

Uncertain Supply Chain Management

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Mapping the landscape: A bibliometric analysis of digital leadership, service quality, and supply chain management

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ABSTRACT

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Despite the recognized importance of service quality in supply chain management, there has been limited research examining the interplay between digital leadership, service quality, and supply chain management. This study employs bibliometric analysis techniques to investigate how digital leadership influences service quality within the context of supply chain management. Utilizing VOSviewer v1.6.20, we analyzed 490 publications from the Web of Science database pertinent to this domain. Our findings reveal that advanced technologies, including digital leadership, IoT, AI, and blockchain, play a crucial role in modernizing supply chains, enhancing operational efficiency, and achieving environmental objectives. The study discusses the broader implications for both theoretical frameworks and practical applications in the field.

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1. Introduction

In today's dynamic and interconnected business landscape, the effective management of supply chains is essential for organizations to maintain competitiveness and meet the evolving needs of customers (MacCarthy et al., 2016; Al-Banna et al., 2023; Chen & Xu, 2024). Supply chain management (SCM) involves the coordination and integration of various activities, including procurement, production, logistics, and distribution, to ensure the seamless flow of goods and services from suppliers to end consumers (Yuan & Xue, 2023; Khan et al., 2019; Al-Faouri et al., 2024). A well-managed supply chain not only enhances operational efficiency but also fosters agility, resilience, and responsiveness in the face of disruptions and uncertainties (Al-Faouri et al., 2024; Romagnoli et al., 2023).

Amidst this backdrop, the emergence and proliferation of digital technologies have revolutionized traditional supply chain management practices (Schniederjans et al., 2020; Büyüközkan & Göçer, 2018). Digitalization has permeated every facet of the supply chain, enabling organizations to digitize, automate, and optimize core processes and functions (Lang & Lang, 2021). From advanced analytics and artificial intelligence (AI) to blockchain and the Internet of Things (IoT), digital technologies offer unprecedented opportunities to reimagine supply chain operations, unlock hidden efficiencies, and create new value propositions for customers (Sallam et al., 2023; Haddud et al., 2017).

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However, the successful adoption and implementation of digital technologies in supply chain management necessitate effective leadership that can navigate the complexities and challenges inherent in digital transformation initiatives (Schneider & Kokshagina, 2021; Centobelli et al., 2020). Digital leadership, encompassing the strategic deployment and adept utilization of digital technologies by organizational leaders, has emerged as a critical determinant of success in contemporary SCM contexts (Papachristos et al., 2023). Digital leaders play a pivotal role in shaping organizational culture, fostering innovation, and driving digitalization efforts across the supply chain ecosystem (Ruel et al., 2021; Romagnoli et al., 2023).

The significance of digital leadership in the realm of SCM lies in its capacity to harness the transformative potential of digital technologies to optimize processes, enhance collaboration, and drive innovation throughout the supply chain ecosystem (MacCarthy & Ivanov, 2022). By leveraging advanced analytics, artificial intelligence, blockchain, IoT, and other digital tools, leaders can gain unprecedented insights into supply chain operations, streamline decision-making processes, and proactively respond to market fluctuations and consumer demands (Sallam et al., 2023).

In recent years, scholarly interest in the nexus between digital leadership and service quality within the domain of SCM has burgeoned (Mondal & Samaddar, 2023; Centobelli et al., 2020). Recognizing that service quality plays a pivotal role in shaping customer satisfaction, loyalty, and ultimately, organizational performance, researchers have sought to unravel the intricate relationship between digital leadership practices and service quality outcomes across various stages of the supply chain. A bibliometric analysis offers a systematic and quantitative approach to synthesizing the extant literature, providing valuable insights into the prevailing trends, key research themes, and scholarly contributions within a particular field of study. By systematically mapping the intellectual structure of the literature, identifying influential authors, journals, and seminal works, and uncovering emerging research trajectories, bibliometric analyses serve as indispensable tools for advancing knowledge and informing future research agendas. Against this backdrop, this paper embarks on a bibliometric journey to explore the impact of digital leadership on service quality in supply chain management. By synthesizing and analyzing a corpus of scholarly publications from leading academic databases, this study aims to delineate the contours of the existing literature, identify research gaps, and offer directions for future inquiry. Through a comprehensive bibliometric analysis, this paper seeks to shed light on the evolving landscape of digital leadership in SCM and its implications for enhancing service quality across the supply chain continuum. The following research questions will guide this study:

RQ1. How have the focal points and thematic elements concerning digital leadership and its influence on service quality within supply chain management evolved over time, and how do they relate to various organizational contexts?

RQ2. What is the significance and impact of scholarly sources in the realm of digital leadership and its effects on service quality in supply chain management, as indicated by the number of publications, h-index, and total citations?

RQ3. What is the profile of the most influential authors in the domain of digital leadership and its impact on service quality within supply chain management in terms of both productivity and scholarly influence?

RQ4. What is the geographical distribution of publications regarding digital leadership and its impact on service quality within supply chain management, and what discernible trends can be identified concerning countries and continents?

RQ5. What prevailing themes and patterns emerge in the research on digital leadership and its impact on service quality within supply chain management, as evidenced by the globally most cited papers?

RQ6. What potential avenues for future research exist within the domain of digital leadership and its impact on service quality within supply chain management?

