

## Green logistics and green supply chain management research: a bibliometric analysis based on Scopus database

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### ABSTRACT

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**Keywords:** green logistics, green supply chain, green supply chain management

Green logistics and green supply chain management have garnered widespread attention from numerous researchers, with a steadily increasing number of publications. This study conducted a comprehensive bibliometric analysis using the VOSviewer tool on green logistics and green supply chain management research from 2003 to 2024, based on the Scopus database. By utilizing bibliometric analysis tools, the study evaluated trends, influential authors, organizations, and countries in this field. With 694 publications selected for analysis, the results reveal developments and research directions such as barriers and drivers; green human resource performance and management; the Dematel method and green supply chain practices; environmental management and green production; and the circular economy and green logistics.

### 1. INTRODUCTION

Global warming and climate change, which have become a significant issue in recent years, have affected the entire world (Deste et al., 2023). In this context, sustainable development has become one of the top priorities for countries and businesses. Green logistics and green supply chain management have emerged as important

strategies to minimize environmental impact. Green logistics focuses on minimizing environmental impact during transportation and distribution, while green supply chain management (GSCM) integrates environmental factors throughout the entire supply chain. The importance of green logistics and green supply chains not only helps reduce operating costs but

also protects the environment, creating sustainable value for businesses and society (Carter & Rogers, 2008). Research on green logistics and green supply chain management not only contributes to academic theory but also has practical application value (De Giovanni & Esposito Vinzi, 2012).

Scientometrics or scientific bibliometrics is a highly effective mathematical statistical method for measuring and evaluating the quality of scientific publications (Broadus, 1987). The scientific bibliometric analysis method helps identify the influence of studies, important authors, and journals in the field, as well as collaboration trends among scholars and countries (Khudzari et al., 2018), thereby helping researchers and business managers better orient themselves in developing strategies and future research (Srivastava, 2007). Using the Scopus database for bibliometric analysis allows us to gain a comprehensive understanding of current research trends, main topics, and the geographical distribution of studies. The use of the Scopus database ensures the accuracy and reliability of research results due to its rich and diverse data from various fields (Mongeon & Paul-Hus, 2016). This research paper on green logistics and green supply chain management not only brings high academic value but also has great practical significance, contributing to the sustainable development of businesses and society. This study focuses on applying the bibliometric method to evaluate research in this topic using the Scopus database to provide insights related to existing research, thereby identifying trends and research gaps. The study aims to clarify research questions such as which authors and countries publish the most on this topic? What are the main

research areas and structures? What are the current gaps and future research directions?

## **2. RESEARCH METHODOLOGY**

### **2.1 Theoretical basis of green logistics and green supply chain management**

Green logistics is considered an indispensable part of green supply chain management. This concept refers to integrating environmental factors into logistics activities to minimize negative environmental impacts (Srivastava, 2007). This includes optimizing transportation to reduce CO<sub>2</sub> emissions, using environmentally friendly transport vehicles, and optimizing warehouse management to save energy.

Supply chain management refers to managing the flow of goods, information, and finance from the source to the final consumer. Green supply chain management refers to integrating environmental factors into supply chain activities, from product design, raw materials, production, transportation to consumption and post-use disposal (Srivastava, 2007). The goal of GSCM is to minimize negative environmental impacts while improving business efficiency and performance.

Sustainable supply chain management expands the concept of GSCM by integrating environmental, economic, and social factors throughout the entire supply chain. Sustainable supply chain management emphasizes sustainable development in supply chain activities, including aspects such as working conditions for employees, social responsibility, and long-term economic benefits (Carter & Rogers, 2008). The goal of Sustainable Supply Chain Management is to create a comprehensive sustainable supply chain, bringing long-term benefits to both businesses and society.

## 2.2 Research methods

The research process was carried out in two steps:

The first step in the process is to identify the database and research keywords. To meet the research objectives, publications were collected by the author group based on the Scopus database because this database is widely recognized in academia and is suitable for the multidisciplinary nature of green logistics and GSCM. The main keywords of interest are "green logistics" and "green supply chain management". The search scope in this study was limited to research areas, focusing on publications in three fields: (1) Business, Management and Accounting; (2) Economics, Econometrics and Finance; (3) Social Sciences. The author group did not specify a specific timeframe for the study but collected all articles containing the selected keywords. The collected publications included: articles, conference papers, book chapters and had to be published in English academic journals. This search was conducted in June 2024, resulting in 701 publications. These publications were then retrieved and re-evaluated based on their titles and abstracts to ensure they contained one of the searched keywords. The final number of publications used for bibliometric analysis was 694, meeting the requirements for the next step of analysis.

