

# A Bibliometric Literature Review of Green Supply Chain Management and Its Impacts Using VOSviewer and R (Bibliometrix)

Christian Ayemoma Apolaagoa, Abdul-Razak Muhammed, Rakibu Suglo Zuzie, Abraham Owusu

Department of Business Administration, Accra Institute of Technology, Accra, Ghana

Email: ayemomac@yahoo.co.uk, ghazak307@gmail.com, zuzierakib@gmail.com, abrahamowusu2013@gmail.com

**How to cite this paper:** Apolaagoa, C. A., Muhammed, A.-R., Zuzie, R. S., & Owusu, A. (2023). A Bibliometric Literature Review of Green Supply Chain Management and Its Impacts Using VOSviewer and R (Bibliometrix). *Journal of Service Science and Management*, 16, 369-390.

<https://doi.org/10.4236/jssm.2023.163021>

**Received:** April 15, 2023

**Accepted:** June 27, 2023

**Published:** June 30, 2023

Copyright © 2023 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

This article applies a bibliometric analysis approach to explore the concept of Green Supply Chain Management (GSCM) and its impacts using a relational technique on existing literature. It uses data sourced primarily from the Scopus database. A total of 652 documents by 1959 authors were retrieved based on narrowed search criteria to obtain relevant publications in the research area. Publications from 2017 to 2022 were used to conduct the analysis. The approach used both VOSviewer and bibliometrics for co-authorship, keyword co-occurrence, bibliographic coupling and co-citations to underscore the scientific evolution of the topic. The objective of the analysis is to identify predominant themes as well as emerging concepts related to the topic and to make significant theoretical contributions to the study area by providing future research directions. The result of the analysis highlights the main information, publication trends, impactful authors and sources, most cited documents, institutional productivity over time, co-authorship network, a three-fold plot of the evolution of the research field, bibliographic coupling, keyword co-occurrence and prominent relationships. These are visually represented in tables and strategic diagrams for easy analysis and understanding of the state of the art in GSCM research. The review is an effort to identify theoretical gaps, guide researchers and industry professionals in their research and operations within the field of management with emphasis on GSCM and coordinate research efforts across and among countries and authors respectively.

## Keywords

Green Supply Chain Management, GSCM, Green Innovation, Green Capability, Environmental Impact, Environmental Sustainability, Green

## 1. Introduction

The trend of industrialization is an indication that more natural resources are needed to ensure the continuous production of goods and services that support human livelihood (Scherr, 2000). The rapid development of industry has accumulated a lot of economic wealth (Qin, 2019) through the transformation of natural resources into goods and services. Over the years, the production chain has resulted in significant environmental impacts (Krishnan et al., 2020) and efforts must be made to mitigate the negative effects that threaten the existence of both flora and fauna. The production process generates waste which contributes to climate change and global warming (Lan et al., 2022). These waste products cause air, water and land pollution and contribute to environmental degradation.

Environmental pollution is the primary cause of disease outbreaks which affect the quality of human life (Manisalidis et al., 2020). Amid these negative impacts as a result of the rudimentary supply chain process, a new concept of green supply chain emerged. This concept encompasses the adoption of practices in the supply chain which mitigate negative environmental impacts (García Alcaraz et al., 2022). The ultimate aim of this concept is to ensure environmental sustainability. The adoption of green supply chain in business operations can be likened to “killing two birds with one stone” in that, green supply chain reduces environmental impacts and production costs and spurs firm profitability, competitive advantage and overall economic growth.

The term green supply chain refers to the idea of integrating sustainable environmental processes into the traditional supply chain (Lerman et al., 2022). It is one of the concepts that have attracted the attention of researchers and industry professionals in recent decades due to its potential positive contributions to environmental sustainability as well as economic development (Singh & Trivedi, 2016). There is also a strong quest for healthy firm competitiveness in supply chain management to obtain some advantage in the entire production-to-consumption chain. Thus, attention has shifted from the rudimentary supply chain management approach to a modernized concept of GSCM.

Environmental pollution resulting from the supply chain is one of the biggest global challenges to livelihood. There has been widespread advocacy for promoting eco-friendly raw materials and products to minimize environmental damage (Yang et al., 2022). Firms are also facing regulatory and social pressures to reduce environmental harms resulting from industrial production (Zhang et al., 2022) and thus, are committed to investments in pollution control and prevention (Huo et al., 2019). GSCM enhances significant earnings while paying attention to environmental competence (Sugandini et al., 2020). It encompasses the

entire production chain that ensures higher returns while reducing the negative environmental impacts. The entire supply chain system is a multilevel system with different product specifications, manufacturers, suppliers, wholesale distributors and retailers (Sajadieh & Bolooriarabani, 2013).

Although existing research has explored GSCM to some extent, there is a need to review the impacts of GSCM and discuss future research trends to coordinate future research efforts in the field. Given the numerous positive impacts of GSCM on both the environment and the economy, there is a need for a more in-depth analysis of the existing body of knowledge in the study area. This is very significant in establishing the current/emerging concepts and thematic areas as well as identifying research gaps to provide direction for future research. This review paper employs a bibliometric analysis approach using VOSviewer and R (bibliometrics) to analyse the documents retrieved from the scopus database.

### 1.1. Review Objectives

The following are the review objectives for the study:

- 1) To obtain an overview of currently available scientific literature on GSCM.
- 2) To analyse contributions made in the research field based on authorship, institutions, predominant journals, citations and geographical area.
- 3) To identify influential authors by citation scores and their network of collaborations with other authors.
- 4) To conduct a comprehensive evaluation of the evolution and development of the important themes in GSCM to establish clusters.
- 5) To highlight emerging themes and concepts within the research field as a basis for future research direction.

### 1.2. Review Questions

The following are questions for the study.

- 1) What is the volume of scientific publications on GSCM within the study period?
- 2) Who are the most influential authors in the research field?
- 3) What journals published the most articles in the research field?
- 4) What are the most cited documents in the research field?
- 5) Which countries contribute the most to the research field in terms of publications?
- 6) What are the predominant research themes in GSCM?
- 7) What clusters can be identified by important thematic areas?
- 8) What are the emerging concepts and themes within the research field?