The remainder of this paper is organized as follows: Section Two delves into the methodological framework that underpins our bibliometric analysis, providing a detailed description of the techniques and tools employed. Section Three presents the data analysis and results, offering a comprehensive examination of the key findings derived from the bibliometric study. Section Four encompasses the discussion, where we interpret the results and explore their broader implications, both theoretical and practical. Finally, Section Five concludes the paper by summarizing the key insights, outlining the study's limitations, and suggesting directions for future research.

2. Methodology

2.1 Study Design

This study employs a bibliometric approach to scrutinize the literature concerning digital leadership's influence on service quality within supply chain management. Bibliometric analysis, a quantitative method, is utilized to assess and map scholarly publications within the specified research domain (Kastrin & Hristovski, 2021; Albalawee et al., 2024; Alqudah et al., 2024).

By employing bibliometric techniques, this study aims to uncover trends, influential authors, seminal works, and emerging research themes in the field. The analysis seeks to understand the evolution and relevance of digital leadership's impact on service quality in supply chain management, examine the influence of academic sources, identify prominent authors, investigate geographical publication distribution, explore relevant topics, analyze relationships between digital leadership and industry sectors, review methodological approaches, and suggest future research directions. The insights garnered from this study can inform decision-making in the continually evolving digital landscape.

2.2 Data Collection and Filtering

The primary dataset comprises scholarly articles sourced from the Web of Science core collection database spanning from 2010 to 2023. A systematic search strategy utilizing relevant keywords ensures the inclusivity of the literature review. Keywords such as “digital leadership”, “digital management”, “service quality”, “supply chain management”, and their synonyms are incorporated into the search query. Inclusion criteria select only peer-reviewed journal articles published within the specified timeframe. The initial search yielded 932 publications. After filtering data based on Web of Science categories relevant to the study, such as management, business, finance, public administration, and economics, the number of publications was reduced to 810. Categories unrelated to the study, including engineering, medicine, agriculture, psychology, and law, were excluded. Further refinement, focusing on the period from 2010 to 2023, resulted in 502 publications. Book chapters were excluded, reducing the count to 494 publications. Finally, non-English publications were excluded, leaving a final dataset of 490 publications for analysis, as shown in Table 1.

Table 1

Data formation

Sample	Publications
A sample search for keywords Web of Science (WOS)	932
Publications related to different categories	-122
Publications outside the study period	-308
Book chapters	-8
Publications not in English	-4
Net sample	490

2.3 The software utilized for data analysis

Bibliometric analysis was conducted to glean valuable insights from the data. Various metrics and statistical methods, including the h-index, total citations, and temporal distribution of publications, were utilized. Keyword analysis was employed to study keyword frequency, extract relevant data on digital leadership's impact on service quality in supply chain management, identify methodological approaches, and highlight potential avenues for future research. VOSviewer (version 1.6.20) was employed to visualize and analyze term networks and co-occurrences. Statistical analyses and visual graphs were generated using Microsoft Excel 365. VOSviewer was selected for its flexibility and user-friendly interface, enabling the creation of networks encompassing diverse entities and visualization options (Abu Huson et al., 2024; Alqudah et al., 2024). Despite other available tools like Gephi, CiteSpace, Sci2, and HistCite, VOSviewer's features make it particularly suitable for generating, visualizing, and exploring complex bibliometric maps effectively (Albalawee et al., 2024; Qudah et al., 2024).

Bibliometric facilitates comprehensive bibliometric studies by allowing researchers to code various elements categorised as sources, authors, records, and conceptual, social, and intellectual structures (Marchiori et al., 2021; Wang, 2018). It utilizes clustering algorithms like "walktrap" and "leading eigenvalues" to create network graphics illustrating co-occurrences among bibliographic metadata (Nicolò et al., 2023). For the keyword co-occurrence analysis, Bibliometric employed the leading eigenvalues algorithm to generate a co-occurrence network map (Lozano et al., 2019; Masoumi & Khajavi, 2023). Before performing the science mapping analyses, the dataset of raw keywords was normalized using a thesaurus to eliminate duplicates, standardize spelling, and merge synonyms. Bibliometric techniques were employed for the automatic assignment of articles to thematic clusters based on a specific probability level. Articles with a probability of 0.8 or higher were considered highly likely to belong to a specific cluster, while those with a probability between 0.4 and 0.8 were classified as likely. To ensure reliability, this automatic classification was supplemented by manual content analysis. Articles with a probability below 0.8 were distributed among authors for independent reading, during which titles, abstracts, and keywords were analyzed. Panel meetings and discussions were conducted to address disagreements and uncertainties, ensuring accurate cluster attribution. A final meeting was held to review and reach a consensus on the final cluster formation. While formal reliability checking was deemed unnecessary due to the achieved step-by-step agreement, a critical review of the most relevant contributions in each cluster was conducted. This review aimed to discuss key insights and complement the bibliometric analysis outcomes, highlighting emerging research directions and suggesting opportunities for future research.

3. Results

3.1 Analysis of publication performance

Before undertaking bibliometric mapping, an initial assessment of the performance of articles within the Web of Science Core Collection (WoS) was conducted. Metrics such as productivity, citations, the Web of Science index, and related publications were considered. The data was obtained from the WoS “document search results”. Fig. 1 illustrates the yearly frequency of paper publications from 2010 to 2023 for the 490 articles analyzed. The total number of citations for all publications during this period is 9,342, resulting in an average of 19.07 citations per publication. The data reveals a consistent increase in both the number of publications and citations over the years, culminating in 2023 with 62 publications and a peak of 1,839 citations.

