

DOES GREEN SUPPLY CHAIN MANAGEMENT RELATED TO CIRCULAR ECONOMY? BIBLIOMETRIC BIG DATA ANALYSIS

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Abstract

This study is a bibliometric research related to Green Supply Chain Management and Circular Economy which is based on articles sourced from the Scopus database with the aim of describing a study on general topics related to Green Supply Chain Management and Circular Economy which is reviewed from trend research, leading countries in articles, affiliated universities, articles with the most citations, and analysis of keywords and authors using analysis tools VOSviewer. The results of this study show that the trend of studies related to Green Supply Chain Management and Circular Economy has increased every period, with the leading country in the study being China. The university affiliated with most of the studies is the University of Essex. The article with the most citations comes from the House Omega (United Kingdom) article entitled "Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications" by Andrea Genovese et al. (2015). Based on VOSviewer's analysis, the keywords include green supply chain management, circular economy, and sustainability, followed by Acquaye, Adolf A. and Genovese, and Andrea as researchers with level connections.

Keywords: Green Supply Chain Management, Circular Economy, Bibliometric

INTRODUCTION

Economics and sustainability are two things that are difficult to go hand in hand. When it transitioned from a developing country to an industrialized country, China faced several problems in the environment and consumption, despite its rapid economic progress (Li et al., 2022). Climate change, degradation, land expansion, and action have immediate and tangible consequences, including declining biodiversity and rapid life. All of this affects the potential of vital ecosystems needed for the advancement and sustainability of life (Gao et al., 2024).

Economic theory states that disproportionate patterns of production and consumption are natural or desirable outcomes because they encourage the creation of wealth resulting from economic activities (including the flow and use of raw materials and resources) and trade in goods and services (Genovese

et al., 2015). However, economic and production systems are inseparable from the environment, with contemporary economic ecological theories emphasizing the increasing impact of activities on the environment (Genovese et al., 2015). Therefore, it is crucial to evaluate the company's performance in general and its impact on the environment

The circular economy (CE) is a relatively new idea, so this topic is interesting for researchers to research because of its working methods in operationalizing sustainability (Gao et al., 2024). CE is an economic paradigm that encourages the use of material standards, recycling, and production waste reduction in the production process (Haas et al., 2015). Companies, universities and research centers, institutions and citizens are asked to contribute to the system of production, distribution and consumption transition processes towards a circular configuration (Del Vecchio et al., 2021).

To achieve a more operationally friendly environment, companies must use technical environments such as green supply chain management (GSCM) and green innovation (Liu & Lu, 2023). GSCM seeks to integrate a problematic environment into the organization by minimizing material flow or by reducing unintended negative consequences of production and consumption processes (Dong et al., 2016). The implementation of GSCM has many obstacles and controversies. Tensions in developing countries Due to immature conceptual understanding and lack of standards, resulting in uncertainty in sustainability projects (Liu et al., 2020).

Therefore, found a method to align GSCM with CE principles is important if environmental limitations of sustainability are to be encouraged (Genovese et al., 2015). GSCM and CE practices both aim to improve environmental and economic performance but with somewhat different perspectives. GSCM mainly focuses on improving environmental performance while economic performance can also be attributed to the design (Liu et al., 2018).

Research considering GSCM and CE has been published, but the relationship between conceptual and theoretical studies of the literature is still needed. The research on Green Supply Chain Management and the Circular Economy is based on articles from the Scopus database. Research in the form of a literature review related to GSCM and CE has been conducted by Liu et al., (2018). However, this study is the only theoretical related implementation used for GSCM and CE studies. This research was conducted to provide a better picture of GSCM and CE. The purpose of the study is to describe the general topic of Green Supply Chain Management and Circular Economy reviewed from trend research, leading countries in articles, affiliated universities, articles with the most citations, and conducting an analysis of keywords and authors using VOSviewer. The research is divided into 4 parts, including Introduction, Method, Results and Discussion, and Conclusion.

METHOD

This study uses bibliometric analysis. Researchers followed four stages, as described in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA): identification, screening, feasibility, and inclusion. The stages of PRISMA in this study are shown in Figure 1.

