



Rajkumar and Venkataraman: Cross-Sectioning Sustainable Supply Chain Governance: A Bibliometric Analysis

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ABSTRACT

Sustainable supply chain governance is pivotal in modern business, addressing global supply chains' profound environmental, social, and ethical impacts. It necessitates establishing and administering policies to guide sustainable practices, ensuring adherence to the supply chain's environmental, social, and ethical standards. Effective governance aligns and supports business operations with sustainability goals, fostering transparency, accountability, and responsible practices. This framework guides decision-making, mitigates risks, and enhances overall supply chain resilience, contributing to a more sustainable and ethically responsible business landscape. The corporate shift towards sustainable supply chain management (SSCM) is manifested by the emerging literature documenting comprehensive changes in governance. A bibliometric-based systematic review of 129 Scopus-indexed documents (2014-2023) reveals four interconnected themes: SSCM, Sustainable Business and Operations Management, Global value chains, and Supply chain risk management. Analysis highlights the critical role of governance mechanisms in driving positive social, ecological, and economic outcomes. Governance achieves this by establishing clear policies and standards for social and environmental responsibility and ensuring robust mechanisms for compliance and accountability. Sustainable supply chain governance provides a blueprint for integrating sustainability. It ensures ongoing commitment and accountability, fostering significant and lasting positive effects on society, the environment, and overall supply chain resilience.

Keywords: Bibliometric Review, Supply Chain Governance, Environmental Regulations, Sustainable Supply Chain Management, Sustainability

JEL Classification: Q01

1. INTRODUCTION

Sustainable supply chain management (SSCM) is the most significant corporate management approach that addresses environmental, social and economic sustainability (Hallinger, 2020;2021). It depends on cooperation among various actors in the supply chain that jointly work to manage materials, data and financial flows (Seuring and Müller, 2008). We can see that sustainable supply chain management has grown enormously over the past 25 years, both academically and practically (Fahimnia et al., 2015). This can be assessed through a well-supported database concerning the characteristics and its influence on various supply chain management (SCM) models and strategies (Ahi and Searcy, 2013; Ansari and Kant, 2017). In a generation of universal

interconnectedness and increased environmental cognisance (Du et al., 2018), the requirement to adopt sustainability has transcended rhetoric and become an obligatory foundation of modern business ethics. At the core of this issue lies the critical concept of sustainable supply chain governance, a complex framework that devises responsible practices from material sourcing to product delivery. The archetype shift has forced organisations to ignore the organisational size and the type of industry to re-examine and regulate their supply chain strategies.

Sustainable supply chain governance (SSCG) captures a complex approach to examining and perfecting supply chain operations, confirming they adhere to all-inclusive social, environmental and economic principles (Morcillo-Bellido and Duran-Heras,

2020). In this dynamically changing world, businesses must maximise efficiency and profitability while minimising their environmental impact, protecting human rights, and reinforcing the communities in which they operate (Costantini et al., 2017). Sustainable supply chain integrating governance has become a cornerstone for conscious business conduct, complementing it with environmental, social and economic essentials. Governance warrants accountability, compliance with global regulations, and transparency, lowering risks (Ferry and Eckersley, 2015; Kim and Park, 2019; Schiller, 2017) by promoting partnerships with supplier governance driving joint sustainability. In turn, it enhances efficiency and cuts costs by adopting innovation. It also reinforces supply chain resilience during disruptions and focuses on resource efficiency by illustrating product stewardship. Eventually, this amalgamation is a prudent investment, a testimony to a firm's obligation to create value, and a vestige of sustainable progress in a progressively demanding world.

Indeed, the analysis of the governance perspective in sustainable supply chain management (SSCM) has led to the development of new literature. The existing literature so far concentrated on how firms can manage relationships with their suppliers using governance mechanisms to advance sustainability performance (Belhadi et al., 2021; Gimenez and Sierra, 2013) or how ecological and social standards can ensure rightfulness in supply chain governance. So far, studies on bibliometric analysis relating to sustainable supply chain governance have yet to be conducted. The current review used bibliometric methods to analyse the evolving conceptual landscape of published research. This research analyses the significance of incorporating sustainable supply chain management in the governance framework. The review is based on the following research questions (RQs) that guide the investigation:

1. How can the distribution of documents over time and geography offer insights into sustainable supply chain governance?
2. What insights can be gained from the most cited documents regarding sustainable supply chain management and governance, including critical topics, conceptual themes, and interdisciplinary collaboration?
3. How is the academic contribution of the previous studies on sustainable supply chain governance structured?

The analysis presented in this study focuses on 128 documents related to governance and sustainable supply chain management, indexed in Scopus. The bibliographic data linked to the database was studied using citation analysis, descriptive statistics, and analysis of the co-occurrence of authors' keywords. These analyses aimed to document and examine the intellectual and conceptual structure of the literature. The main objective of this research is to bridge the gap between practice and research in sustainable supply chain management governance, with a particular focus on the impact of COVID-19.

The review article is organised as follows: Section 1 familiarises the reader with the background of the study. Section 2 reviews the background of governance in sustainable supply chains. Section 3 presents the research methodology used in the study. Section

4 answers the research questions. Section 5 provides the study's outcomes, and Section 6 concludes the study.

2. REVIEW OF LITERATURE

SSCM has gained significant recognition within the vast literature on sustainability in recent years (Hasan, 2013; Seuring and Müller, 2008). SSCM is vital in countering external pressures and incentives devised by various stakeholder groups, including social and environmental pressure groups, regulators, members of society, and consumers. All these stakeholders influence the companies' and societies' production and consumption activities. However, SSCM aims to incorporate the three pillars of sustainability into the whole supply chain (Seuring and Müller, 2008). For this review, the have used Stock and Boyer's (2009) definition of sustainable supply chain management as "*The management of a network of relationships within a firm and between interdependent organisations and business units consisting of material suppliers, purchasing, production facilities, logistics, marketing, and related systems that facilitate the forward and reverse flow of materials, services, finances and information from the original producer to final customer with the benefits of adding value, maximising profitability through efficiencies, and achieving customer satisfaction*" (p 706). Addressing sustainable consumption and production requires a systemic transformation involving coordinated efforts from diverse sectors and global regions (UN, 2021a).