The second step is data analysis. The study uses the data analysis results from the Scopus system, including characteristics (document type, language, source), publication year, country, and author. Next, the data file extracted from Scopus was imported into VOSviewer software for co-authoring network analysis and co-occurrence of keywords analysis. Co-author analysis was used

in this study to describe and analyze the relationships between authors based on the number of times they co-appeared in research works; thereby highlighting the collaborative relationships among scientists on the research topic. Co-author analysis was performed for authors with a minimum of 3 published documents and a minimum of 1 citation. Co-occurrence of keywords analysis was performed for keywords with a minimum of 5 occurrences. The results of the analysis were evaluated to identify research trends and gaps, thereby proposing future research directions.

## 3. RESULTS AND DISCUSSION

### 3.1 Description of retrieved documents

With 694 documents retrieved based on the Scopus database (Table 1). The documents are divided into 3 types: articles, conference papers, and book chapters. Of these, articles accounted for the highest proportion (590 articles, or 85.01%); followed by conference papers (85 articles, or 12.25%); and finally book chapters (19 articles, or 2.74%). The documents are written in English and published in scientific journals.

**Table 1. Description of retrieved documents**

| Characteristic   | Quantity | Percentage |
|------------------|----------|------------|
|                  |          | (%)        |
| Article          | 590      | 85.01      |
| Conference paper | 85       | 12.25      |
| Book chapter     | 19       | 2.74       |
| Total            | 694      | 100        |

*Source: Compiled from Scopus database, 6/2024*

### 3.2 Document sources

Specifically regarding document sources, documents were published in 122 different sources. Figure 1 shows the top 5 journals on

green logistics and GSCM. The Journal of Cleaner Production has 64 documents, followed by Sustainability Switzerland (61 documents), International Journal Of Supply Chain

Management (27 documents), Uncertain Supply Chain Management (25 documents), and finally International Journal Of Logistics Systems And Management (23 documents).

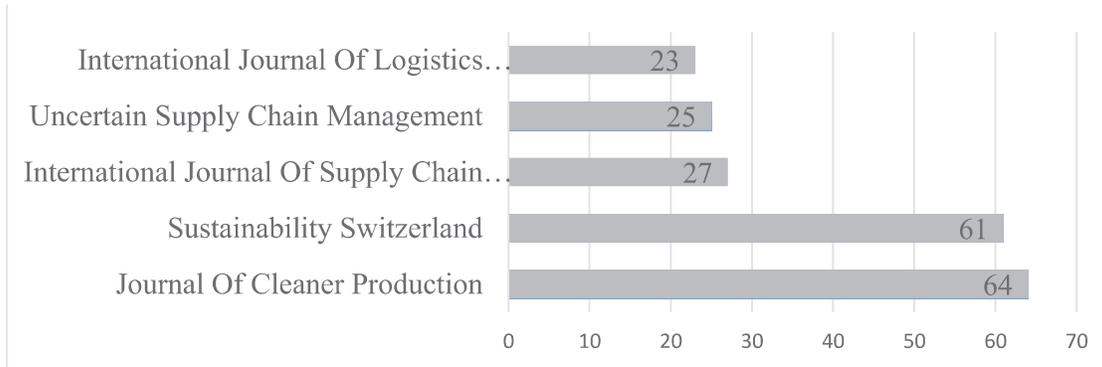


Figure 1. Popular document sources on green logistics and GSCM

Source: Compiled from Scopus database, 6/2024

3.3 Development of the topic by year

The number of published articles related to green logistics and GSCM is presented in Figure 2. Although the first article appeared in 2003, the number of documents remained limited from 2003 to 2010. After 2010, the number of

publications continuously increased, reaching its peak in 2023 (91 articles). The increasing trend in publishing research on this topic shows that green logistics and GSCM is a field that receives much attention from researchers.