## 2. Literature

Over the years, researchers in the field of management have shown a vested interest in concepts that promote profitability, environmental sustainability and

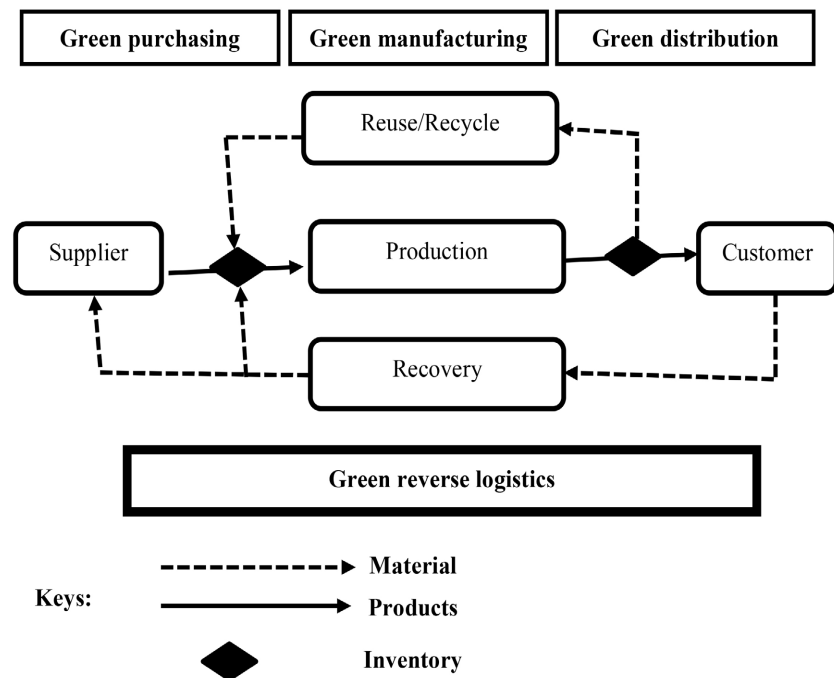
development in the industry (Khanra et al., 2022). Organisations are primarily concerned with strategies that can enhance their economic, social and environmental performance. GSCM is the first step in integrating sustainable development concepts into supply chain management in the production process (Qin, 2019). GSCM is a process in which products or services are sourced, produced and delivered by eco-friendly processes to fulfill the stakeholders' concerns (Ahmed et al., 2019). The GSCM process improves efficiency and reduces production costs.

## 2.1. Green Supply Chain

The term green supply chain refers to the idea of integrating sustainable environmental processes into the traditional supply chain (Junaid et al., 2022). Green supply chain is a comprehensive concept which encompasses the different stages in the production chain (Khan, 2018). **Figure 1** below is a simple model which explains these stages.

## 2.2. Green Purchasing

The process of manufacturing products starts with purchasing raw materials. Green purchasing refers to the activity of purchasing raw materials which can be recycled after use (Khan et al., 2022). Firms endeavour to avoid purchasing raw materials that have adverse effects on plant and animal life. In most cases, eco-friendly raw materials are preferred (Rajaeifar et al., 2022). The environmental concerns being raised globally puts industry professionals on the urge to consider the environmental impacts of their operations. This includes the types



**Figure 1.** The GSCM model. Source: Khan (2018).

of raw materials they source to feed their production processes. One critical measure of an effective green purchasing approach is the measure of the amount of waste generated in the course of the production process (Mohammed et al., 2022). Green purchasing has the potential of reducing waste and allowing for effective recycling/reuse whilst reducing the cost of production (Sugandini et al., 2020).

### 2.3. Green Manufacturing

Green manufacturing has a positive significant impact on social, economic and environmental performance (Afum et al., 2020). The main purpose of green manufacturing is to mitigate adverse environmental effects by adopting socially and environmentally accountable manufacturing practices that ensure the profitability of the firm. This offers a competitive advantage in the industry and also yields quality and cheaper products for consumers. Green manufacturing ensures an efficient process which improves on the operational, financial and environmental dimensions. Diana et al. (2017) highlighted the central role of manufacturing in the sustainable management of operations. Manufacturing forms the core of the process that yields the finished products for distribution to end users.

### 2.4. Green Distribution

Green distribution encompasses all measures taken to ensure that the final product gets to the consumer and becomes available for use with minimum wastage or environmental destruction. Green marketing strategy is the company's strategic orientation that leads to green marketing of the finished products (Papadas et al., 2017). The marketing strategy of the company in distribution determines the reach and eventually, the customer base. Green distribution could increase the profitability of the firm while protecting the interest of the environment.

### 2.5. Green Reverse Logistics

Green reverse logistics practices enable firms to improve their public corporate image and reduce wastage (Khan et al., 2018). The practice of reverse logistics comprising reuse, remanufacturing, recycling, rebranding and product regeneration to produce new and usable finished products (Govindan et al., 2015). This ensures maximum use of materials and end-products of the production chain. Reverse logistics reduce the expenses on raw materials as well as the negative impact of environmental pollution resulting from the production chain. This can be achieved by sourcing eco-friendly and reusable raw materials as part of the green supply chain mechanism.

### 2.6. Green Technology and Innovation in Supply Chain

Green technology and innovation refer to the development and application of

sustainable practices in the production chain to ensure efficient production while promoting long-term environmental sustainability. This includes the promotion of new mechanisms to reduce pollution throughout the product life cycle (Mylan, 2015). The concept of green technology is considered an effective strategy that can foster a sustainable environment and development (Danish & Ulucak, 2020). Green Technology and the associated practices mitigate the damage to the environment and spur positive impacts in sectors such as energy and health (Zhu & Ye, 2018). Green Technology and innovation strategies are environmentally friendly and encompass energy efficiency, health and safety concerns, recycling, as well as the promotion of renewable resources (Awan, 2019). Innovation could be technologically or non-technologically motivated by economic or environmental considerations such as cost reduction, pollution control, waste management or the promotion of eco-friendly materials (Miranda et al., 2021).

## **2.7. Impact of Green Supply Chain Management**

GSCM emerged as a concept to mitigate the adverse environmental impacts resulting from the production chain. Researchers and industry players have shown interest in GSCM because of its impact on both corporate performance and the built environment. This review adopts the triple bottom line theory from existing literature which categorised the impacts under environmental, economic and social impacts (Qin, 2019).

### **2.7.1. Environmental Impacts**

Green supply chain has received much attention due to its inherent impacts on the environment. Theyel (2000) pointed out that GSCM could improve corporate performance and achieve business objectives through the improvement of environmental performance (Huo et al., 2019). The ultimate aim of GSCM is to improve the environment and ensure long-term environmental sustainability to support plant and animal life (Zhu and Sarkis, 2004). GSCM provides options to procure eco-friendly raw materials and adopt reverse logistics practices such as reuse, recycling and regeneration of waste into useable materials. This reduces the amount of waste disposed into the environment which could have dire consequences on plant and animal life. Also, green practices such as ISO14001 certification, pollution prevention and material recycling have significant positive effects on the environment (Hajmohammad et al., 2013).