In the present-day business topography, the need for sustainable supply chain governance has become an overriding concept. For instance, various conferences of the COP, the supreme decision-making body of the United Nations Framework Convention on Climate Change, bring out various protocols and regulations for regulating climate change. Moreover, sustainable supply chain governance research has gained prominence over the past decade (Richey et al., 2010a).

The United Nations encourages responsible and sustainable business practices, incorporating supply chains through the UN Global Compact platforms. Therefore, Companies are encouraged to take a precautionary approach to environmental challenges, promote environmental responsibility, and support environmentally friendly technologies (Foster, 2002). Furthermore, the United Nations Sustainable Development Goal (SDG) 12 provides a framework for governing sustainability. Mainly, goal 12.7 focuses on promoting sustainable practices in companies' supply chains (UN, 2021b). The primary objective of this goal is to ensure that by 2030, companies adopt sustainable practices and integrate sustainability information into their reporting cycle (UN, 2021). Lately, organisations are encouraged to integrate sustainability into their supply chain operations to contribute towards achieving the Sustainable Development Goals (SDGs).

The focus on sustainable supply chain governance's sustainability-oriented perspective has led to the integration of several environmental management concepts such as transparency, traceability, and risk management. This study examined four

Table 1: Top-cited article in Scopus database

Rank	Document	Type	Scopus citations	Major research focus
1	(Koberg and Longoni, 2019) "A systematic review of sustainable supply chain management in global supply chains"	Rev	354	This research paper investigates the concept of sustainable supply chain management (SSCM) in supply chains across the world and aims to recognize the essential components and mechanisms of governance in SSCM.
2	(Formentini and Taticchi, 2016) "Corporate sustainability approaches and governance mechanisms in sustainable supply chain management"	Art	223	This paper categorises governance mechanisms and identifies enabling factors for SSCM based on three sustainability profiles.
3	(Costantini et al., 2017) "Eco-innovation, sustainable supply chains and environmental performance in European industries"	Art	203	The article emphasises the significance of well-coordinated governance mechanisms in managing sustainable supply chains for environmental benefits.
4	(Mathivathanan et al., 2018) "Sustainable supply chain management practices in Indian automotive industry: A multi-stakeholder view"	Art	170	The paper emphasizes the significance of incorporating environmental, social, and economic considerations into sustainable supply chain management.
5	(Boström et al., 2015) "Sustainable and responsible supply chain governance: Challenges and opportunities"	Conf	145	The paper pinpoints six major challenges in sustainable supply chain governance and recommends partnership building and flexibility as solutions.
6	(Li et al., 2014) "Governance of sustainable supply chains in the fast fashion industry"	Art	133	The paper emphasises the significance of sustainability governance in fast fashion supply chains and explores factors that can improve sustainable performance.
7	(Reefke and Sundaram, 2017) "Key themes and research opportunities in sustainable supply chain management-identification and evaluation"	Art	131	The paper highlights the significance of governance in sustainable supply chains, underscoring the need for policies and practical guidance.
8	(Govindan et al., 2016) "Accelerating the transition towards sustainability dynamics into supply chain relationship management and governance structures"	Art	131	The paper emphasise the importance of governance mechanisms and relationships in achieving effective sustainable supply chain management.
9	(Neutzling et al., 2018) "Linking sustainability-oriented innovation to supply chain relationship integration"	Art	117	The paper emphasises effective inter-organizational relationships, introduces an analytic framework, and stresses on value generation and operationalization of sustainability outcomes in supply chain governance.
10	(Garcia-Torres et al., 2019) "Traceability for sustainability-literature review and conceptual framework"	Rev	104	The paper underscores traceability's role in transparency, dynamic capabilities, collaboration, and ethical concerns, highlighting its impact on SSCG.
11	(Gosling et al., 2016) "The role of supply chain leadership in the learning of sustainable practice: toward an integrated framework"	Art	102	The paper highlights the importance of sustainable supply chain governance mechanisms, such as green supplier programs and codes of conduct, in promoting sustainable practices throughout the supply chain.
12	(Niesten et al., 2017) "Sustainable collaboration: The impact of governance and institutions on sustainable performance"	Art	101	This article underscores the significance of inter-firm cooperation in attaining sustainability within supply chains, while also stressing the influence of institutions and governance mechanisms on collaboration and performance
13	(Sodhi and Tang, 2018) "Corporate social sustainability in supply chains: a thematic analysis of the literature"	Art	99	The paper identifies key themes in SSCG, emphasizing the importance of stakeholder engagement, transparency, and accountability for effective implementation of social sustainability practices
14	(Lăzăroiu et al., 2020) "Sustainability management and performance in the urban corporate economy: A systematic literature review"	Rev	98	In order to improve operational efficiency and environmental outcomes, the paper stresses the importance of stakeholder involvement and the orientation of the value chain in sustainable supply chain management.
15	(Esfahbodi et al., 2017) "Governance pressures and performance outcomes of sustainable supply chain management – An empirical analysis of UK manufacturing industry"	Art	95	The study found that governance pressures are necessary for the effective implementation of SSCM practices, and while they positively affect environmental performance, they do not necessarily lead to improved economic performance.

Source: Compiled by authors, using data extracted by Scopus

Rev: Review Article, Art: Empirical Article, Conf: Conference article

related concepts of supply chain governance: SSCG, Sustainable Business and Operation Management, Global Value Chains, and Supply Chain Risk Management (Table 1).

The distinctive aspect of sustainable governance can be contrasted with each of the themes of supply chain governance (Table 2). For example, sustainable supply chain management outlines an

Table 2: Top-cited article in Scopus Database.

