sustainability and food security. The results elaborate on the need for adaptable tactics in the face of global disruptions and the opportunity for technology to improve supply chain operations. Moreover, this study's findings emphasise the benefits of resilience, openness, and efficiency in logistics services. These insights guide scholars, practitioners, and policymakers as we navigate a constantly shifting environment. The research aims to advance a supply chain ecosystem that is more resilient, efficient, and capable of handling the complex needs of the modern world.

This study has highlighted the importance of supply chain innovation for businesses of all sizes. Supply chain innovation can help businesses reduce costs, improve efficiency, increase quality, reduce environmental impact, develop new products and services, and improve resilience to disruptions. However, in the studies extracted, the authors identified several gaps in supply chain innovation research. These gaps include (i) the need for industry studies and analysis of long-term effects to provide businesses with trends of supply chain innovation, (ii) studies that highlight the full scope and consequences of certain practices or changes on sustainability and supply chain innovation, (iii) a more comprehensive study is needed to validate the process of extracting significant supply chain innovation references when using bibliometric network analysis. Therefore, this research will significantly contribute to supply chain innovation research by providing new insights into how to create and manage more innovative, sustainable supply chains. This will help businesses improve performance, reduce environmental impact, and develop new products and services.

Research limitations refer to the constraints or weaknesses in the design, methodology, or materials used in a study that may impact or influence the interpretation of the results (Ross & Bibler Zaidi, 2019). Limitations should be presented honestly and not minimised to ensure readers can generalise findings appropriately. The limitations of this article are that study materials

or documents are taken from two international publishing sources. Does not include research published in other reputable journals. "It is anticipated that future researchers will use a wider range of reputable publishing sources."

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