This trend underscores the growing significance of digital leadership and its impact on service quality in supply chain management within academic and professional discourses. The upward trajectory in publication and citation counts reflects the field's expanding relevance and the increasing scholarly interest in these topics. As digital technologies continue to transform supply chain management practices, the emphasis on digital leadership and service quality has become more pronounced, driving a surge in research output. This trend is indicative of the field's dynamic nature and its critical role in advancing supply chain management practices in a digital era. By understanding the publication performance trends, we can better contextualize the significance of various research contributions and identify key areas of focus and emerging themes within the field (Abu Huson et al., 2024; Kastrin & Hristovski, 2021).

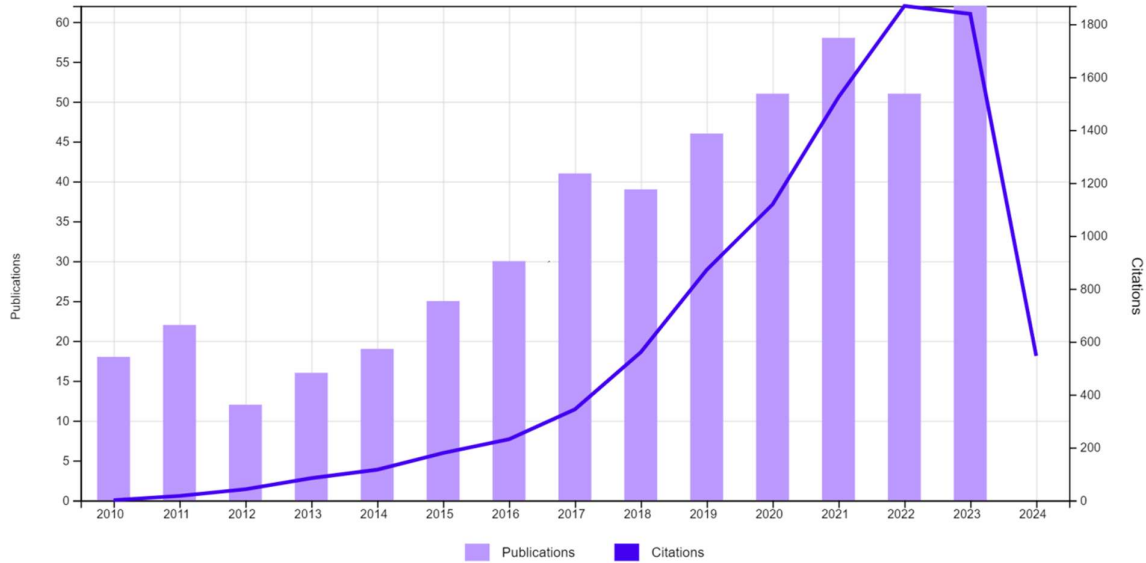


Fig. 1. Times cited and publications over time (2010-2023)

3.2 Web of science index distribution

Table 2 presents the distribution of the 490 articles analyzed in this study across various Web of Science (WoS) indexes, highlighting both the record count and the percentage representation of each index relative to the total dataset. This distribution underscores the multidisciplinary nature of research on digital leadership and its impact on service quality in supply chain management, encompassing contributions from social sciences, emerging sources, scientific disciplines, conference proceedings, and book literature. The majority of research in this area is published in journals indexed in the Social Sciences Citation Index (SSCI), followed by the Emerging Sources Citation Index (ESCI) and the Science Citation Index Expanded (SCI-EXPANDED). Although smaller, the inclusion of conference proceedings and book chapters highlights the diverse range of scholarly contributions in this field.

Table 2

Web of science index distribution

Web of Science Index	Record Count	% of 490
Social Sciences Citation Index (SSCI)	248	50.612%
Emerging Sources Citation Index (ESCI)	159	32.449%
Science Citation Index Expanded (SCI-EXPANDED)	109	22.245%
Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH)	36	7.347%
Conference Proceedings Citation Index – Science (CPCI-S)	25	5.102%
Book Citation Index – Social Sciences & Humanities (BKCI-SSH)	8	1.633%
Book Citation Index – Science (BKCI-S)	2	0.408%

3.3 Top publication titles and publishers

Highlighting the importance of journals in the domain of digital leadership and its impact on service quality in supply chain management is crucial. Journals serve as pivotal platforms for disseminating research findings, facilitating knowledge exchange, and nurturing scholarly discussions within this field (Alqudah et al., 2024; Albalawee et al., 2024). They provide a centralized repository of peer-reviewed articles, case studies, and theoretical frameworks that significantly contribute to advancing the understanding of digital leadership's impact on service quality in supply chain management. Moreover, journals play a crucial role in shaping academic discourse, setting research agendas, and establishing standards of excellence within the discipline. Researchers rely on reputable journals to access the latest developments, methodologies, and best practices,

thereby enhancing the rigor and relevance of their work. Additionally, journals act as conduits for interdisciplinary collaboration, allowing researchers from diverse fields such as management, accounting, finance, and economics to share insights and perspectives on the digital business landscape. Therefore, by showcasing the most prominent publication titles associated with the keywords in this study, this section underscores the central role of journals in advancing knowledge and fostering innovation. Fig. 2 illustrates the most prominent publication titles associated with the keywords in the study within the WoS database. The leading publication title is the “International Journal of Production Research”, followed by the “Journal of Business Logistics” and “Operations and Supply Chain Management: An International Journal”, each contributing 14 records and accounting for 2.857% of the total 490 publications. Following closely is “Benchmarking: An International Journal” in the second position, with 13 records, constituting 2.653% of the total publications. In the third position are the “International Journal of Logistics Management”, “International Journal of Physical Distribution & Logistics Management”, and “Journal of Transport and Supply Chain Management”, each with 11 records, making up 2.245% of the overall tally.