### **2.7.2. Economic Impacts**

Existing research has shown that GSCM has a positive impact on corporate financial performance through green procurement practices (Carter et al., 2000). The implementation of GSCM practices improves the competitive advantage of enterprises, reduced production costs, increase profitability and overall business performance (Sarkis, 2003). This translates into economic growth, development and sustainability.

### 2.7.3. Social Impacts

The social impacts of GSCM are dependent on the practices employed by industry players to prevent or limit social problems resulting from their operations (Qin, 2019). It has been argued that firms ought not to concentrate only on the economic and financial performance of their operations but also take up a social responsibility to address the social problems in society. GSCM reduces negative impacts on the environment which indirectly reduces the social problems associated with widespread environmental pollution. This eventually improves the quality of life and promotes social welfare.

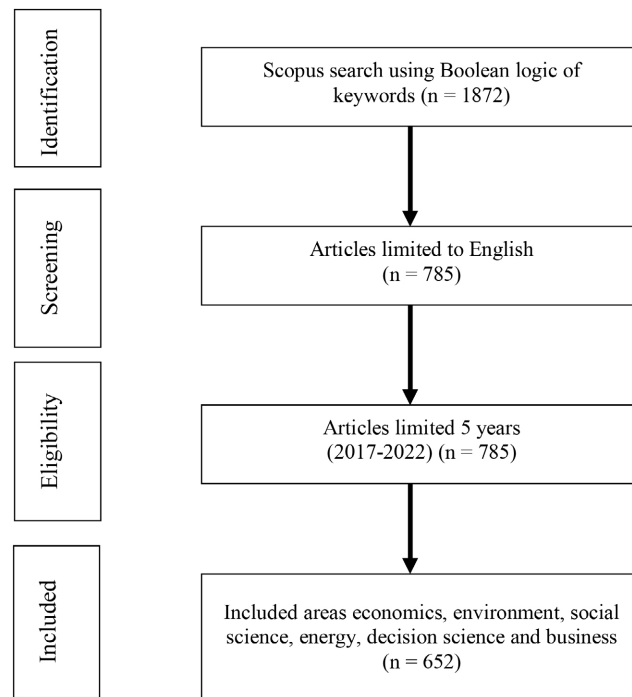
### 2.7.4. Research Gap

Much effort has not been devoted to conducting literature reviews on GSCM since it is an evolving concept (Liu & Chang, 2017) and has not received widespread acceptance on the production front. The literature review revealed that there exist limited reviews conducted on GSCM and its impacts to provide future direction of research. More so, this review employs a bibliometric analysis approach to analyse existing literature in the study area which is still in its infancy. This review is justified by the gaps identified in the study area and will contribute to understanding the emerging concepts in the study area. It will also contribute to filling the gaps in theory and methodological direction used in research within the study area.

## 3. Methodology

The data was extracted from Scopus which is one of the bibliographic databases widely used by researchers in the conduct of bibliometric studies. According to Terán-Yépez et al. (2020), Web of Science and Scopus are widely used for bibliometric analysis. The Scopus database was selected for this review because it is considered the largest database of abstracts and citations of peer-reviewed literature (Piwowar-Sulej et al., 2021). Scopus also contains more records of published articles in so many journals (Singh et al., 2021).

An initial search was conducted using a Boolean logic of the following keyword combination (“green supply chain management” or “green innovation” or “GSCM” or “green capability” or “green technology” and “environmental impact” or “environmental sustainability” or “green economic performance” or “sustainability” or “firm competitiveness”) which yielded 1872 documents. The search was further limited to articles in English published in journals from 2017 to 2022 which reduced the results to 785 documents. The limitation of the search to English was to enable an output that is readable to an English audience. A further limitation of the search to 5 years from 2017 to 2022 would enhance the analysis of the evolution of literature in the study area over a significant period into the past and not just a snapshot of current literature. Again, the search was narrowed to include only publications in the areas of economics, environment, social science, energy, decision science and business which yielded 652 documents for the analysis (Figure 2).



**Figure 2.** Steps in the identification and screening of relevant publications. Source: Researchers Design (2023).

## 4. Results of Analysis

### 4.1. Main Information

**Table 1** below shows the main information obtained from the analysis in VOS-viewer. The review used literature publications from 2017 to 2022 for the analysis. A total of 652 documents were sourced from 279 sources (Journals, Books, etc.). The annual growth rate of publications in the study area was 18.26%, an indication of the infancy of publications in the study area since the rate of publication within the period was low.

### 4.2. Publication Output and Growth

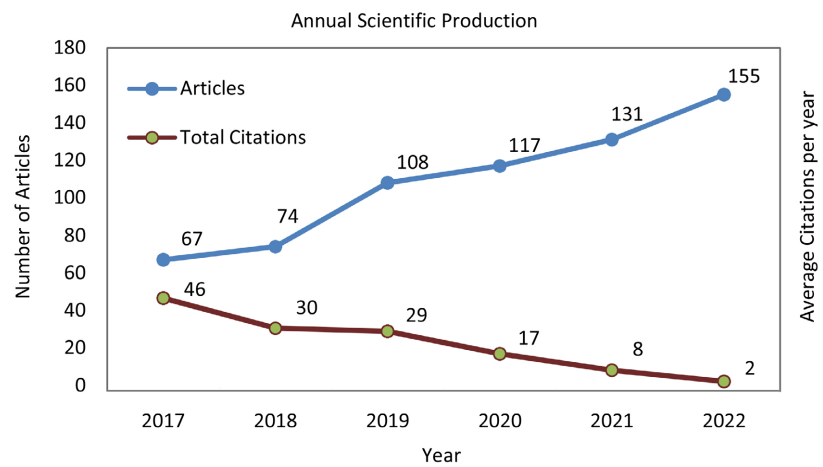
The annual publications in **Figure 3** revealed the development in the research field over the study period. Since 2017, there has been a gradual increase in publications on the topic per year, with most in 2022. This is a representation of the evolution of the study area publications over the period under consideration. There were 67 articles published on the topic in 2017. This number increased to 108 in 2019 reaching 155 in 2022. Researchers are interested in the study area and emerging concepts which accounts for the steady increase in publications.

To understand the trend of publications by countries, **Table 2** shows the results of country production over time. Most documents were recorded from China and Brazil.

The most relevant sources discovered from the analysis in biblioshiny are as shown in **Table 3** below. Sustainability Switzerland is the most relevant source of literature in the study area with 64 articles. This is closely followed by the Jour-



nal of cleaner production with 56 articles. The least relevant source at the bottom of the table with 4 articles is corporate social responsibility and environmental management.