Scopus is a reputable database among academics (Jadhav et al., 2023). A number of studies have shown that bibliometric analysis can be performed using the Scopus database (Nawaz et al., 2020). The research was compiled based on articles sourced from the Scopus database.

The analysis used in this study includes analysis of publication trends, leading countries, affiliated universities, articles with the most citations, the relationship between keyword emergence and authorship. Keyword affinity analysis assumes that frequent repetition of words indicates a close relationship between the selected terms (Zupic & Cater, 2015). Through the use of network bibliometrics, research helps to illustrate conceptual relationships by identifying relationships between keywords in the literature (Callon et al., 1983). The findings from the co-emergency study are useful in estimating development studies related to green supply chain management and circular economy. When analyzing authorship relationships, we aim to see how two or more authors collaborate to write an article. This method reveals a pattern of collaboration among authors in compilation studies. The author uses VOSviewer to build a visualization network in the green supply chain management and circular economy literature.

Query used as follows (1 February 2025) : (TITLE-ABS-KEY ("CIRCULAR ECONOMY") AND TITLE-ABS-KEY ("GREEN SUPPLY CHAIN MANAGEMENT")) AND (LIMIT-TO (SUBJAREA, "BUSI") OR LIMIT-TO (SUBJAREA, "ENVI") OR LIMIT-TO (SUBJAREA, "ENER") OR LIMIT-TO (SUBJAREA OR LIMIT -TO LIMIT-TO (EXACTKEYWORD, "Sustainability") OR LIMIT-TO (EXACTKEYWORD, "Sustainable Supply Chains") OR LIMIT-TO (EXACTKEYWORD, "Green Supply Chain") OR LIMIT-TO (EXACTKEYWORD, "Sustainable Supply Chain Management") OR LIMIT-TO (EXACTKEYWORD, "Environmental Sustainability") OR LIMIT-TO (EXACTKEYWORD, "Environmental Impact") OR LIMIT-TO (EXACTKEYWORD, "Environmental Management")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (PUBSTAGE, "final"))