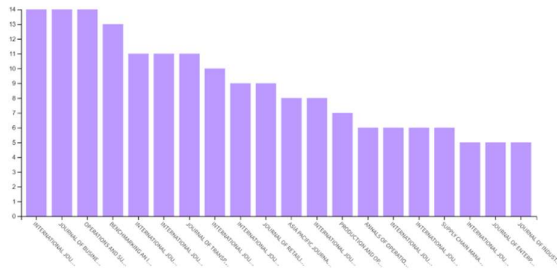


Fig. 2. Top contributing publication titles

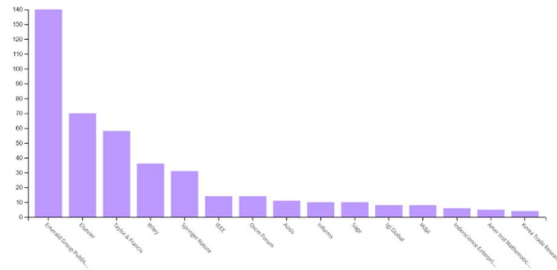


Fig. 3. Top contributing publishers

Fig. 3 highlights the publishers with the highest number of record counts in the field of digital leadership and its impact on service quality in supply chain management. Leading the list is “Emerald Group Publishing” with an impressive 140 records, representing 28.571% of the total 490 publications. Following closely is “Elsevier” with 70 records, comprising 14.286% of the overall tally. “Taylor & Francis” secures the third position with 58 records, accounting for 11.837% of the total publications. These distinguished publishers are noteworthy for their substantial contributions, each having published more than 50 articles in this domain. Collectively, they constitute 54.874% of the total number of publications indexed in the WoS database, highlighting their significant role in disseminating research on digital leadership and its impact on service quality in supply chain management. The prominence of these publishers underscores their critical role in the academic landscape, providing robust platforms for scholars to share their findings and advance the discourse in this field. Their extensive portfolios reflect a commitment to fostering high-quality research and facilitating scholarly communication across disciplines, thereby shaping the future directions of research in digital leadership and supply chain management.

3.4 Bibliometric mapping

Bibliometric mapping is an advanced analytical technique in bibliometrics that quantitatively analyzes scholarly publications (Kastrin & Hristovski, 2021; Abu Huson et al., 2024). This method provides a visual representation of the structure, relationships, and patterns within the literature on digital leadership and supply chain management. By employing statistical and computational tools, researchers can create graphical representations that reveal author collaborations, citation relationships, and thematic clusters (Skute et al., 2019; Alqudah et al., 2024). Such visualizations systematically organize extensive scholarly data, facilitating the identification of trends, assessment of research impact, and exploration of potential areas for further investigation.

In this study, VOSviewer software was utilized to identify patterns and gaps in the literature, uncover potential research areas, and highlight significant contributors within the field. By applying scientometric techniques, particularly bibliographic data analysis, the study conducted a thorough examination of the existing body of research (Kastrin & Hristovski, 2021; Albalawee et al., 2024). Co-occurrence analysis was employed to identify frequently appearing words, while bibliographic coupling was used to detect keyword clusters, prominent authors, and contributing nations.

Through cluster analysis, three prominent clusters were identified, each reflecting significant research trends within the field, as shown in Fig. 1. The analysis revealed a total of 301 links with an overall link strength of 608, underscoring the interconnected nature of the research topics. These clusters highlight the central themes and emerging areas of interest in the study of digital leadership and its impact on service quality in supply chain management.

The insights gained from bibliometric mapping are invaluable for researchers and practitioners alike. By visualizing the intricate web of relationships and identifying key areas of focus, this approach aids in the strategic planning of future research endeavors (Qudah et al., 2024; Alqudah et al., 2024). Moreover, it provides a comprehensive overview of the current state of the field, guiding scholars in navigating the complex landscape of digital leadership and supply chain management literature.

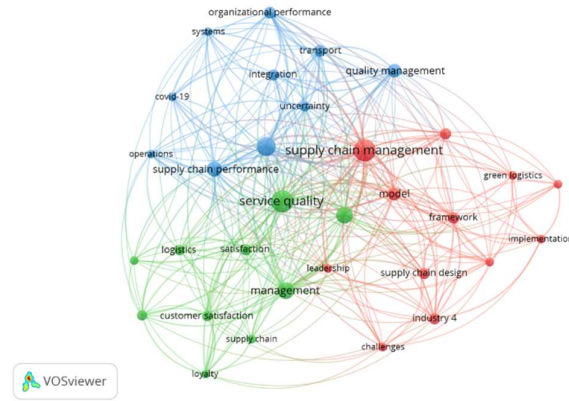


Fig. 4. Co-occurrence network map for keyword co-occurrence analysis

The co-occurrence network map offers a visual representation of the relationships among frequently occurring keywords within the literature (Abu Huson et al., 2024). To enhance clarity, keywords that were not connected to others (isolated nodes) were excluded from the analysis, retaining only those with at least one connection (edges). This refinement resulted in a network map featuring 32 keywords, which were further categorized into three distinct and well-defined thematic clusters. Naming these clusters effectively is crucial to communicate their primary concepts and objectives and to highlight significant areas of interest. Each cluster should be titled using representative keywords that succinctly convey the main ideas, scope of the study, and its potential implications. Creating informative and descriptive titles for these clusters enhances the comprehensibility and impact of the analysis, facilitating a better understanding of key themes and trends within the research domain (Albalawee et al., 2024; Qudah et al., 2024). By generating clear and descriptive titles for these clusters, researchers can effectively convey the essence of the studies grouped within each cluster (Alqudah et al., 2024). This approach not only aids in identifying and interpreting the primary concepts and aims but also underscores the significant areas of interest and emerging trends in the field of digital leadership and its impact on service quality in supply chain management. Furthermore, the detailed analysis of these clusters provides valuable insights into the interconnected nature of the research topics. It reveals how digital leadership influences various aspects of supply chain management, including innovation, service quality, and sustainability. These insights can guide future research directions, inform policy-making, and support the development of best practices within the industry.