**Figure 3.** Annual scientific production.

**Table 1.** Main information.

Description	Results
<b>Main Information About Data</b>	
Timespan	2017-2022
Sources (Journals, Books, etc.)	279
Documents	652
Annual Growth Rate %	18.26
Document Average Age	2.02
Average citations per doc	18.13
References	43,245
<b>Document Contents</b>	
Keywords Plus (ID)	3163
Author's Keywords (DE)	2135
<b>Authors</b>	
Authors	1959
Authors of single-authored docs	52
<b>Authors Collaboration</b>	
Single-authored docs	56
Co-Authors per Doc	3.5
International co-authorships %	31.13
<b>Document Types</b>	
article	652

**Table 2.** Top 10 results of country production over time.

Country	Year	Articles
Brazil	2017	9
Brazil	2018	13
Brazil	2019	25
Brazil	2020	55
Brazil	2021	89
Brazil	2022	111
China	2017	33
China	2018	78
China	2019	125
China	2020	203

**Table 3.** Top 20 most relevant sources.

Sources	Articles
Sustainability (Switzerland)	64
Journal of cleaner production	56
Environmental science and pollution research	36
Business strategy and the environment	17
International journal of supply chain management	17
Science of the total environment	15
International journal of environmental research and public health	13
Resources, conservation and recycling	12
International journal of production economics	8
Benchmarking	7
Frontiers in environmental science	6
Management of environmental quality: An international journal	6
Technological forecasting and social change	6
International journal of logistics research and applications	5
Journal of environmental management	5
Corporate social responsibility and environmental management	4

**Table 4** below shows the top 20 results of the most impactful authors. On the top is Khan Sar with an h-index of 5 and 244 total citations. Kumnar V appears as the next impactful author with h-index of 5 and 170 total citations. At the bottom of the table is Green KW, h-index 3 with 146 citations. The table shows that on average, the authors have high h-index which shows that their output in the study area contributes to understanding the emerging concepts.

**Table 4.** Top 20 results of the most impactful authors over time.

Element	h_index	g_index	m_index	TC	NP	PY_start
Khan Sar	5	6	0.833	244	6	2017
Kumar V	5	5	0.833	170	5	2017
Li G	5	5	0.833	94	5	2017
Sarkis J	5	5	0.833	251	5	2017
Wang X	5	6	0.833	238	6	2017
Wang Y	5	7	1.25	127	7	2019
Jabbour CJC	4	4	0.667	97	4	2017
Sahu AK	4	4	0.8	80	4	2018
Sueyoshi T	4	4	0.667	26	4	2017
Yu Z	4	4	2	129	4	2021
Zhang Y	4	4	0.8	206	4	2018
Ahmad M	3	4	3	29	4	2022
Ali Y	3	3	0.6	106	3	2018
Chen H	3	3	0.5	61	3	2017
Chen X	3	3	0.5	82	3	2017
Chiappetta Jabbour CJ	3	3	0.75	279	3	2019
Fernando Y	3	3	0.75	263	3	2019
Ghosh S	3	4	1.5	19	4	2021
Goto M	3	3	0.6	22	3	2018
Green KW	3	3	0.5	146	3	2017

From the results in **Table 5**, most documents were affiliated with Formerly Indian Institute of Food Processing Technology—IIFPT, Human Agricultural University, and Universiti Malaysia Terengganu with 17, 16 and 14 articles respectively. Less than 10 documents each were affiliated with Nanjing Institute of Environmental Sciences and Sant'anna School of Advanced Studies.

**Table 6** below shows the most frequent words used in the existing literature. The most frequently used keywords and phrases among others were sustainable development, environmental management sustainability, supply chain management, environmental impact, environmental technology, environmental economics, environmental sustainability, environmental protection etc. The focus on environment, sustainability and technology is a visible research area of interest and researchers understand the future implications and are readily participating in expanding their work in this field.

The results of the co-authorship analysis are shown in **Figure 4**. Co-authorship illustrates the number of publications of the authors and how they are interconnected. The unit of analysis was a minimum of 2 authors using the full counting

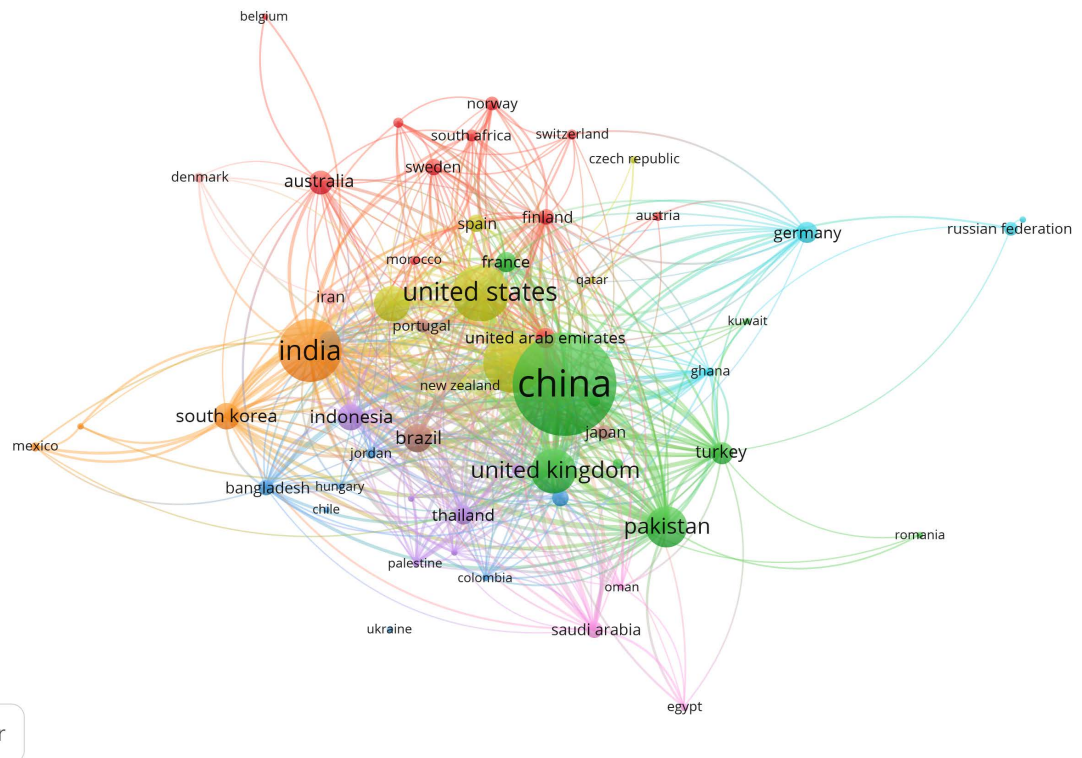
**Table 5.** Top 20 results of most relevant affiliations.