Supply Chain Governance Theme	Distinctive Aspect of Sustainable Governance
Transparency	There is a strong emphasis on transparency to ensure clear communication and visibility of sustainability efforts and impacts throughout the supply chain.
Traceability	Implementation of traceability measures to track products and verify sustainable and social compliance.
Collaboration	Collaborate with suppliers, partners, and communities to tackle sustainability challenges and create a positive impact.
Ethical Sourcing	Commitment to ethical sourcing practices prioritizes suppliers and materials that adhere to fair labour, human rights standards, and environmentally responsible production methods.
Environmental Management	Comprehensive environmental management strategies are integrated throughout the supply chain to minimize waste, reduce carbon footprint, and protect ecosystems.
Social Responsibility	Dedication to social responsibility initiatives including supporting community development projects, promoting diversity and inclusion, and ensuring safe and equitable working conditions for all stakeholders.
Risk Management	Incorporating sustainability into risk management processes to enhance long-term resilience by identifying and mitigating environmental, social, and governance risks.
Continuous Improvement	Strive for continuous sustainability improvement by setting goals, monitoring metrics, and adapting strategies based on feedback and learning.
Compliance	It puts emphasis on the significance of responsible sourcing practices and ethical labor conditions that go beyond what is required by minimum compliance standards.
Stakeholder Management	It puts emphasis on the significance of responsible sourcing practices and ethical labor conditions that go beyond what is required by minimum compliance standards.
Performance Measurement	The system integrates social and environmental metrics such as carbon footprint, water usage, and worker safety.
Efficiency & Cost Management	It values the long-term environmental and social well-being as much as the financial performance.

all-inclusive approach that ensures supply chain activities are environmentally friendly, socially responsible, and economically viable (Singhry, 2015). SSCG is the key structure that guides the all-round integration of sustainability practices into supply chain management (Formentini and Taticchi, 2016a). However, sustainable Supply Chain Management integrates environmental, social, and economic sustainability into the supply chain, i.e. it concentrates on all the aspects of the triple bottom line. Sustainable Business and Operations Management extends this focus internally. Global Value Chains span global activities, while Supply Chain Risk Management prioritises risk mitigation (Dutta, 2021; Lee and Ulferts, 2011; Qazi et al., 2018).

Morali and Searcy (2013) revealed that there was only a small emphasis, at 13%, placed on sustainable supply chain governance. The governing body's obligations were unclear, which further compounded the challenges that were amplified by the COVID-19 pandemic. The global pandemic highlighted the critical role of resilient governance structures in addressing commotions within the complex web of global supply chains. However, the global pandemic has worsened existing vulnerabilities and revealed further weaknesses due to insufficient organisational engagement. It also highlighted the interconnection of the three dimensions of sustainability, underscoring the limitations in their integration. This chaotic period urges organizations to review and fortify governance frameworks, recognising their pivotal role in sustainable and resilient global supply chain management.

In their research, Boström et al. (2015) explore the challenges and opportunities of sustainable supply chain governance and also explain how firms involved in the global supply chain affect the governance mechanism. However, firms understand their operations' social and environmental significance within their organizational boundaries. The authors have identified six crucial areas where global sustainable supply chain governance faces gaps: communication, compliance, knowledge and information,

geographical barriers, power imbalances, and legitimacy issues. The paper also explores various governance labels, auditing procedures, product information systems, procurement guidelines, and eco-branding practices. The authors suggest ways to address these gaps through collaboration among firms and stakeholders to create a sustainable and resilient global supply chain.

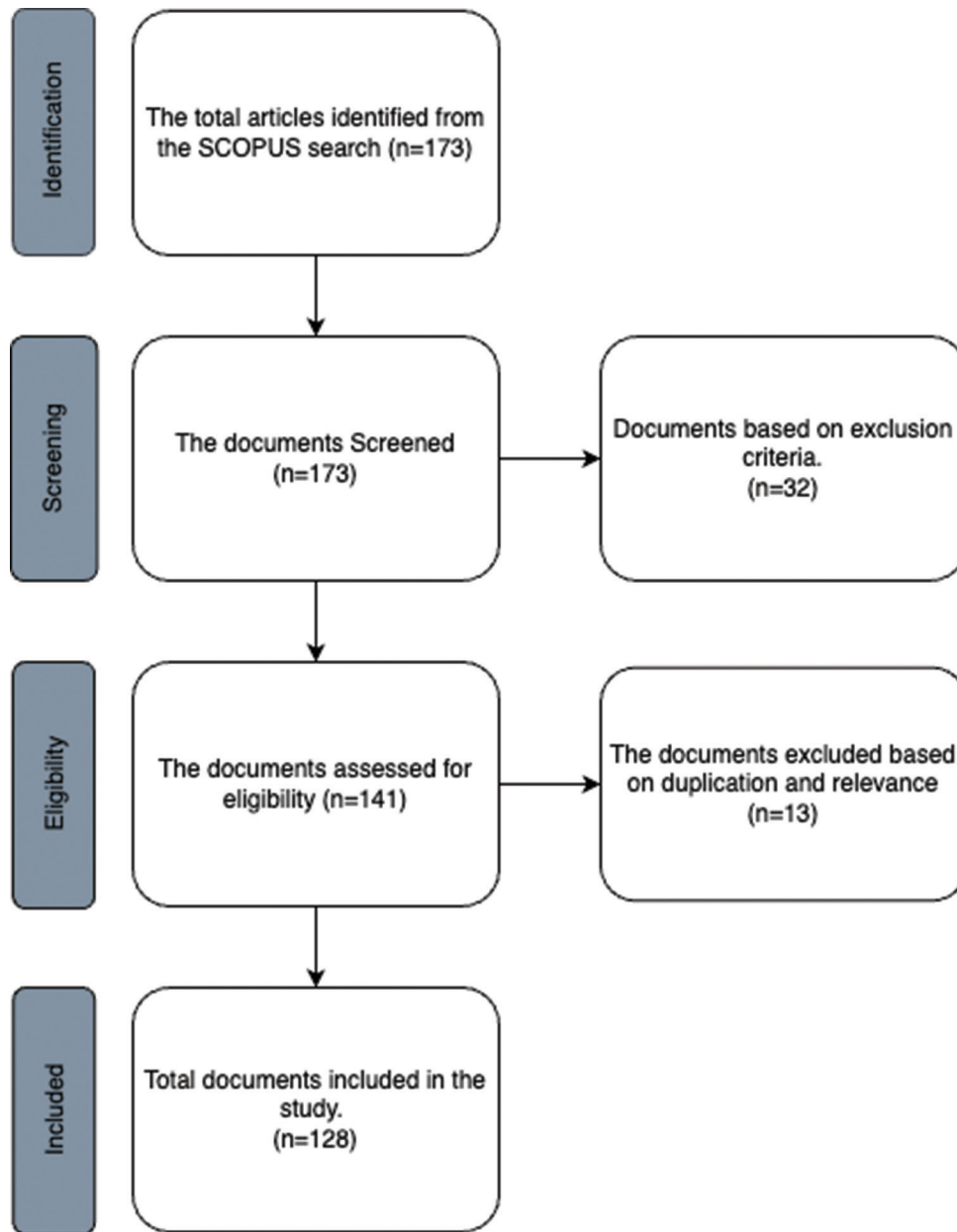
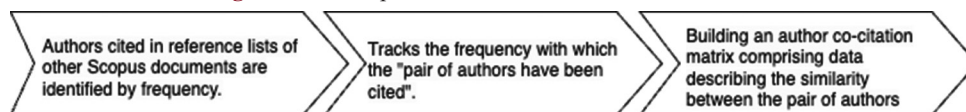
3. RESEARCH METHODOLOGY