The first cluster (identified as Red) focuses on digital leadership strategies for implementing sustainable green logistics in supply chain management. Digital leadership in implementing sustainable green logistics within supply chain management entails leveraging advanced technologies and fostering an organizational culture that prioritizes sustainability (Alabdali et al., 2024; Chauhan et al., 2022). A core strategy involves the integration of Internet of Things (IoT) devices and sensors across the supply chain to enhance real-time monitoring and data collection (Haddud et al., 2017). This data-driven approach allows for precise tracking of carbon footprints, energy consumption, and resource utilization, enabling companies to identify and mitigate inefficiencies (Nikseresht et al., 2024; Aljawarneh et al., 2023). Digital leaders must advocate for the adoption of robust analytics platforms that process this data to provide actionable insights, driving continuous improvement in sustainability efforts (Pappas et al., 2018; Kache & Seuring, 2017).

Additionally, embracing blockchain technology can significantly enhance transparency and accountability in green logistics (Jan et al., 2024). By creating immutable records of every transaction and shipment, blockchain ensures that all stakeholders have access to verifiable data regarding the environmental impact of their activities (Kouhizadeh & Sarkis, 2018). This transparency not only builds trust but also encourages suppliers and partners to adhere to sustainable practices (Gardner et al., 2019; Romagnoli et al., 2023). Digital leaders play a crucial role in orchestrating these blockchain implementations, ensuring that the technology is seamlessly integrated and effectively utilized (Jabbar et al., 2021; Maheswari et al., 2024).

Another essential strategy is the deployment of artificial intelligence (AI) and machine learning (ML) algorithms to optimize logistics operations (Helo & Hao, 2022; Woschank et al., 2020). These technologies can predict demand patterns, optimize route planning, and improve inventory management, all while minimizing environmental impact (Haddud et al., 2017). For instance, AI-driven route optimization can reduce fuel consumption by determining the most efficient delivery paths, thereby lowering emissions (Abduljabbar et al., 2019). Leaders in digital transformation must ensure that their teams are proficient in AI and ML applications and are continuously exploring innovative ways to apply these technologies in sustainable logistics (Chauhan et al., 2022; Salah et al., 2023). Moreover, digital leadership involves fostering a culture of sustainability within the organization (Weerabahu et al., 2023). This includes promoting continuous learning and development in green logistics and sustainability principles, encouraging innovation, and recognizing efforts that contribute to environmental goals (Bertels et al., 2010; Nirmal et al., 2024). Leaders should also ensure that sustainability metrics are integrated into performance

evaluations and decision-making processes, thereby aligning organizational objectives with environmental stewardship (Javaid et al., 2022). Finally, collaboration and partnership are vital. Digital leaders should actively engage with external stakeholders, including technology providers, industry groups, and regulatory bodies, to stay abreast of emerging trends and standards in sustainable logistics (Al-Banna et al., 2023; Yuen et al., 2022). This collaborative approach not only helps in adopting best practices but also in advocating for policy changes that support green logistics initiatives (Nirmal et al., 2024; Haddud et al., 2017).

In summary, digital leadership in sustainable green logistics involves a multifaceted approach that combines advanced technology adoption, data-driven decision-making, cultural transformation, and external collaboration. By focusing on these strategies, digital leaders can drive significant improvements in the environmental performance of their supply chains, contributing to broader sustainability goals while maintaining operational efficiency and competitiveness.