Figure 1. PRISMA Stages

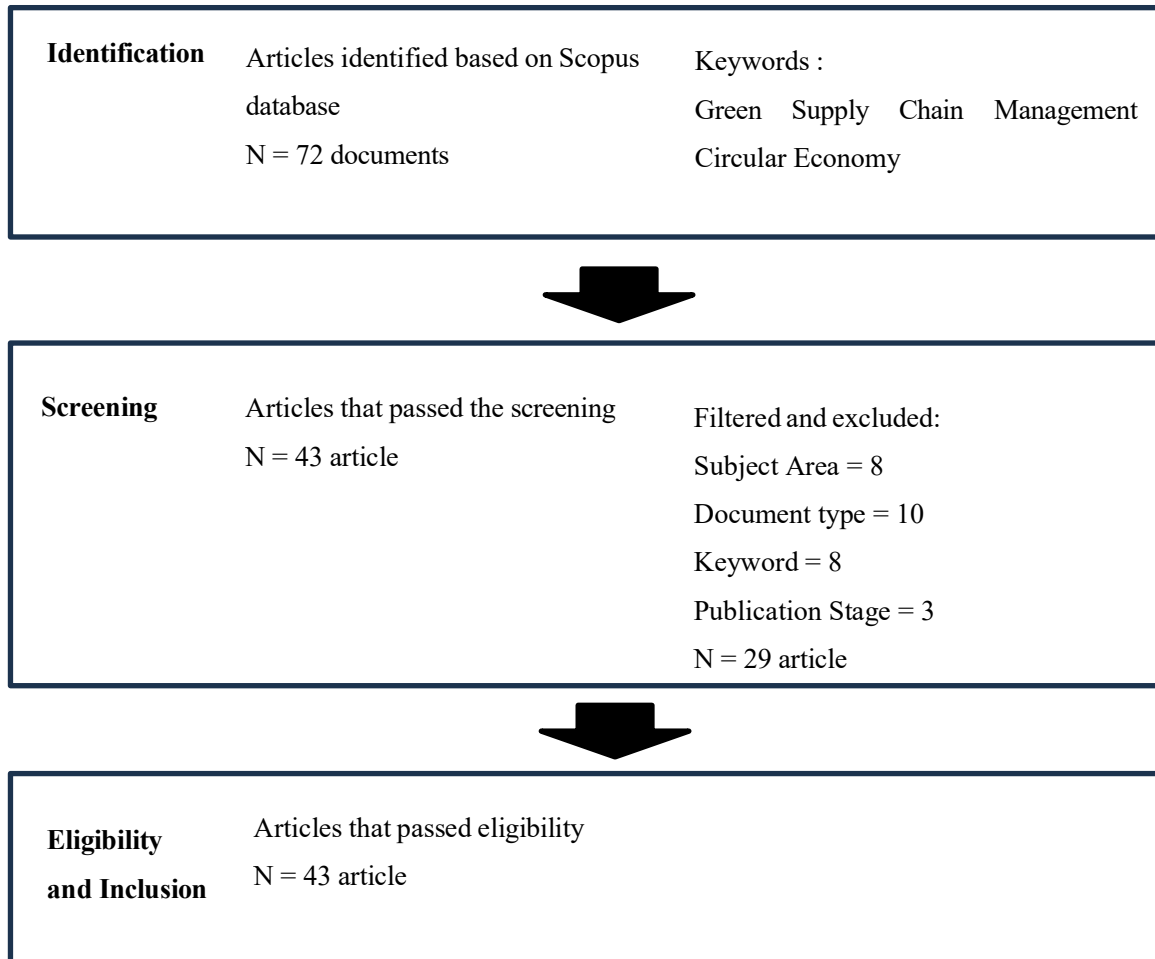


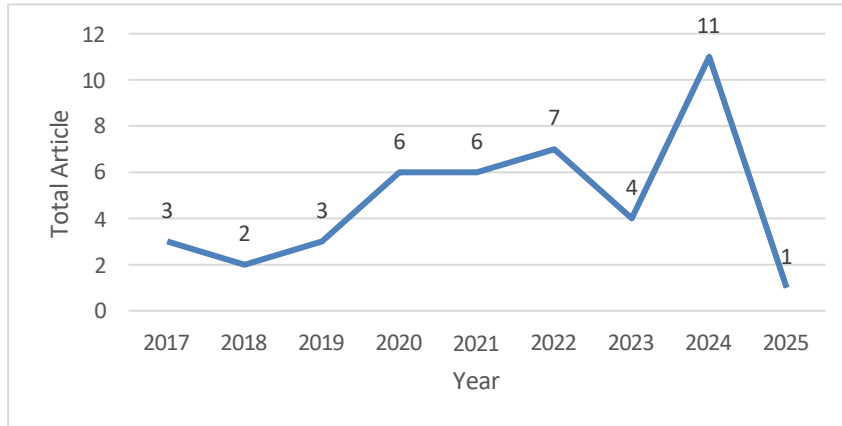
Figure 1 explains the stages in the search and screening of articles that will be used in this study. Based on searches for the keywords "Green Supply Chain Management" and "Circular Economy", 72 articles were obtained. Then a screening was carried out based on the field of study, type of document, keywords and publication stage so that 43 articles were obtained to be used in this study.

RESULTS AND DISCUSSION

Publication Trends

The analysis of publication trends aims to find out research trends related to green supply chain management and circular economy every year. Publication trends related to green supply chain management and circular economy can be seen in graph 1.