The authors of this research have analysed and combined bibliographical information from various research papers on the topic of governance in sustainable supply chain management (SSCM). A study by Zupic and Čater (2015) propounded that bibliometric review can amalgamate the production pattern amidst a large document corpus with lucidity. Even though we find that previous studies have been published on sustainable supply chain management using bibliometric reviews (Fahimnia et al., 2015; Nimsai et al., 2020; Yu et al., 2022) and governance (Mumu et al., 2021; Wu et al., 2018; Zheng and Kouwenberg, 2019). However, the approach mentioned has not yet been utilized in the combined body of literature related to these particular ideas.

3.1. Source Identification Process

The Scopus database was preferred over the Web of Science (WoS) because of its more comprehensive coverage (Mongeon and Paul-Hus, 2016; Zupic and Čater, 2015). In this study, the researchers concentrated on peer-reviewed Journal articles, book chapters, Reviews, Conference papers and books because of their broader scope for covering content. The scope of the review was defined by the authors as "Sustainable supply chain governance" without considering the date of publication, type of article, or the area of its origin.

PRISMA, or the "preferred reporting items for systematic reviews and meta-analyses" as suggested by Moher et al. (2009), was used

Figure 1: A detailed article selection and search process based on PRISMA**Figure 2:** The steps to build an author's Co-citation matrix

Source: Adopted from (Small, 1973; van Eck and Waltman, 2017; Zupic and Čater, 2015)

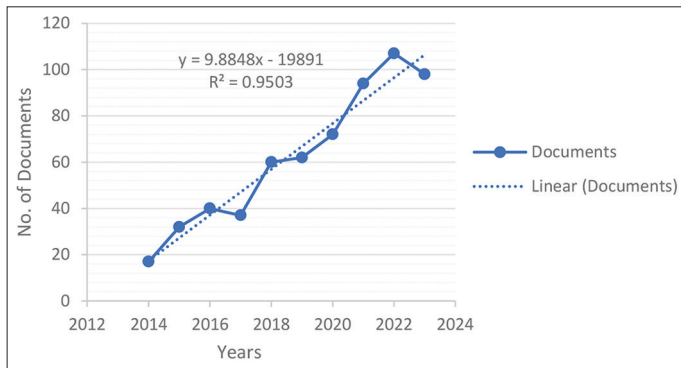
for probing and selecting the document. A Scopus search was conducted in November 2023 using the keywords “Sustainable supply chain” and “governance” within titles, abstracts and keywords. Nearly 173 documents were found in the initial stage (Figure 1). Later, the authors applied Scopus filters to limit the documents to Journal Articles, Book Chapters, Conference Proceedings, Books and Reviews published in English. The subject area was set to Environmental science, Social Science, Business, Management and Accounting, Economics, Econometrics and Finance, and multidisciplinary and restricting the year from 2014

to 2013 resulting in the exclusion of 28 studies. Then, the duplicate and irrelevant articles were vetted by the authors. Nearly 128 journal articles or reviews were found at the end of this process.

4. DATA ANALYSIS

Data analysis was performed using Excel, Tableau and VOSviewer for metadata related to 141 exported from the Scopus database. The documents were disambiguated for an accurate bibliometric analysis (Zupic and Čater, 2015).

Figure 3: Annual publication trend



Source: Crafted by authors using data from the Scopus database

The first research question was addressed through the use of descriptive analysis. Scopus analytical tools were utilized to examine the growth trajectory and distribution of the knowledge base across the subject area. In addition, the data pertaining to the authors who have published these articles was topographically visualized.

With VOSviewer, the second and third research questions were answered with document citation and co-citation analysis for authorship (van Eck and Waltman, 2017). The most significant journals were identified with document citation analysis. Even though the document citation analysis possesses some limitations, it is commonly used to study the scholarly impact (Zupic and Čater, 2015). The citation analysis determined the frequency with which other Scopus-indexed documents cited each journal article. Therefore, this is referred to as “Scopus citation.”

The intellectual arrangement of narratives on sustainable supply chain governance was studied using the co-citation analysis. The co-citation analysis was performed using VOSviewer with a three-step process (van Eck and Waltman, 2017). Figure 2 illustrates the process by which VOSviewer constructs a co-citation matrix for authors.

The author co-citation map (ACA) was employed in this review to analyse the relationships between authors in sustainable supply chain governance. Author co-citation maps are commonly utilised to identify the “intellectual structure” of a particular discipline or line of inquiry.