The second cluster (denoted as Green) intricately explores the optimization of customer satisfaction through the nexus of service quality management and performance in the realm of online shopping service supply chain logistics. This comprehensive endeavor underscores the necessity of adopting a holistic approach that seamlessly integrates both service quality management and performance enhancement strategies (Cho et al., 2012; Kolasani, 2023). In the contemporary digital milieu, characterized by heightened consumer expectations for seamless experiences, punctual deliveries, and superior service provision, businesses operating within the online shopping domain must diligently strive to ensure operational efficiency and excellence across the entire supply chain continuum (Choi et al., 2021; Manuj et al., 2014; Yuan & Xue, 2023). Effective service quality management entails the deployment of a plethora of methodologies aimed not only at meeting but surpassing customer expectations (Torres, 2014; Kumar et al., 2021). This encompasses the implementation of stringent quality control protocols, continual improvement endeavors, and the establishment of proactive troubleshooting mechanisms (Kolasani, 2023; Zu & Kaynak, 2012). By embracing robust quality management frameworks, organizations can streamline their operational workflows, mitigate the occurrence of errors, and fortify overall service dependability, thereby nurturing a foundation of trust and allegiance among their clientele (Nasereddin, 2024). Concurrently, optimizing performance assumes a pivotal role in augmenting customer contentment by refining processes, harnessing technological advancements, and fostering synergistic collaboration among supply chain affiliates (Salah et al., 2023; Jutidharabongse et al., 2024). Through diligent performance evaluation, analysis, and subsequent optimization endeavors, organizations can discern areas necessitating refinement, capitalize on existing strengths, and adapt responsively to evolving consumer preferences and market exigencies (Bastrygina et al., 2024). The integration of innovative technologies such as artificial intelligence, data analytics, and automation serves to further augment service quality and performance by enabling real-time monitoring, predictive analytics-driven insights, and the provision of tailored recommendations attuned to individual customer predilections (Richey et al., 2023; Chauhan et al., 2022). Moreover, effective communication and collaboration across all stakeholders within the supply chain ecosystem serve as linchpins for ensuring seamless operations and timely order fulfillment (Mubarik & Khan, 2024; Karsokiene & Giedraitis, 2023). By cultivating robust partnerships with suppliers, logistics service providers, and other pertinent stakeholders, enterprises can foster heightened visibility, transparency, and accountability across the supply chain spectrum, thereby mitigating risks and optimizing resource allocation (Richey et al., 2023). Ultimately, by prioritizing the twin pillars of service quality management and performance optimization, businesses can furnish unparalleled online shopping experiences that not only gratify customers but also engender repeat patronage and fortify enduring loyalty, thereby conferring a competitive edge amidst the dynamic landscape of contemporary commerce (Ostrom et al., 2021; Vitsentzou et al., 2022).

In summary, the “Green” cluster represents a multifaceted approach to optimizing customer satisfaction in online shopping service supply chain logistics. By focusing on service quality management, performance optimization, and collaborative partnerships, businesses can differentiate themselves in a competitive market, build customer loyalty, and drive sustainable growth in the digital era.

The third cluster (labeled as Blue) focuses on enhancing organizational performance through governance and quality management in times of uncertainty. Navigating the challenges posed by volatile environments requires organizations to adopt a comprehensive and strategic approach tailored to address multifaceted challenges (Salvador & Sancho, 2023; Jutidharabongse et al., 2024). In such contexts, where disruptions, fluctuations, and unforeseen events are prevalent, organizations must rely on robust governance structures and stringent quality management practices to navigate ambiguity, mitigate risks, and sustain operational excellence (Dahmen, 2023; Kolasani, 2023). Governance frameworks serve as the foundation of organizational stability and effectiveness, offering the structure, direction, and oversight necessary to guide decision-making processes and resource allocation amidst uncertainty (Kelley, 2011; Salvador & Sancho, 2023). Clear delineation of roles, responsibilities, and decision rights fosters transparency, accountability, and alignment across all organizational levels (Farayola & Olorunfemi, 2024). Furthermore, robust governance mechanisms facilitate agile responses to changing circumstances by empowering decision-makers with the authority and flexibility to adapt strategies and tactics as needed to navigate turbulent waters (Ansell et al., 2023; Hussain, 2024). An integral aspect of effective governance in uncertain times is proactive risk management (Settembre-Blundo et al., 2021; Drysdale & Gurr, 2017). Organizations must systematically identify, assess, and mitigate risks emanating from both internal and external sources, including market volatility, regulatory changes, supply chain disruptions, and operational vulnerabilities (Jüttner et al., 2003). Implementing risk management processes grounded in data-driven analysis and scenario planning enables organizations to preemptively

identify potential threats and devise contingency plans to mitigate their impact, enhancing resilience and ensuring business continuity in the face of uncertainty (Salvador & Sancho, 2023; Richey et al., 2023). Concurrently, quality management assumes heightened significance as a cornerstone of organizational performance in turbulent environments (Al-Swidi & Mahmood, 2012). Upholding rigorous quality standards across products, services, and processes is paramount for maintaining customer trust, satisfaction, and loyalty amidst uncertainty (Jutidharabongse et al., 2024; Salvador & Sancho, 2023). Quality management methodologies such as Six Sigma, Total Quality Management (TQM), and Lean principles offer systematic approaches for identifying inefficiencies, reducing defects, and optimizing processes to enhance overall performance and competitiveness (Anvari et al., 2011). Continuous improvement initiatives driven by quality management principles enable organizations to adapt swiftly to changing market dynamics, customer expectations, and technological advancements, positioning them for sustained success in dynamic environments (Kolasani, 2023; Al-Swidi & Mahmood, 2012). Moreover, cultivating a culture of quality and accountability is essential for embedding quality management practices into the organizational DNA (Bertels et al., 2010). When employees are empowered to take ownership of quality, uphold standards of excellence, and actively contribute to continuous improvement efforts, organizations become more agile, adaptive, and resilient in the face of uncertainty (Ghafoor, 2024; Salvador & Sancho, 2023). Open communication, collaboration, and knowledge sharing further strengthen the organizational fabric, enabling teams to harness collective intelligence and creativity to address challenges and seize opportunities as they arise (North et al., 2020; Dahmen, 2023).

In conclusion, the symbiotic relationship between governance and quality management is indispensable for enhancing organizational performance in times of uncertainty. By establishing robust governance frameworks, implementing proactive risk management practices, upholding rigorous quality standards, and fostering a culture of accountability and continuous improvement, organizations can navigate uncertainty with confidence, leverage opportunities for growth, and emerge stronger and more resilient in the face of adversity. This understanding of the interplay between governance and quality management offers valuable insights for scholars and practitioners seeking to navigate the complexities of dynamic environments and drive organizational success.