Graph 1. Publication Trends

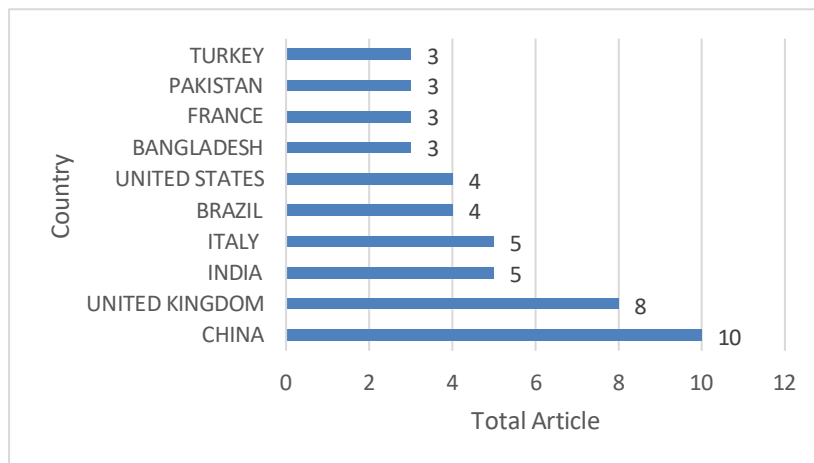


Based on the results of the analysis, the publication trend regarding green supply chain management and the circular economy has increased every year. As for the number of studies, the most occurred in 2024, with a total of 11 studies. In 2024, many parties will increasingly realize the importance of green supply chain management and the circular economy in realizing the success of the SDGs. The growing interest in the circular economy, both in academia and the professional sector, reflects its potential to facilitate the separation between the growth economy and the impact environment (Mejía Ochoa et al., 2024).

Leading Countries in Study

The analysis of the leading countries in this study aims to find out which countries have contributed the most to publication studies related to green supply chain management and circular economy. The analysis of the leading countries in this study can be seen in the diagram below.

Diagram 1. Leading Countries in Study



Based on the results of the analysis, China is the country with the most publications related to green supply chain management and circular economy, namely 10 articles. Researchers in China are very interested in studying the topic because the manufacturing industry has a significant development, so it is important to evaluate the performance of companies and their impact on the environment (Liu & Lu, 2023).

Affiliated Universities in Study

The Analysis of Affiliated Universities aims to find out which universities support and contribute to development research, especially those related to important topics such as Green Supply Chain Management (GSCM) and Circular Economy (CE).

Table 1. Affiliated Universities in Study

University	Country	Number of Articles
University of Essex	United Kingdom	2
Hong Kong Polytechnic University	Hong Kong	2
University of Derby	United Kingdom	2
University of West England	United Kingdom	2
University of Warwick	United Kingdom	2
Universidade do Vale do Rio dos Sinos	Brazil	2
St. Anne's School Pisa Superior University	Italy	2
Bristol Business School	United Kingdom	2
Sheffield University Management School	United Kingdom	2
Kent Business School	United Kingdom	2

Based on the analysis, universities in the UK have become affiliated universities in Green Supply Chain Management (GSCM) and Circular Economy (CE). These universities are the University of Essex, the University of Derby, the University of West England, the University of Warwick, Bristol Business School, Sheffield University Management School, and Kent Business School. Other affiliated universities are from Hong Kong, Brazil, and Italy.

Most Citation Articles

Table 2. Articles with the Most Citations

Article Title	Journal Publisher	Number of Citations
Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications	Omega (United Kingdom)	1003
Comparing linear and circular supply chains: A case study from the construction industry	International Journal of Production Economics	353
A new holistic conceptual framework for green supply chain management performance assessment based on circular economy	Journal of Cleaner Production	279
Effect of eco-innovation on green supply chain management, circular economy capability, and performance of small and medium enterprises	Journal of Business Research	183
Determinants of the transition towards circular economy in SMEs: A sustainable supply chain management perspective	International Journal of Production Economics	146
Green logistics performance and sustainability reporting practices of the logistics sector: The moderating effect of corporate governance	Journal of Cleaner Production	134
Multi-dimensional circular supply chain management: A comparative review of the state-of-the-art practices and research	Transportation Research Part E: Logistics and Transportation Review	128
Modified Carroll's pyramid of corporate social responsibility to enhance organizational performance of SMEs industry	Journal of Cleaner Production	117

The role of the focal company in sustainable development goals: A Brazilian food poultry supply chain case study	Journal of Cleaner Production	109
The adoption of operational environmental sustainability approaches in the Thai manufacturing sector	Journal of Cleaner Production	93