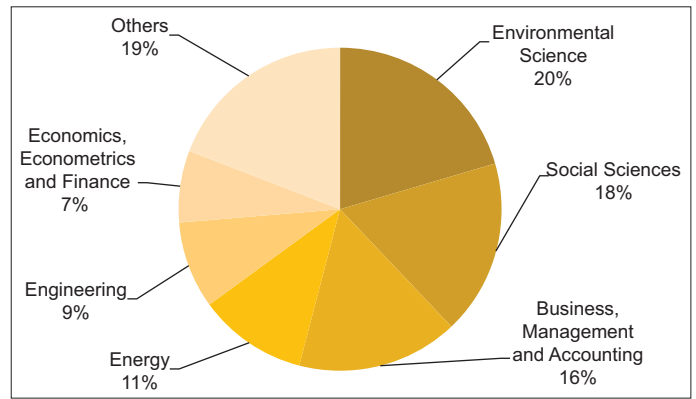
5. RESULTS

The results are presented following the research questions.

- i. Growth trajectory, Subject sphere, and topographical allocation of the literature

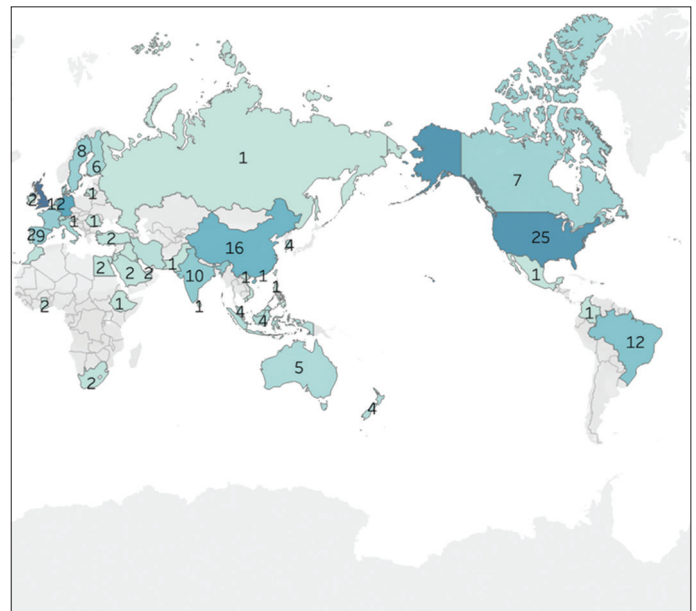
The first article on sustainable supply chain governance was published in 2008. Despite this, 2014 manifested the foundation of remarkable growth in articles that pertained to the mentioned topics (Figure 3). In the below graph, we can also see that $y = 9.8848x - 19891$, $R^2 = 0.9503$, which means the linear correlation: y increases by 9.8848 for each unit increase in x and the initial $y = -19891$. The key factors that have increased sustainable supply chain governance are heightened

Figure 4: Subject area



Source: Constructed by authors using data from the Scopus database

Figure 5: Topographical representation of Author’s contribution



Source: Compiled by authors using data from the Scopus database

environmental awareness, rigorous regulations and customer demand for sustainability.

Analyses of the subject domain of 128 journal articles showcased the interdisciplinary knowledge base of the two concepts covered in this review, as shown in Figure 4. Interestingly, Business Management and Accounting, Social Sciences, Energy and Engineering, hold nearly one-third of the literature. This suggests a high potential for theoretical knowledge from an interdisciplinary perspective.

The topographical map (Figure 5) presents the authors’ data contributing to the scholarly idea from a particular nation or region. Researchers from The United Kingdom, The United States of America, China, Germany, and Australia have contributed to the field. In a broader sphere, Scholars from Europe, North America and Asia have contributed to the field of study. Interestingly, the total research published by the European Union nations and the United Kingdom is nearly three-fourths of the database. This skewness can be the by-product of the stringent ecological

regulations by the European Union or their commitment to climate change (BBC News, 2021).

5.1. Most Important Research in SSCG

Most cited documents in the area of research have a baseline that underscores the importance of the governance mechanisms of the supply chain and highlights the function of governance in attaining the goals of sustainability (Formentini and Taticchi, 2016b; Koberg and Longoni, 2019). The highly cited articles also mention that sustainable supply chain governance can foster environmental performance and 'eco-inventions' within the economy (Costantini et al., 2017). The top 15 cited articles exhibit a cross-disciplinary collaboration from subjects like Business management, operation management and Economic community advancement (Govindan et al., 2016; Li et al., 2014; Mathivathanan et al., 2018). However, there exists significant scholarly collaboration between various researchers across the globe (Boström et al., 2015; Lăzăroiu et al., 2020; Reefke and Sundaram, 2017).

When analysing the meta-dataset of the top 15 cited studies, it is clear that there are 11 research articles, three review articles and one conference proceeding. This clearly shows a need for more clarity in developing conceptual ideas and reviewing the past literature. For instance, Koberg and Longoni (2019) introduced the concept of SSCM in global supply chains (GSCs), and they defined SSCM as "an approach for firms to improve sustainable outcomes in their supply chains by integrating environmental, social, and economic goals across their supply chain processes". They also considered structural and relational aspects of Global Supply Chains (GSCs). The structural aspect involves managing sustainability through the network of participants involved in the global supply chain. In contrast, the relational aspect centres around how focal companies establish relationships with supply chain members and stakeholders to implement sustainable supply chain management (SSCM). The