Affiliation	Articles
Formerly Indian Institute of Food Processing Technology—IIFPT	17
Henan Agricultural University	16
Universiti Malaysia Terengganu	14
Shandong University	12
Università Degli Studi di Milano	12
Dalian University of Technology	11
Federal University of Paraná	11
Jinan University	11
King Saud University	11
Tongji University	11
International Islamic University Malaysia	10
Jiangsu University	10
Multimedia University	10
National Institute of Food Technology	10
Notreported	10
Universiti Teknologi Malaysia	10
Universiti Teknologi Mara	10
Wuhan University of Technology	10
Nanjing Institute of Environmental Sciences	9
Sant'anna School of Advanced Studies	9

**Table 6.** Top 20 results of most frequent words.

Words	Occurrences
Sustainable development	193
Sustainability	154
Supply chain management	151
Environmental impact	112
China	90
Environmental technology	90
Carbon dioxide	81
Environmental management	73
Economic development	71
Green technology	63
Green supply chain management	61
Article	60
Environmental economics	55





**Figure 5.** Co-authorship (Countries' biggest network 59 out of 63).

covering the green network of balls shows the current keywords being used. The middle and right rectangles show words that have been used over the period with a connection to the currently most used keywords. This gives a direction for future researchers to be guided in selecting topics with the currently researched keywords to produce relevant publications of interest (**Figure 6**).

Two documents are bibliographically coupled if they both cite one or more documents in the same subject of study. **Figure 7** shows the bibliographical coupling of documents with the minimum citations per document set at 25 of which 131 out of 652 met the criteria.

The bibliographic coupling (sources) has 82 as the biggest connections out of 279 with the minimum number of documents and citations set to 2. **Figures 8-12** are maps of the bibliographic coupling which shows the various networks that met the stated criteria.

**Figure 13** below shows topical areas that have evolved over the period from 2017 to 2022. This is vital information for potential researchers to be able to select current topics in their publications. Themes in the study area have evolved into sustainability, sustainable development and waste management which are potential areas for future research.

**Figure 14** below shows the emerging, niche, basic motor themes of current trends in the study area. More researchers are concentrating on environmental impact and green technology which have the potential of growth in publications.





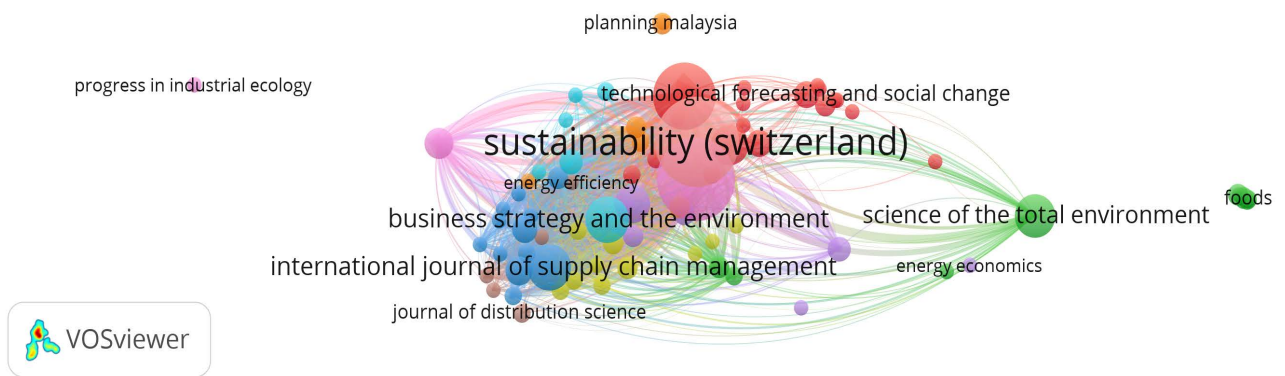


Figure 8. Bibliographic coupling (Sources (Min citations per document = 2, 82 out of 279 met the criterion)).