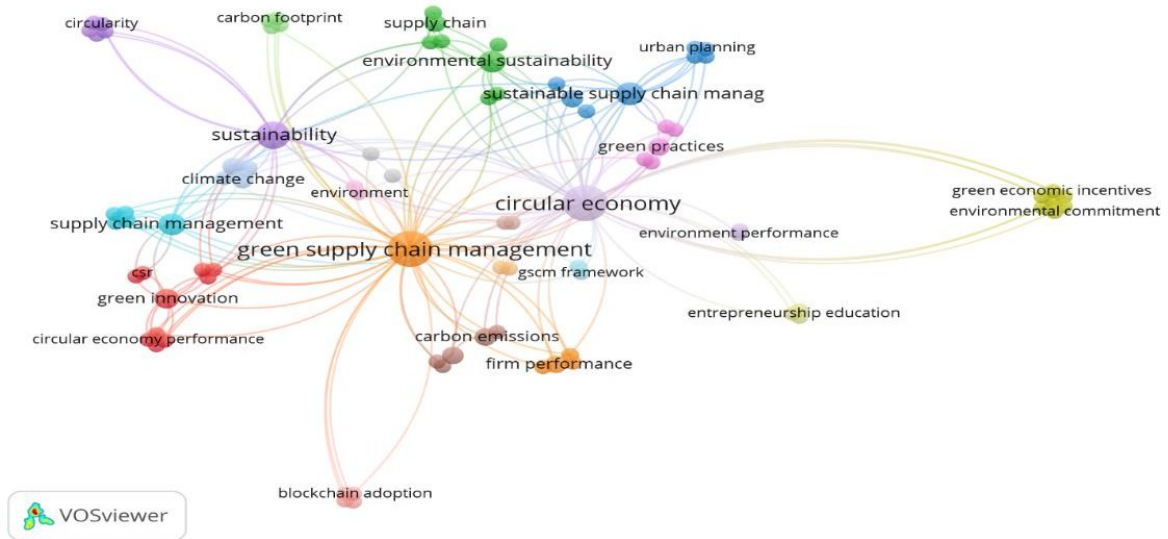
Based on the results of the analysis, research from Andrea Genovese et al. (2015) entitled "Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications" was published in the journal Omega (United Kingdom) with citations as of February 1, 2025 as many as 1003 times. This study compares the performance of traditional and circular production systems on various indicators. The results show that the integration of circular economy principles in sustainable supply chain management can provide clear benefits from an environmental point of view (Genovese et al., 2015).

Keyword Occurrence

Subject theme to determine the direction of future studies for studies related to "Green Supply Chain Management" and "Circular Economy". Academics can quickly identify Topics, ongoing research, hot topics, and future trends by looking at the frequency of keywords in a field. In the scientific field, the analysis of the occurrence of keywords simultaneously creates a network theme and the relationship between those themes (Nawaz et al., 2020).

A graph representation of the emergence of the network generated by bibliometric analysis with VOSviewer is shown in Figure 2. In Figure 2, there are several models of nodes. A larger node implies an in-depth further study of a particular term, while a circular node indicates the presence of a keyword (Donthu et al., 2021). The number of occurrences of keywords in an image is indicated by the size of the nodes. Thicker edges show a more frequent correlation between vertices. In research, relationships are represented by edges, which are lines that connect between nodes (Donthu et al., 2021). The strength of a keyword's occurrence is determined by the separation between the two vertices and the thickness of the line connecting them (Callon et al., 1983).

Figure 2. Visualization Network Basen on Keywords



Based on figure 2, the research sample is dominated by green supply chain management and circular economy, both of which are topics in the study. Research related to green supply chain management and the circular economy is often associated with sustainability. The three have their own linkages where green supply chain

can be seen in Figure 4. The figure shows that there are 7 clusters that show how the authors group according to field studies or areas of interest in authorship articles with the topics of green supply chain management and circular economy. The level of network integration is indicated by the density of the network, which is the size of the nodes connected to each other. The network density between authors can be seen in Figure 4. The more connections between a given node in density and the higher the network indicates a higher level of interaction and connection between authors. Based on Figure 4, Acquaye, Adolf A., and Genovese, Andrea is an author with a high level of interaction and connection.