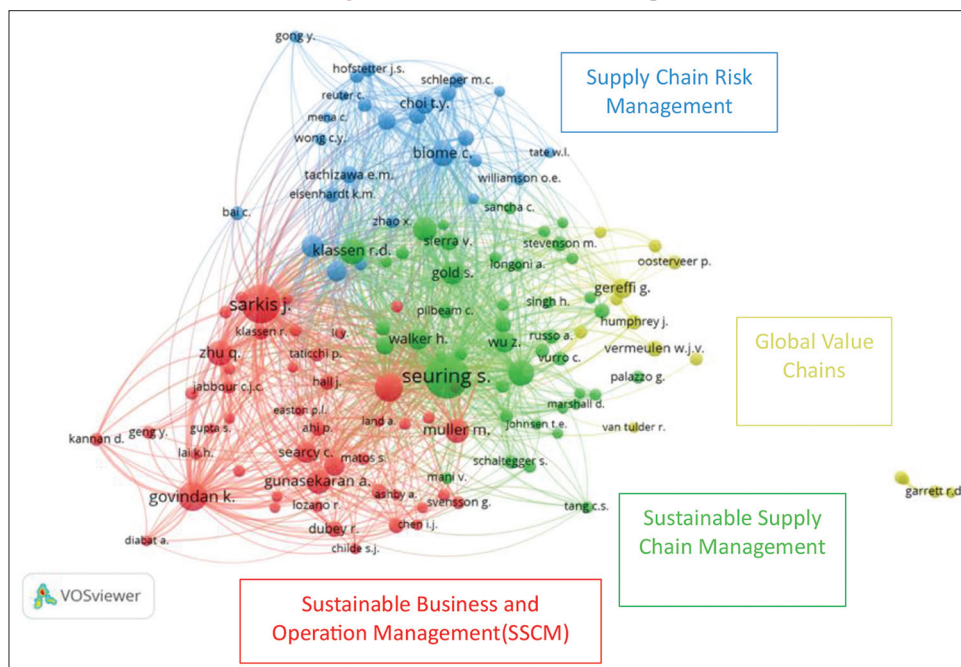
article also brings attention to the limitations of relying only on certifications and calls for further research on the engagement of buyer firms in collaborative ventures.

Garcia-Torres et al. (2019), aim to explore how traceability for Sustainability (TFS) can be encouraged in the global apparel supply chain through governance processes and mechanisms. The definition of governance used in this study is "authority and power relationships that determine how financial, material and human resources are allocated and flow within a chain." The article discusses the processes and mechanisms of governance that retailers utilize to promote TFS in the supply chain. Additionally, governance is identified as one of the three dimensions of TFS, along with collaboration, tracking, and tracing.

In a review article, Lăzăroiu et al. (2020) emphasised that to gain a competitive edge, it is vital for companies to prioritize sustainable supplier selection. In addition, establishing strategic relationships with supply chain partners is crucial for achieving organizational goals. The correlation between a company's sustainability commitments and its growth prospects, stakeholder data requirements, and sustainability performance in supply chains should not be overlooked. The authors of the article suggest that reducing ambiguity in sustainability data can lead to more effective sustainability processes. The article also offers insights into sustainable development governance, organizational knowledge development, and corporate sustainability.

These articles stress the prominence of sustainable methods in global supply chains and highlight various dimensions and mechanisms to achieve sustainability goals. These include integrating environmental, social, and economic goals, considering structural and relational aspects of supply chains, implementing governance processes and mechanisms, and emphasising the

Figure 6: Author's co-citation map



Source: Constructed by authors using data from the Scopus database

selection of sustainable suppliers for competitive advantage.

The top-cited research articles were published in business management, production engineering, engineering operations, corporate governance, operations management, economics and management (Table 1). However, one study only focused on the cost-effectiveness (Costantini et al., 2017). The authors examined how innovation can help reduce environmental pressure and improve environmental performance while being cost-effective. They also discussed how different technologies can work together to prevent economic resources from being squandered.

A study by Mathivathanan et al. (2018) focused on the manufacturing industry. The article examined how SSCM affects the performance of the manufacturing industry in the UK under governance pressures. It also discussed the commitment and readiness of the oil and gas industry to adopt sustainable supply chain management practices. Additionally, it reviewed the literature on supply chain management (SCM) and sustainability, including discussions on sustainable supply chain management practices.

Other top-cited studies within the meta-data set focused on exploring approaches to corporate sustainability and mechanisms related to governance in sustainable supply chain management (Formentini and Taticchi, 2016). In a study, Li et al. (2014) examined the effect of CSR practices on the sustainability performance of fast fashion supply chains and their partners.

5.2. Intellectual Structure of the Literature

5.2.1. Co-citation analysis based on authors

The co-citation analysis was done to analyse the intellectual structures or the theoretical pillars (Figure 6). Co-citations based on authors were used to analyse and visualise the connections between authors in academic literature. Its primary purpose was identifying influential authors and works that have significantly impacted the field. This provides insights into the intellectual lineage of ideas, which can help identify clusters of researchers who share similar research interests. Such identification can lead to the development of research networks and partnerships. Overall, co-citation based on authors is a valuable tool that can help researchers navigate the complex landscape of academic literature and identify meaningful connections that might otherwise go unnoticed (Mustafee et al., 2014; Wang et al., 2012). The size of a node indicates the frequency of citation of a particular author or concept in the reference lists of the reviewed documents. A larger node size implies that the author or concept is cited more frequently, which indicates a higher level of influence or relevance within the field. The juxtaposition of nodes in a co-citation analysis denotes the corresponding authors' relative degree of intellectual affinity (Zupic and Čater, 2015). The lines that connect author nodes reflect co-citation links, and their density represents co-citation frequency between the scholars. The various colours in the visualisation map represent various subject matters with a common origin (Small, 1973; van Eck and Waltman, 2017).

The author's co-citation maps visualise four subject areas in the present research. The lucidity of the literature's conceptual structure

can be seen from the rationality of the clusters. The network diagram represents four different thoughts within the subject area, and we have named them Sustainable supply chain management (SSCM), Global value chains, Supply chain risk management and Sustainable Business and Operations Management. Even though there are four themes within the subject area, we can see that Sustainable supply chain management, with 44 authors, is the central theme that connects the other three dimensions, serving as the theoretical fix between the themes. From the network diagram, it is apparent that Stefan Seuring bridged the boundaries by contributing extensively to most of the themes in the interest area. He conceptually focused on social responsibility, environmental sustainability, and ethical considerations in supply chain practices (Beske et al., 2014; Seuring and Müller, 2008; Yawar and Seuring, 2017). Seuring and Govindan K incorporated the concepts of Sustainable supply chain modelling from the qualitative perspective, aiming to identify the challenges and opportunities in this field and to provide recommendations for future research (Brandenburg et al., 2014).