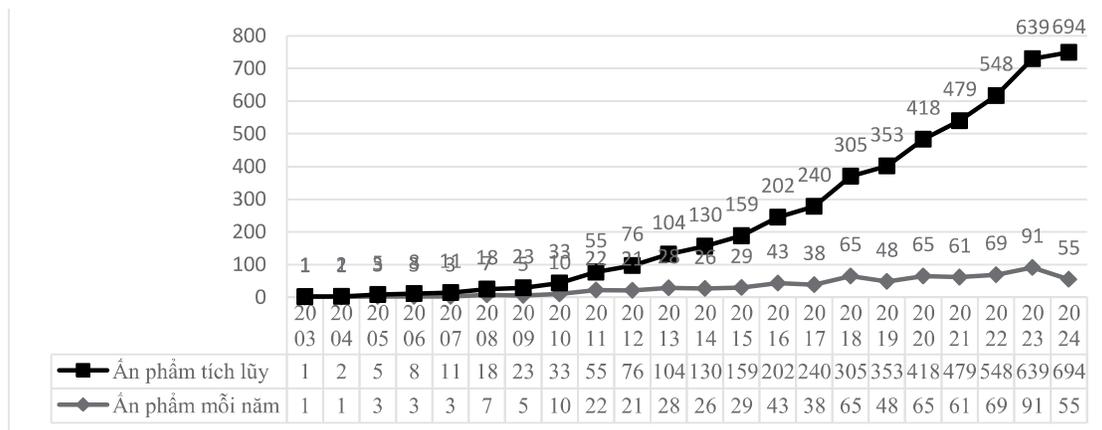


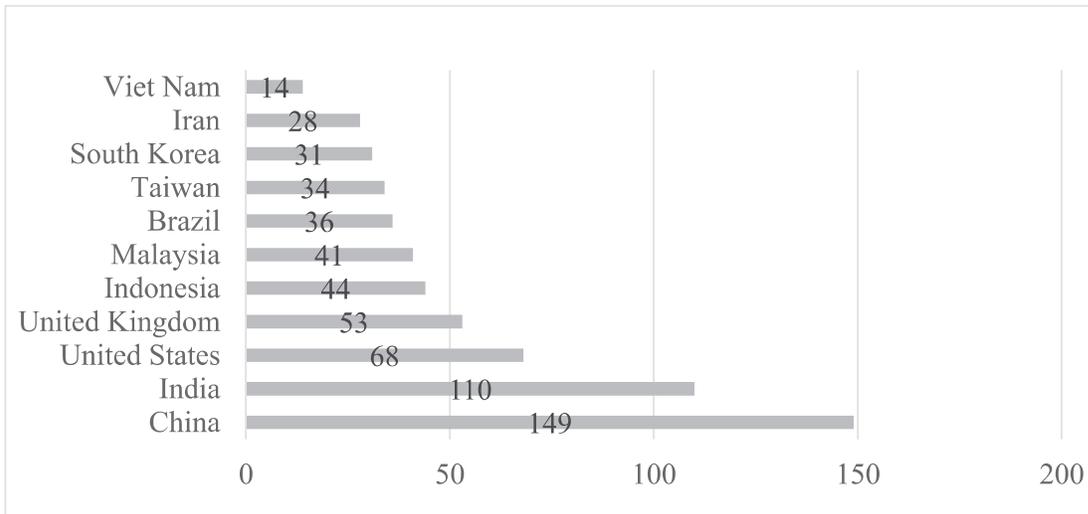
Figure 2. Number of published articles

Source: Compiled from Scopus database, 6/2024

3.4 Geographical distribution of research topics

From 2003 to present, researchers in 72 countries worldwide have contributed to the topic of green logistics and GSCM. Figure 3 shows the

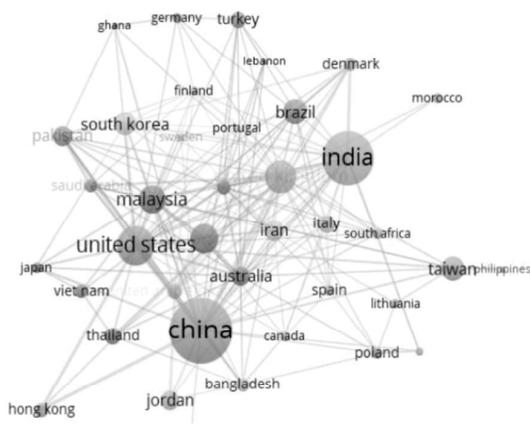
number of documents from the top 10 countries, with China leading (149 documents) and India second (110 documents). Vietnam has 14 published studies, with the first document in 2014 and the latest in 2024.



**Figure 3. Geographical distribution of research topics**

*Source: Compiled from Scopus database, 6/2024*

The visualization map of the international cooperation network among countries (Figure 4) shows that out of a total of 72 countries, China cooperates with the most other countries (26 countries, 115 links).