3.5 Author bibliographic coupling

Author bibliographic coupling, an extension of the concept of bibliographic coupling, occurs when two authors reference the same articles in their published works (Abu Huson et al., 2024). The underlying principle suggests that the more references shared between two authors across their body of work, the greater the similarity in their research focus (Albalawee et al., 2024; Qudah et al., 2024). The effectiveness of utilizing document bibliographic coupling for identifying research frontiers and constructing science maps has been extensively researched and confirmed (Alqudah et al., 2024). Fig. 5 presents the top 30 influential authors across various affiliations, with authors ranked based on their contribution to documents and the frequency of citations. Notably, the data analysis established a minimum citation threshold of 50 citations. The authors form seven distinct clusters, among which Prof. Terry Esper belongs to the yellow cluster, and Prof. Rajesh Kumar Singh is part of the blue cluster, both standing out as the most prolific contributors to the field of digital leadership's impact on service quality in supply chain management from 2010 to 2023. Each author has contributed 6 documents to the field. Prof. Terry Esper's works have amassed 215 citations, while Prof. Rajesh Kumar Singh's contributions have garnered 184 citations within the study field.

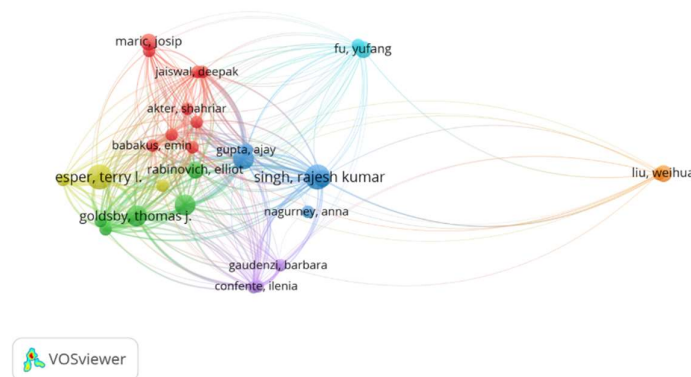


Fig. 5. Visualization of author-based bibliographic coupling network

Table 5 provides a detailed breakdown of the most influential authors in the field. The table offers a comprehensive overview of various authors' contributions to the field of supply chain management, with a particular emphasis on digital leadership's

effects on service quality. Each author is listed alongside their respective affiliations, h-index, i10-index, total citations, number of documents in the study field, citations within the study field, and total link strength.

Table 3

The most contributed authors

Author	Affiliation	h_index	i10_index	Total citations	Documents in the study field	Citations in the study field	Total link strength
Terry Esper	The Ohio State University	32	45	4729	6	215	1353
Rajesh Kumar Singh	Management Development Institute	58	148	11546	6	184	1016
Thomas J. Goldsby	Dee & Jimmy Haslam Chair of Logistics	46	76	10434	5	376	2158
A. Michael Knemeyer	The Ohio State University	39	63	7343	5	111	1044
Gyan Prakash	National Institute of Technology, Jalandhar	11	11	1704	5	57	1124
Anchal Gupta	Lal Bahadur Shastri Institute of Management	12	12	429	4	59	1003
Elliot Rabinovich	Arizona State University	37	51	6986	4	66	572

3.6 Countries bibliographic coupling

Fig. 6 provides an insightful visualization of countries that significantly contribute to scientific and technical literature, highlighting their active participation in collaborative networks and frequent involvement in research and development activities. This VOSviewer-generated visualization reveals intriguing patterns in the connections between countries, demonstrating the global landscape of scientific cooperation (Abu Huson et al., 2024). China stands out in this visualization, highlighting its strong economic and research ties with nations such as India, Malaysia, and Iran. These connections emphasize China's pivotal role in regional and global research networks, reflecting its substantial investment in scientific endeavors and international collaborations. China holds the top position based on the number of documents, with an impressive count of 152 documents and 2,590 citations. The United States is also prominently featured, holding the top position based on the number of citations with 141 documents and 4,289 citations. The U.S. is linked through strong diplomatic and economic ties with countries such as China, Germany, and the United Kingdom. This positioning underscores the United States' role as a central hub for global research and development, facilitating extensive international cooperation and contributing significantly to the advancement of scientific knowledge. Moreover, the visualization reveals the formation of clusters among countries with robust interconnections, signifying substantial collaboration in various research and development projects. A notable cluster comprises European nations, including Germany, France, Spain, Sweden, and Finland. This cluster indicates a high level of cooperation and shared research initiatives among these countries, reflecting the strong tradition of collaborative research within Europe. This regional collaboration is vital for addressing shared scientific and technological challenges and leveraging collective expertise.

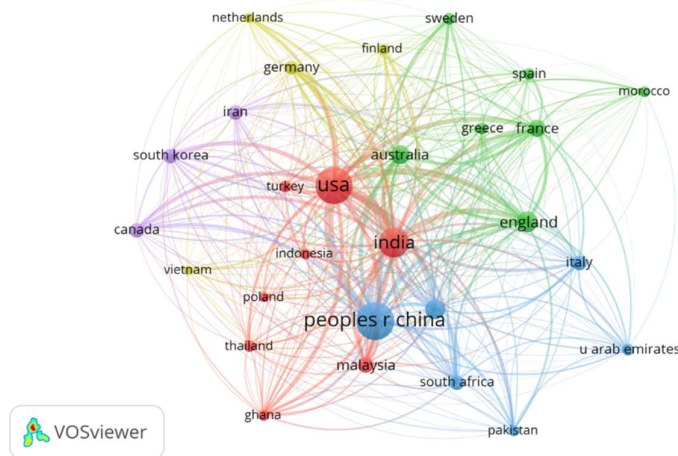


Fig. 6. Visualization of countries-based bibliographic coupling network

4. Discussion

The study's comprehensive analysis of digital leadership in supply chain management, coupled with its bibliometric mapping of global research contributions, unveils several critical insights and implications. It significantly advances the theoretical understanding of digital leadership, emphasizing the crucial roles of technology and sustainability in contemporary supply