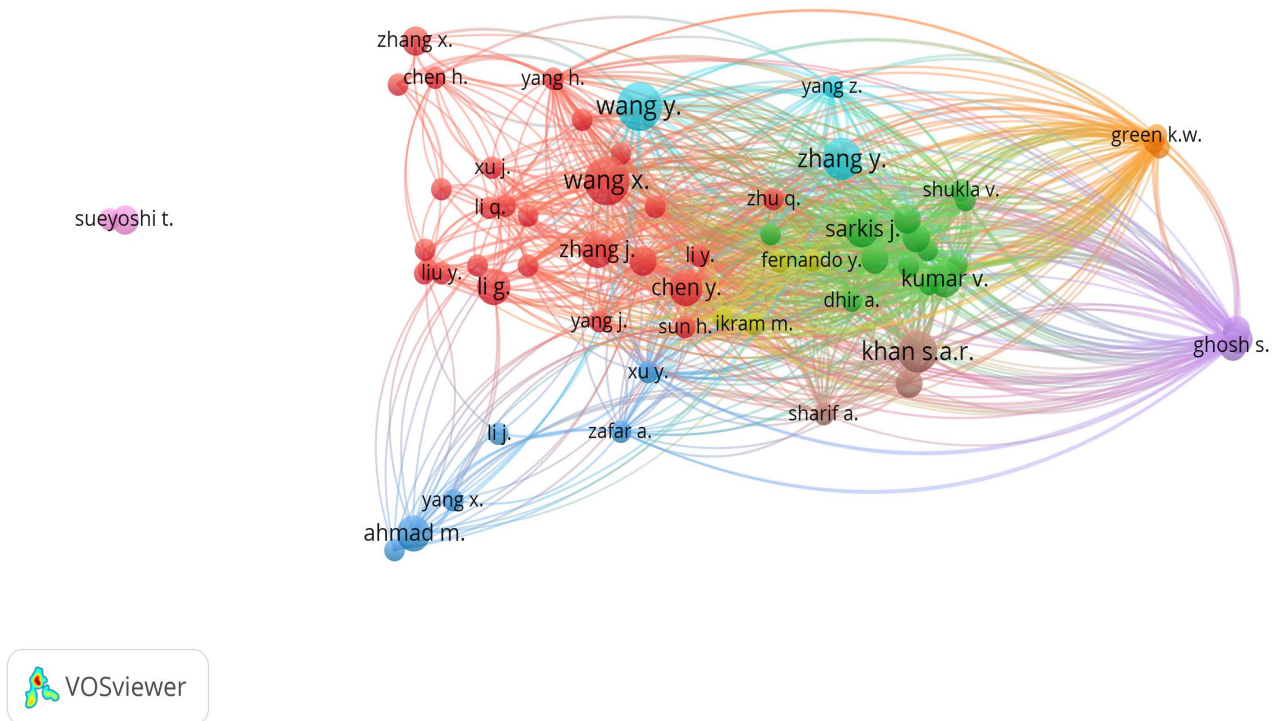
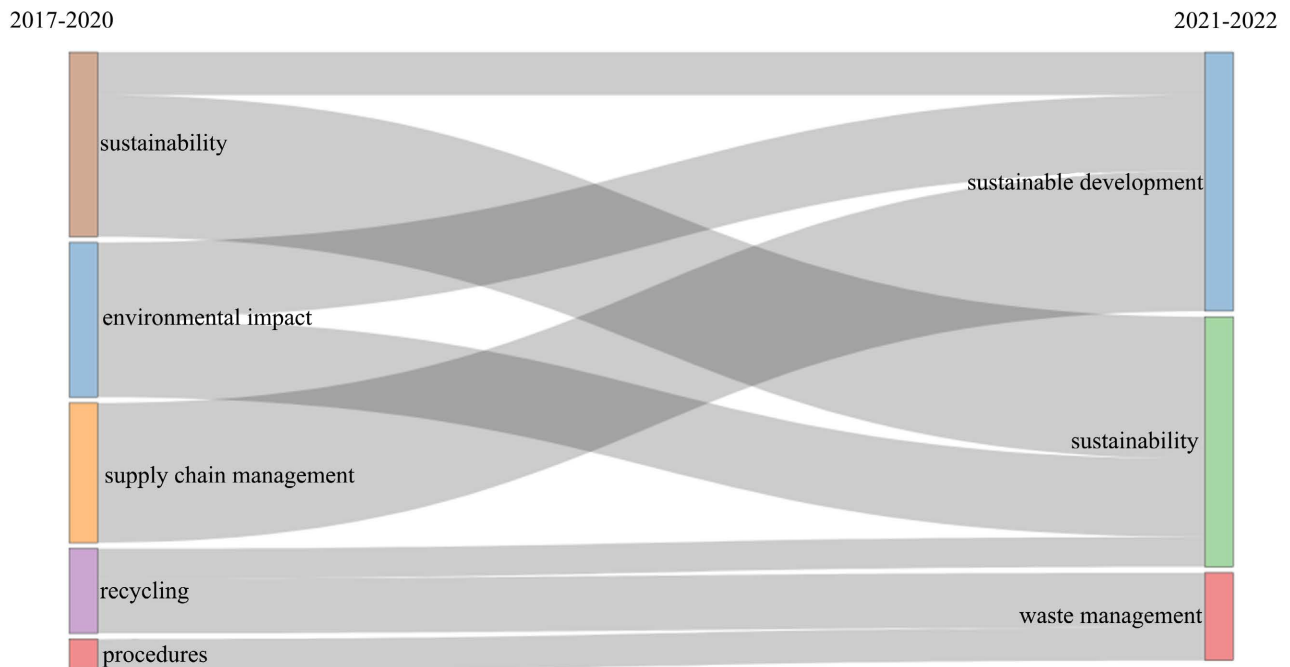


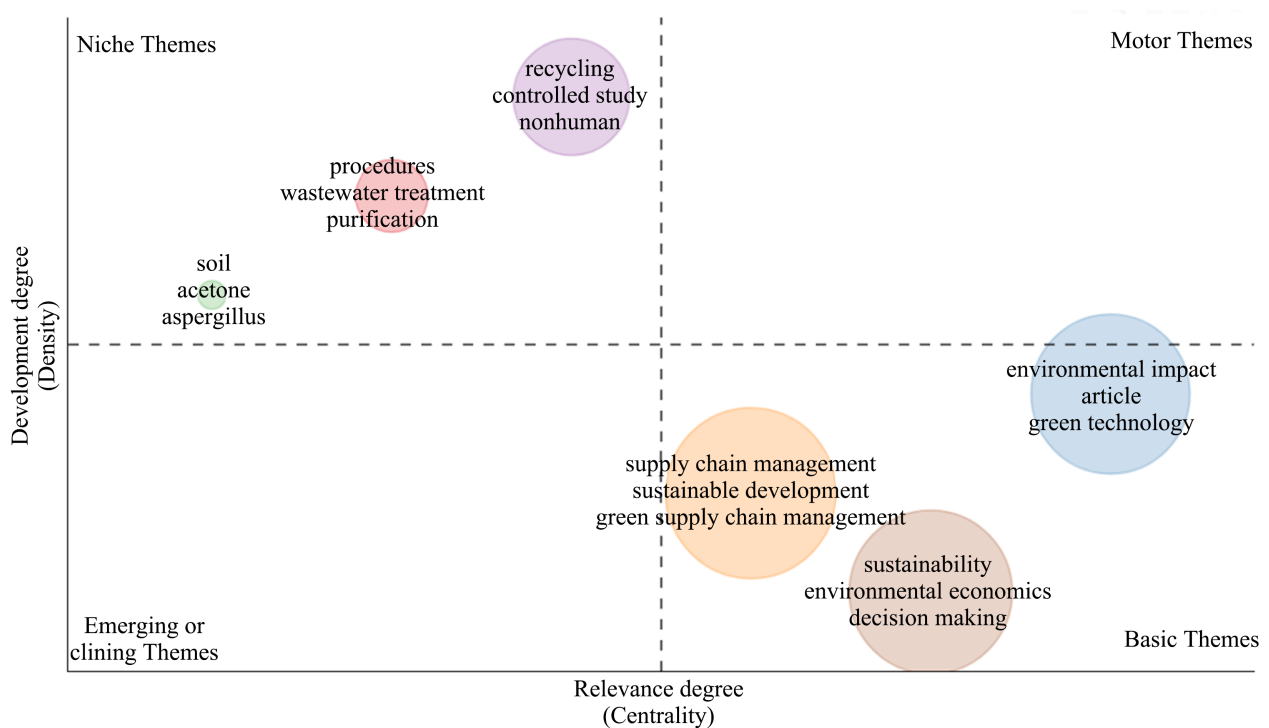
Figure 9. Bibliographic coupling (Authors min document = 2 Min citation = 2, 68 out of 1958 met criteria).