Recently, Stephen Seuring conducted a literature review based on bibliometric analysis of the circular economy aimed at identifying the trends, prominent researchers, publications with significant impact, etc. The article clarified the distinctions and connections between terms like circular economy, closed-loop supply chain, circular supply chain management, and reverse logistics. The study recommends collecting additional empirical and longitudinal data, using more diverse theories and methodologies, and focusing more on subjects like zero waste, industrial symbiosis, circular product design, sourcing, supply management, and reuse (Zhang et al., 2023). Another influential author in the area is Joseph Sarkis, his recent research includes Circular economy, the relationship between Industry 4.0 and Sustainable development goals from a social perspective, Corporate sustainability, and Environmental accounting (Bai et al., 2023; Chen et al., 2023; Grimm et al., 2023; Sarkis, 2023; Tian and Sarkis, 2023).

Sustainable Business and Operation Management School, comprising 47 authors, is the most prominent theme among the four themes of the subject area. Authors like Sarkis, Govindan, Carter, Muller, Gunasekaran and Searcy are critical contributors to this theme, embodying diverse fields like Corporate Sustainability, Environmental Management, Operation Management, Logistics, Procurement Strategies, and Green operations. The published work of these authors mainly focuses on analysing the potentiality of blockchain in providing transparent data, identifying the barriers to implement sustainable manufacturer and supplier collaboration, and how modern technology can aid in creating a circular economy (Aditi et al., 2023; Jauhar et al., 2023; Zhu et al., 2023). Their research points out the importance of improving transparency and traceability with modern technologies like Blockchain and improving an organisation's environmental performance by incorporating social responsibility.

The supply chain risk management theme encompassed 26 authors, with Blome C, Choi T.Y., foerstl K. and Jia F. being the prominent authors. Their research focused on how the humanitarian supply chain can be sustainable, how resilient an intertwined supply chain

network can be, and what leadership roles are in a sustainable supply chain. On the whole, these studies focused on integrating sustainability in risk models, making a supply chain resilient to risks, and managing stakeholders like management, employees, customers, etc. (Anjomshoae et al., 2023; Choi et al., 2023; Jia et al., 2019).

The global value chain theme encompasses 14 authors. The key authors of this cluster are Gereffi G, Vermeulen W.J.V, Humphrey J, and Lambin E.F. Their research focused on the global value chains of different sectors, policy gaps with regards to the governance of transboundary waste movement and how global value chain interventions can promote market-oriented growth and poverty reduction in developing nations (Gereffi, 2020; Humphrey and Navas-Alemán, 2010; Thapa et al., 2023). Overall, research on the global value chain theme focuses on Trade policy, Globalisation, Human rights, Labour practices, Adaptability and Resilience.

6. DISCUSSION

This review uses bibliometrics to explore research on Sustainable Supply Chain Management (SSCM) in governance. It builds upon previous reviews by explicitly connecting the related concepts.

The research conducted has shown that governance is an emerging area of study. Additionally, we are of the opinion that an appropriate governance mechanism is the foundation of SSCM, which plays a crucial role in aligning organizational practices with ecological and social responsibility (Bhaskar et al., 2020; Esfahbodi et al., 2017), making it an important topic for practice, research, and policy-making. This conclusion is supported by the current research trend in the field (Figure 3), as well as the contributions of scholars to academia (Lepoutre et al., 2007; Rasoolimanesh et al., 2019). In fact, the literature already demonstrates a strong collaboration among authors from diverse backgrounds.

A thorough analysis of highly cited documents reveals how governance has transformed sustainable supply chain management, rewriting the ecological and social responsibility approach in business. The supply chain legacy has primarily focused on optimising cost and operational efficiency, overlooking the comprehensive impact on the environment and society. The rise of sustainability as a crucial business agenda has obligated firms to amalgamate governance structures that align with environmentally responsible and ethical practices (Niesten and Lozano, 2015; Salvioni et al., 2016). Moreover, these studies suggest that re-evaluating sustainable supply chain governance can yield benefits at multiple levels.

At the global level, sustainable supply chain governance can facilitate transformative change across the three dimensions of sustainability (Richey et al., 2010b). At the institutional level, sustainable supply chain governance can shape the practices of industries, regional economies, and individual businesses. These governance mechanisms can motivate firms to adopt circular economy principles, minimise waste and reduce the ecological footprint by implementing policies and standards prioritising environmental sustainability. Governance at the institutional level

ensures ethical behaviour within supply chains, fair treatment of workers, community engagement, and support for local economies. Sustainable supply chain governance at the micro level directly impacts individual business and their day-to-day operations. It encompasses practices highlighting ecological responsibility, such as reducing energy consumption, waste and carbon emissions. Proper governance mechanisms at the micro level foster positive social impacts and sustainable relationships with local communities (Formentini and Taticchi, 2016b; Jager et al., 2020).

The top-cited articles also indicate that an effective governance mechanism can increase sustainable supply chain transparency (Garcia-Torres et al., 2019). We also found that these articles emphasise that effective governance is a key that drives transparency in sustainable supply chains by establishing clear standards, regulations, and control mechanisms (Montecchi et al., 2021). Therefore, sustainable supply-chain governance is critical for its transparency, sustainability, traceability and resilience. However, governments need to mandate disclosure requirements for companies to report on environmental and social practices in their supply chains. Robust regulations ensure compliance with ethical and sustainable standards, promoting transparency.

The author's co-citation network diagram revealed four themes within the subject area. The first theme is SSCM, which conceptualises governance. Remarkably, this theme can be found as the conceptual fix of the subject area interconnecting the rest of the three themes. Sustainable Business and Operation Management is the second theme in the network map focused on Corporate Sustainability, Environmental Management, Operation Management, Logistics, Procurement Strategies, and Green operations. Supply chain risk management is the third theme within the subject area, focusing on how advanced technologies such as AI and blockchain help with risk identification and supply chain resilience in response to global disruptions like the coronavirus pandemic. The last and fourth theme in the network map is the Global value chain, emphasising the effect of Industry 4.0 on global production networks, strategies for geopolitical uncertainties and sustainability in global value chains.