chains. The identification of thematic clusters—such as sustainable green logistics, customer satisfaction through service quality, and organizational performance during uncertain times—highlights the multifaceted nature of digital leadership. The integration of advanced technologies like IoT, AI, and blockchain, as emphasized in the first cluster, aligns with and extends existing theories on digital transformation and sustainable supply chain management. The widespread integration of AI and machine learning technologies will become central, enabling predictive analytics, real-time decision-making, and process automation to optimize inventory management, demand forecasting, and supply chain visibility. The expansion of IoT capabilities will enhance operations by providing real-time data on asset location, condition, and status, improving logistics, reducing losses, and increasing efficiency. The focus on service quality management in the second cluster reinforces the importance of meeting and exceeding customer expectations through digital tools, enhancing theoretical frameworks like the SERVQUAL model. The third cluster's emphasis on governance and quality management during uncertainty underscores the necessity of robust governance frameworks and proactive risk management, contributing to theories of organizational resilience and adaptive management. These findings collectively underscore the interconnectedness of digital leadership, technology adoption, sustainability, and customer-centric strategies in enhancing overall organizational performance. The study's practical implications are equally significant for industry practitioners, policymakers, and researchers. For practitioners, the research highlights the importance of adopting advanced technologies to boost sustainability and operational efficiency, recommending the implementation of IoT, AI, and blockchain to provide real-time insights, optimize logistics, and enhance transparency. Businesses can leverage these insights to enhance customer satisfaction by focusing on service quality management, integrating digital tools to streamline operations, reduce errors, and provide seamless online shopping experiences, thereby fostering customer loyalty. The findings also stress the need for robust governance and quality management practices, particularly in uncertain times, urging organizations to focus on proactive risk management, clear governance structures, and continuous improvement to maintain operational stability. For policymakers, the study offers valuable insights into global research collaboration patterns, suggesting that understanding these patterns can guide the formulation of policies that support cross-border research partnerships and optimize resource allocation. The bibliographic coupling analysis underscores the importance of international collaboration in research and development, encouraging institutions to build strategic alliances, enhance knowledge transfer, and foster innovation. Finally, the study identifies emerging trends and potential areas for future research, such as the role of digital leadership in sustainability and the impact of quality management on customer satisfaction, providing a foundation for scholars to explore new dimensions and contribute to the evolving body of knowledge in these fields. There will be a stronger emphasis on sustainability and circular economy principles, focusing on waste reduction, resource efficiency, and sustainable sourcing practices. Advanced robotics and automation will handle repetitive tasks and complex assembly processes with greater precision and efficiency, reducing labor costs and increasing production speed and accuracy. Supply chains will become more customer-centric, leveraging digital tools to better understand and respond to customer needs with personalized services, faster delivery times, and improved product availability. Strong governance frameworks and proactive risk management strategies will be crucial, with companies investing in advanced risk assessment tools and robust contingency plans to mitigate potential disruptions. The use of digital twins and simulation models will become more common, allowing organizations to create virtual replicas of their supply chains for better scenario planning, risk analysis, and optimization. By staying ahead of these trends, organizations can enhance their supply chain resilience, drive innovation, and maintain a competitive edge in an ever-evolving business landscape.

5. Conclusion

This study has provided a comprehensive examination of digital leadership within supply chain management, emphasizing the critical integration of technology, sustainability, and governance to enhance organizational performance. Through detailed bibliometric analysis and thematic clustering, the research delineates the multifaceted roles of digital leadership in driving sustainability, improving customer satisfaction, and ensuring organizational resilience amidst uncertainties. The findings underscore the pivotal role of advanced technologies such as IoT, AI, and blockchain in modernizing supply chains, enhancing operational efficiency, and achieving environmental goals. Additionally, the study highlights the importance of robust service quality management frameworks in meeting and exceeding customer expectations, which is essential for maintaining competitiveness in the dynamic landscape of online commerce. Furthermore, the research points to the necessity of strong governance structures and proactive risk management practices to navigate the complexities and uncertainties that characterize today's business environment. By mapping global research contributions and identifying key thematic areas, the study offers valuable insights into the current state of digital leadership in supply chain management. It also paves the way for future research to explore emerging trends and deepen the understanding of how digital leadership can be leveraged to drive innovation and efficiency in various organizational contexts. Despite its comprehensive approach, the study has several limitations. The primary focus on digital leadership within the context of supply chain management may overlook other critical areas where digital leadership plays a significant role. Future research could expand the scope to include other sectors and contexts. The bibliometric analysis relies on available scientific and technical literature, which may not capture all relevant research contributions, particularly those in emerging fields or non-English publications, suggesting the need for more inclusive data sources in future studies. The rapid pace of technological advancement means that the findings may quickly become outdated, necessitating continuous research to keep up with the evolving technology landscape and its implications for digital leadership. While the study highlights global research contributions, there may be regional variations and specific contexts that require more detailed examination. Future research could explore these regional differences in greater depth.

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