**Figure 13.** Three field plot of topical areas (2017-2022).



**Figure 14.** Thematic map (2017-2022).

## 5. Findings, Discussion and Conclusion

The review set out to enhance the knowledge base of green supply chain and the related field of the study area. Bibliometric analysis was conducted using VOSviewer and the Bibliometrix package of R. The relational technique ap-

applied four major methods: co-authorship analysis, keyword co-occurrence analysis, co-citation analysis and bibliographic coupling. These methods were conducted on 652 documents from the Scopus database. The Boolean logic for the selection of these 652 documents was “green supply chain management” or “green innovation” or “GSCM” or “green capability” or “green technology” and “environmental impact” or “environmental sustainability” or “green economic performance” or “sustainability” or “firm competitiveness”. The co-authorship analysis identified leading researchers in the network as Khan Sar, Kumar V, Li G, Sarkis J, Wang X, Jabbour CJC, Sahu AK, Sueyoshi T and Yu Z. The most strong-link countries were China, USA, Malaysia, Italy, Pakistan, UAE, Australia and Türkiye.

The keyword co-occurrence analysis shows the occurrences of keywords in the documents as, sustainable development, environmental management sustainability, supply chain management, environmental impact, environmental technology, environmental economics, environmental sustainability and environmental protection. Sustainability has been identified as the most occurred keyword since 2017. The evolution analysis of the themes in the study areas revealed the dynamic evolution and future development of green supply chain and how the constructs established backgrounds and provided a paradigm shift towards environmental sustainability and technology.

The annual scientific production indicates that the study area has received attention from researchers and has potential growth in literature production. Researchers are collaborating from the co-authorship analysis to expand their territories and create a network of publications in the study area.

The study has given an overview of currently available scientific literature on GSCM and contributions made in the research field based on authorship, institutions, journals, citations and countries. Influential authors have been identified and their collaboration with other authors. The evolution and development of the important themes in the subject area culminated in identifying meaningful clusters. Finally, the emerging and hot topical areas of the study field have been highlighted to direct and coordinate research in green supply chain.

## 6. Future Research Direction

The findings of the review will guide and encourage researchers to put effort into sustainability, environmental technology, waste management, environmental economics, environmental impact and green technology and provide a baseline for future research development and coordination across countries, authors and affiliating universities.

## Acknowledgements

We acknowledge the tutelage of Dr. Kwame Ofori Simpe in VOSviewer and bibliometrix.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- Afum, E., Agyabeng-Mensah, Y., Sun, Z., Frimpong, B., Kusi, L. Y., & Acquah, I. S. K. (2020). Exploring the Link between Green Manufacturing, Operational Competitiveness, Firm Reputation and Sustainable Performance Dimensions: A Mediated Approach. *Journal of Manufacturing Technology Management*, *31*, 1417-1438. <https://doi.org/10.1108/JMTM-02-2020-0036>
- Ahmed, W., Najmi, A., Arif, M., & Younus, M. (2019). Exploring Firm Performance by Institutional Pressures Driven Green Supply Chain Management Practices. *Smart and Sustainable Built Environment*, *8*, 415-437. <https://doi.org/10.1108/SASBE-04-2018-0022>
- Awan, U. (2019). Effects of Buyer-Supplier Relationship on Social Performance Improvement and Innovation Performance Improvement. *International Journal of Applied Management Science*, *11*, 21-35. <https://doi.org/10.1504/IJAMS.2019.096657>
- Carter, C. R., Kale, R., & Grimm, C. M. (2000). Environmental Purchasing and Firm Performance: An Empirical Investigation. *Transportation Research Part E: Logistics and Transportation Review*, *36*, 219-228. [https://doi.org/10.1016/S1366-5545\(99\)00034-4](https://doi.org/10.1016/S1366-5545(99)00034-4)
- Danish, & Ulucak, R. (2020). How Do Environmental Technologies Affect Green Growth? Evidence from BRICS Economics. *Science of the Total Environment*, *712*, Article ID: 136504. <https://doi.org/10.1016/j.scitotenv.2020.136504>
- Diana et al. (2017). Putting Environmental Technologies into the Mainstream: Adoption of Environmental Technologies by Medium-Sized Manufacturing Firms in Brazil. *Journal of Cleaner Production*, *142*, 4011-4018. <https://doi.org/10.1016/j.jclepro.2016.10.054>
- García Alcaraz, J. L., Díaz Reza, J. R., Arredondo Soto, K. C., Hernández Escobedo, G., Happonen, A., Puig I Vidal, R., & Jiménez Macías, E. (2022). Effect of Green Supply Chain Management Practices on Environmental Performance: Case of Mexican Manufacturing Companies. *Mathematics*, *10*, Article No. 1877. <https://doi.org/10.3390/math10111877>
- Govindan, K., Khodaverdi, R., & Vafadarnikjoo, A. (2015). Intuitionistic Fuzzy-Based DEMATEL Method for Developing Green Practices and Performances in a Green Supply Chain. *Expert Systems with Applications*, *42*, 7207-7220. <https://doi.org/10.1016/j.eswa.2015.04.030>
- Hajmohammad, S., Vachon, S., Klassen, R. D., & Gavronski, I. (2013). Lean Management and Supply Management: Their Role in Green Practices and Performance. *Journal of Cleaner Production*, *39*, 312-320. <https://doi.org/10.1016/j.jclepro.2012.07.028>
- Huo, B., Gu, M., & Wang, Z. (2019). Green or Lean? A Supply Chain Approach to Sustainable Performance. *Journal of Cleaner Production*, *216*, 152-166. <https://doi.org/10.1016/j.jclepro.2019.01.141>
- Junaid, M., Zhang, Q., & Syed, M. W. (2022). Effects of Sustainable Supply Chain Integration on Green Innovation and Firm Performance. *Sustainable Production and Consumption*, *30*, 145-157. <https://doi.org/10.1016/j.spc.2021.11.031>
- Khan, S. A. R. (2018). Introductory Chapter: Introduction of Green Supply Chain Management. In S. A. R. Khan (Ed.), *Green Practices and Strategies in Supply Chain Management* (pp. 1-7). IntechOpen.