Figure 4. Visualization Network Based on Writer

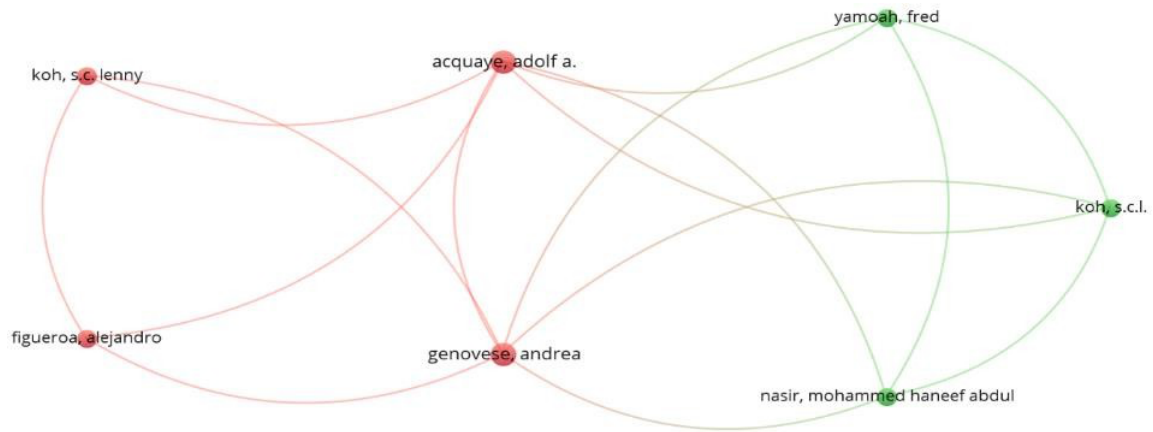


Table 4 shows the active authors' studies related to green supply chain management and circular economy.

Table 4. Active Author in Article Publication

Author Name	Article	Citation	Total Link Strength
Acquaye, Adolf A.	2	1354	7
Garza Reyes, Jose Arturo	2	144	7

Genovese, Andrea	2	1354	7
Kumar, Vikas	2	144	7
Wang, Yulan	2	138	7
Zhang, Abraham	2	138	7
Ahmed, Rizwan Raheem	1	117	5
Ahmed, Sayed Farrukh	1	0	5
Daddi, Tiberio	2	29	5
De Oliveria, Jorge Henrique Caldeira	1	23	5

CONCLUSION

Research related to Green Supply Chain Management and Circular Economy has been carried out by researchers from various countries. This study uses the stages of PRISMA implementation in collecting articles from the Scopus database, obtained as many as 43 articles. This bibliometric research tries to describe articles related to Green Supply Chain Management and Circular Economy. The results of the study show that research trends related to Green Supply Chain Management and Circular Economy are increasing every period, with China leading the way in this study. The college most affiliated with this study is the University of Essex. As for articles accompanied by citations, the most sources come from House Omega (United Kingdom), namely an article titled "Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications" by Andrea Genovese et al. (2015). This study analyzes the emergence of keywords and author analysis together. Most of the keywords used are green supply chain management, circular economy, and sustainability. The authors of the analysis together show that Acquaye, Adolf A. and Genovese, Andrea are the researchers with the highest level of connection.

This study has several limitations, including not considering the proceedings of books and articles as a source of reference. This can reduce the substance related to the topic discussed. This study only uses the Scopus database so it is not enough to explore the research. The analysis tool of this study is VOSviewer which has limitations in analyzing pattern relationships, so readers are unable to infer the direction between variables.

Based on the above limitations, the researcher provides research suggestions to add reference sources from books and proceedings. To study this topic more broadly, it is expected to use additional databases such as Springer, Emerald ProQuest, and so on. Further research can perform bibliometrics using ARstudio to get better analysis.

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