The network diagram reframes the concept of sustainable supply chain management by incorporating the concepts of traceability, corporate sustainability, stakeholder pressure and firm performance. Esfahbodi et al. (2017) discuss the impact of governance pressures in the form of environmental regulations on the adoption of sustainable supply chain management (SSCM) practices among UK manufacturers. Sodhi and Tang (2018) examined the significance of social sustainability in supply chains, the obstacles involved in implementing social sustainability practices, and the role of certification schemes and standards in promoting social sustainability. Figure 5 shows the rate of scientific production from various countries in the world.

Researchers have delved into the various aspects of sustainable supply chain management in the last few decades. They have explored integrating sustainability practices, developing metrics and assessment tools for sustainability performance, and discovering innovative technologies for transparency and

traceability. Several studies have focused on the challenges and opportunities of sustainable sourcing, circular economy practices, and the social impacts of supply chain decisions. Furthermore, there has been an increased collaborative effort between academia, industry, and policymakers. This indicates a growing recognition of the need for multi-stakeholder involvement in shaping sustainable supply chain governance. It is important to note that the research landscape is continually evolving, and there may have been new developments since the last update. To obtain the latest information, it is recommended to check recent academic publications and reputable supply chain management and sustainability journals.

7. CONCLUSION

The value added through considering supply chain management in conjunction with governance is highlighted by the interactions between four areas that have emerged from this review. Over the past decades, researchers and practitioners of SSCM, Global value chain, Sustainable business and operation management and Sustainable risk management increasingly incorporated the concepts of governance to steer the intricacies of global supply chains and address environmental, social, and economic challenges. Sustainable supply chain governance (S-SCG) has been primarily focused on a linear economy model, which means taking, making, and disposing of products. However, this approach has not been effective in addressing challenges related to the depletion of valuable resources in landfills, resource scarcity, and excessive consumption. The corporates must shift towards circular economy principles to tackle these issues, emphasising the importance of resource efficiency, waste reduction, and responsible consumption. This requires changing from linear to circular models, adopting governance mechanisms prioritising closed-loop systems, recycling, and sustainable sourcing. This evolution in conceptualisation is crucial for addressing the broader ecological and social impacts of supply chains and fostering a more resilient and sustainable approach to resource management. The concept of sustainable supply chain governance leads to many positive outcomes that enhance businesses' overall success and resilience. Accepting sustainability within governance structures empowers firms to enthusiastically participate in ecological conservation efforts by reducing resource depletion, curtailing carbon emissions and espousing responsible waste management practices. Besides the ecological gains, cost savings associated with operational efficiency and resource utilisation are the benefits of sustainable supply chain governance. Mollifying risks related to environmental and social factors ensures an active stance against possible commotion and regulatory changes. In this article section, the researchers have highlighted the review's various limitations and debated the study's future implications.

7.1. Possible Future Research Implications

SSCM is a framework that aims to incorporate environmental, social, and economic considerations into the entire lifecycle of the supply chain. Researchers can utilise this model to develop

strategies that encourage responsible sourcing, eco-friendly production processes, and ethical labour practices. By aligning Sustainable Business and Operations Management with SSCM, scholars can ensure that sustainability principles are ingrained in the supply chain and the overall business operations. This alignment leads to a comprehensive and long-lasting approach to sustainability.

Global Value Chains (GVCs) are crucial in today's interconnected world. Researchers must analyse how sustainable practices can be harmonised across diverse geographic locations within GVCs. Understanding the interdependencies within GVCs helps to identify opportunities for sustainable practices and mitigate potential negative impacts. Additionally, adopting a comprehensive approach to sustainability can enhance the resilience of GVCs against various disruptions.

Effective Supply Chain Risk Management is essential for identifying and mitigating potential threats to the supply chain. It is crucial to integrate sustainability considerations into the process. Researchers can explore how sustainable practices contribute to risk reduction and resilience. For example, diversifying suppliers to include those with robust sustainability practices can help mitigate environmental and social risks. Similarly, understanding how climate change or social issues may pose risks to the supply chain allows for proactive risk management.

A unified examination of these interconnected areas offers future researchers a comprehensive lens to understand the complicated dynamics of supply chain governance. This fosters interdisciplinary collaboration, enabling scholars to integrate insights from various fields and interplay between sustainable practices, global value chains, and risk management. Researchers can construct practical solutions that balance social and environmental considerations while also keeping an eye on operational efficiency. This unified framework improves resilience and provides a base for policy recommendations, technological integration and long-term impact assessment. Further researchers can contribute to sustainable supply chain governance by leveraging an interconnected perspective. This can influence academic discourse and practical applications in business and policy realms.

7.2. Limitations of the Study

Bibliometric reviews are intended to analyse the qualities of the knowledge base instead of specific literature findings. Even though this review debated the theoretical trends in the field, this was mainly on the conclusions drawn from the author's co-citation analysis of the metadata extracted from Scopus-indexed documents. Additionally, future reviews should be drawn upon the findings of this review in order to have a more in-depth examination of the results. It is recommended that more detailed review methods be used.

Secondly, the dependence on published literature presents the concept of publication bias and may overlook the negative or uncertain findings, possibly angling the analysis. Quality is often ignored, potentially bloating the significance of less meticulously researched topics and language biases should be addressed.

Sustainable supply chain governance is growing across the three dimensions of sustainability (i.e. Economic, Social and Environmental). Sustainable governance promotes ecological stewardship by highlighting responsible resource use, reducing waste, and adhering to regulations. Socially, it fosters ethical sourcing, fair labour practices, community engagement, promoting societal responsibility, and enhancing well-being. The importance of risk mitigation increases supply chain resilience, while the quest for efficiency and innovation interjects cost savings and competitiveness. Regulatory compliance and a positive brand reputation build trust with stakeholders and attract socially and environmentally conscious consumers. In the long term, sustainable supply chain governance aligns with global sustainability goals, fostering a resilient, responsible, and adaptive supply chain ecosystem that contributes to overall business viability and societal well-being.

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