- Khan, S. A. R. et al. (2018). Green Supply Chain Management, Economic Growth and Environment: A GMM Based Evidence. *Journal of Cleaner Production*, 185, 588-599.
- Khan, S. A. R., Yu, Z., & Farooq, K. (2022). Green Capabilities, Green Purchasing, and Triple Bottom Line Performance: Leading toward Environmental Sustainability. *Business Strategy and the Environment*, 32, 2022-2034. <https://doi.org/10.1002/bse.3234>
- Khanra, S., Kaur, P., Joseph, R. P., Malik, A., & Dhir, A. (2022). A Resource-Based View of Green Innovation as a Strategic Firm Resource: Present Status and Future Directions. *Business Strategy and the Environment*, 31, 1395-1413. <https://doi.org/10.1002/bse.2961>
- Krishnan, R., Agarwal, R., Bajada, C., & Arshinder, K. (2020). Redesigning a Food Supply Chain for Environmental Sustainability—An Analysis of Resource Use and Recovery. *Journal of Cleaner Production*, 242, Article ID: 118374. <https://doi.org/10.1016/j.jclepro.2019.118374>
- Lan, K., Zhang, B., & Yao, Y. (2022). Circular Utilization of Urban Tree Waste Contributes to the Mitigation of Climate Change and Eutrophication. *One Earth*, 5, 944-957. <https://doi.org/10.1016/j.oneear.2022.07.001>
- Lerman, L. V., Benitez, G. B., Müller, J. M., de Sousa, P. R., & Frank, A. G. (2022). Smart Green Supply Chain Management: A Configurational Approach to Enhance Green Performance through Digital Transformation. *Supply Chain Management: An International Journal*, 27, 147-176. <https://doi.org/10.1108/SCM-02-2022-0059>
- Liu, S. M., & Chang, Y.-T. (2017). Manufacturers' Closed-Loop Orientation for Green Supply Chain Management. *Sustainability*, 9, Article No. 222.
- Manisalidis, I., Stavropoulou, E., Stavropoulos, A., & Bezirtzoglou, E. (2020). Environmental and Health Impacts of Air Pollution: A Review. *Frontiers in Public Health*, 8, Article No. 14. <https://doi.org/10.3389/fpubh.2020.00014>
- Miranda, I. T. P., Moletta, J., Pedroso, B., Pilatti, L. A., & Picinin, C. T. (2021). A Review on Green Technology Practices at BRICS Countries: Brazil, Russia, India, China, and South Africa. *SAGE Open*, 11, 1-4.
- Mohammed, M., Shafiq, N., Al-Mekhlafi, A. B. A., Rashed, E. F., Khalil, M. H., Zawawi, N. A., & Sadis, A. M. (2022). The Mediating Role of Policy-Related Factors in the Relationship between the Practice of Waste Generation and Sustainable Construction Waste Minimisation: PLS-SEM. *Sustainability*, 14, Article No. 656. <https://doi.org/10.3390/su14020656>
- Mylan, J. (2015). Understanding the Diffusion of Sustainable Product Service Systems: Insights from the Sociology of Consumption and Practice Theory. *Journal of Cleaner Production*, 97, 13-20. <https://doi.org/10.1016/j.jclepro.2014.01.065>
- Papadas, K. K., Avlonitis, G. J., & Carrigan, M. (2017). Green Marketing Orientation: Conceptualization, Scale Development and Validation. *Journal of Business Research*, 80, 236-246. <https://doi.org/10.1016/j.jbusres.2017.05.024>
- Piwowar-Sulej, K., Krzywonos, M., & Kwil, I. (2021). Environmental Entrepreneurship—Bibliometric and Content Analysis of the Subject Literature Based on H-Core. *Journal of Cleaner Production*, 295, Article ID: 126277. <https://doi.org/10.1016/j.jclepro.2021.126277>
- Qin, Z. Y. (2019). A Literature Review of the Impact of Green Supply Chain Management on Firm Performance. *Journal of Service Science and Management*, 12, 872-879. <https://doi.org/10.4236/jssm.2019.127059>
- Rajaeifar, M. A., Ghadimi, P., Rauegi, M., Wu, Y., & Heidrich, O. (2022). Challenges and Recent Developments in Supply and Value Chains of Electric Vehicle Batteries: A Sustainability Perspective. *Resources, Conservation and Recycling*, 180, Article ID: 106144.



- <https://doi.org/10.1016/j.resconrec.2021.106144>
- Sajadieh, M. S., & Bolooriarabani, A. (2013). Coordination in Supply Chain Management. In *Supply Chain Management: Concepts, Methodologies, Tools, and Applications* (pp. 1140-1162). IGI Global. <https://doi.org/10.4018/978-1-4666-2625-6.ch067>
- Sarkis, J. (2003). A Strategic Decision Framework for Green Supply Chain Management. *Journal of Cleaner Production, 11*, 397-409. [https://doi.org/10.1016/S0959-6526\(02\)00062-8](https://doi.org/10.1016/S0959-6526(02)00062-8)
- Scherr, S. J. (2000). A Downward Spiral? Research Evidence on the Relationship between Poverty and Natural Resource Degradation. *Food Policy, 25*, 479-498. [https://doi.org/10.1016/S0306-9192\(00\)00022-1](https://doi.org/10.1016/S0306-9192(00)00022-1)
- Singh, A., & Trivedi, A. (2016). Sustainable Green Supply Chain Management: Trends and Current Practices. *Competitiveness Review, 26*, 265-288. <https://doi.org/10.1108/CR-05-2015-0034>
- Singh, V. K., Singh, P., Karmakar, M., Leta, J., & Mayr, P. (2021). The Journal Coverage of Web of Science, Scopus and Dimensions: A Comparative Analysis. *Scientometrics, 126*, 5113-5142. <https://doi.org/10.1007/s11192-021-03948-5>
- Sugandini, D. et al. (2020). Green Supply Chain Management and Green Marketing Strategy on Green Purchase Intention: SMEs Cases. *Journal of Industrial Engineering and Management, 13*, 79-92.
- Terán-Yépez, E. et al. (2020). Sustainable Entrepreneurship: Review of Its Evolution and New Trends. *Journal of Cleaner Production, 252*, Article ID: 119742. <https://doi.org/10.1016/j.jclepro.2019.119742>
- Theyel, G. (2000). Management Practices for Environmental Innovation and Performance. *International Journal of Operations & Production Management, 20*, 249-266. <https://doi.org/10.1108/01443570010304288>
- Yang, M., Chen, L., Wang, J., Msigwa, G., Osman, A. I., Fawzy, S., & Yap, P. S. (2022). Circular Economy Strategies for Combating Climate Change and Other Environmental Issues. *Environmental Chemistry Letters, 21*, 55-80. <https://doi.org/10.1007/s10311-022-01499-6>
- Zhang, Y., Hu, H., Zhu, G., & You, D. (2022). The Impact of Environmental Regulation on Enterprises' Green Innovation under the Constraint of External Financing: Evidence from China's Industrial Firms. *Environmental Science and Pollution Research, 30*, 42943-42964. <https://doi.org/10.1007/s11356-022-18712-2>
- Zhu, Q., & Sarkis, J. (2004). Relationships between Operational Practices and Performance among Early Adopters of Green Supply Chain Management Practices in Chinese Manufacturing Enterprises. *Journal of Operations Management, 22*, 265-289. <https://doi.org/10.1016/j.jom.2004.01.005>
- Zhu, S., & Ye, A. (2018). Does the Impact of China's Outward Foreign Direct Investment on Reverse Green Technology Process Differ across Countries? *Sustainability, 10*, Article No. 3841. <https://doi.org/10.3390/su10113841>