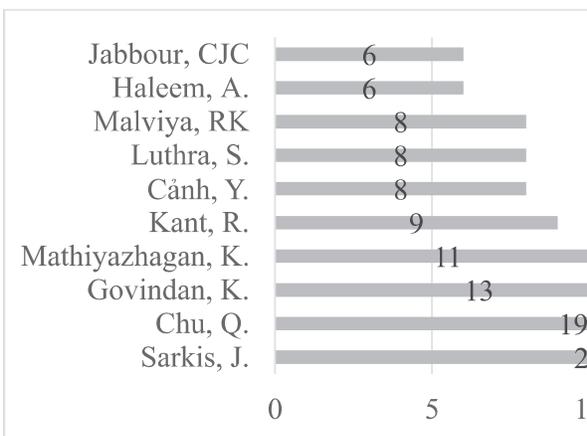
**Figure 4. Visualization map of the international cooperation network among countries**

*(Source: Compiled from Scopus database, 6/2024)*

**3.5 Leading authors and organizations**

Leading authors include Sarkis, Chu, Govindan, Mathiyazhagan, Kant, Canh, Luthra, Malviya, Haleem, Jabbour. Leading organizations are Dalian University of Technology, Clark University, Graduate School of Management at Clark University, Hong Kong Polytechnic University, University of Southern Denmark, and University of Jordan.

The visualization map of the researchers' collaboration network (Figure 6) shows the collaboration among authors in research on green logistics and GSCM.



**Figure 5. Number of documents by top 10 authors**

(Source: Compiled from Scopus database, 6/2024)

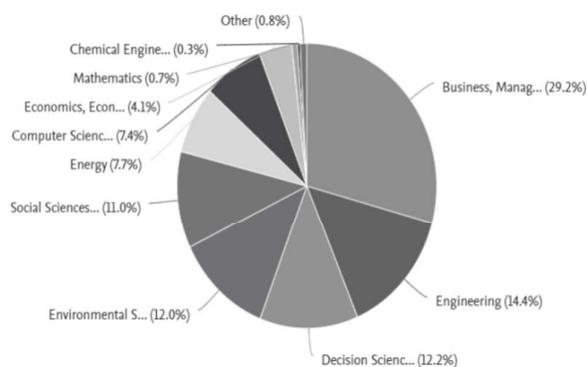


**Figure 6. Visualization map of researchers' collaboration network**

(Source: Compiled from Scopus database, 6/2024)

**3.6 Number of publications classified by Industry group**

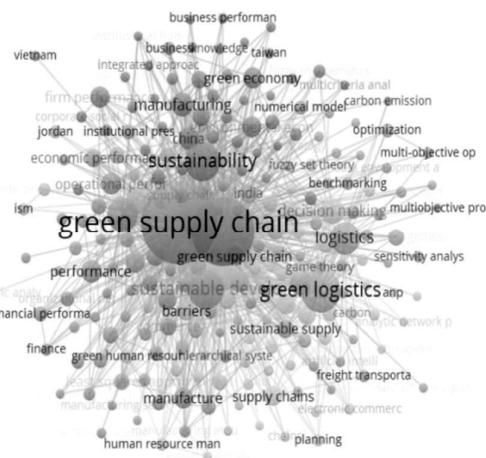
In the research areas related to green logistics and GSCM presented in Figure 5, the interdisciplinary nature of published research related to green logistics and GSCM is affirmed, with Business, Management, and Accounting (203 documents) being prominent, followed by Engineering (100 documents), Science (85 documents), Environmental Science (83 documents), and Social Sciences (76 documents).



**Figure 7. Number of publications classified by industry group**

**3.7 Prominent keywords**

According to the data analysis results from VOSviewer, there are 5,381 keywords mentioned by the authors. Among them, the keyword "green supply chain management" appeared most frequently with 217 documents, and "green logistics" with 125 documents.



**Figure 8. Development trend of keywords**

**3.8 Main research trends**

A total of five topics were generated in the co-keyword analysis; the analysis of representative keywords within each topic facilitated the naming of each specific topic:



management research, including addressing barriers and drivers, improving performance through green human resource management, applying analytical methods such as Dematel, and focusing on green manufacturing and the circular economy. These studies provide in-depth insights and potential solutions to improve the sustainability and performance of global supply chains. The research results also indicate research trends, thereby guiding future research. This information is not only useful for researchers but also for policymakers and practitioners in developing sustainable strategies.

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