

# Green Supply Chain Management Practices and Sustainability Performance: A Review and Future Perspectives

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## Abstract

As the world becomes more aware of and pays more attention to social and environmental issues such as climate change, pollution, and various health problems caused by pollution, sustainable development has emerged as a universally recognised and critical concept across countries. Green supply chain management (GSCM) practice as a green comprehensive environmental management tool has also received special attention from the public. Therefore, this paper aims to conduct a comprehensive review and analysis of existing research on GSCM practices and sustainability performance (SP) to identify research gaps, and to provide recommendations for future research agendas. For the bibliometric analysis of this study, the time span is from 2005 to 2024. Specifically, 676 papers were retrieved for this study, the most prolific and influential source journal analysis, main research country analysis, and content analysis of cited papers were performed. Furthermore, it reveals the ever-expanding coverage of sustainability-related topics in this field of research, providing valuable insights into its evolution over time. Finally, this study identifies and suggests potential mediator or mediator for future research on the relationship between GSCM practices and SP, providing scholars and practitioners with valuable insights to guide their research efforts and advance knowledge in the field.

**Keywords:** Sustainability Performance, Green Supply Chain Management Practices, Literature Review

## Introduction

Due to the deterioration of the environment and limited resources, the consideration of sustainable development is a top priority for human beings, especially after the Sustainable Development Goals introduced by the United Nations (UN, 2015). Accordingly, sustainable

development has been a concern in the world. In fact, sustainable development was first coined by the World Commission on the Environment and Development at the United Nations' Brundtland Report (1987), referring to current and future development achieved without infringing on the possible development rights of future generations (Çankaya & Sezen, 2019). In this setting, GSCM covering green concepts, based on collaboration and coordination, has become one of the sustainable development strategies of enterprises (Sun & Chu, 2022). The term GSCM was first proposed in the early 1990s and subsequently attracted the attention of academics and practitioners (Alghababsheh et al., 2022). This is because the adoption of GSCM practices can address issues such as irrational consumption of resources, reduction or elimination of waste, emissions (including heat emissions that contribute to the greenhouse effect) and environmental pollution in the supply chain (Akhmatova et al., 2022).

Sarkis et al. (2011) defined GSCM as the integration of environmental considerations into the supply chain, such as minimising resource flows and unintended negative impacts during production and consumption. Given its growing importance to business operations and performance, as well as environmental impact, GSCM has been the subject of numerous research studies over the past two decades. However, the previous literature revealed inconsistent empirical results with regard to this relationship. While some studies found a positive impact of GSCM practices on performance (Suki et al., 2022), others found the opposite (Ahmad et al., 2022). Based on the above literature, it is found that the relationship between GSCM and performance is not always consistent. Furthermore, the lack of clarity about the impact of implementing GSCM practices on performance improvement has hindered a full understanding of the resulting consequences (Esfahbodi et al., 2023).

The aim of this paper is to enhance the relationship between GSCM practices and SP by exploring potential moderators and mediators in their relationship. In addition, a review of the extant literature helps to identify gaps in literature and provides opportunities for future research. Previous reviews have focused on a meta-analysis of effects of GSCM practices and performance, classification and measures of GSCM practices and measurement of SP, and the framework for future research (Choudhary and Sangwan, 2022; Geng et al., 2017; Hammou et al., 2022).

To fulfil the research objectives, section 2 provides a literature review of current studies related to GSCM practices on sustainability performance. Section 3 introduces the review process. Section 4 presents the results and discussion of the relationship between GSCM practices and SP. Finally, Section 5 presents the results and conclusions of the work and future research opportunities.

## **Literature Review**

### *Sustainability Performance*

With the increasing global awareness of environmental issues, such as rapid depletion of resources, environmental pollution, global warming and decreasing biodiversity, the sustainability has been widely used in in the academic field and has brought term of sustainability into the mainstream of academic discussion, which is to gain a competitive advantage in the business world (Khan et al., 2020; Xu et al., 2023). According to Elkington (1998), sustainability is considered as an integration of three aspects, i.e., environmental,

economic and social dimensions, which is the famous "triple bottom line" concept. The implementation of sustainable practices is a manifestation of corporate responsibility for the environment and society, and has become a strategic measure for companies (Banihashemi et al., 2019).

#### *Economic Performance*

Economic performance, as the general profitability of the business (Geng et al., 2017), is generally an important driver for companies to implement green supply chain management practices (Zhu et al., 2005). At the same time, it is also an evaluation of the operation and economic results of enterprises, and a kind of economic growth on the basis of ensuring ecological development and quality of life (Abdul-Rashid et al., 2017). Achieving economic sustainability is essential for business growth. According to Saunila et al. (2019), economic performance primarily focuses on the level of a firm's profitability, which is considered as the monetary benefits of an organization (Suki et al., 2022; Tan et al., 2022). Economic performance refers to the ability to reduce material purchases, energy consumption, waste treatment, waste discharge, environmental accident fines (Souto, 2022; Yu et al., 2023), as well as the improvements in return on investment and earnings per share (Xu et al., 2023).

#### *Environmental Performance*

Environmental performance is an expression of an organization's initiatives and responsibilities to create a greener environment in its operations (Bhattacharya et al., 2019). At the same time, it is also a strategic indicator, which is a manifestation of a company's ability to reduce pollution, reduce waste, prevent the use of hazardous material, and reduce the number of environmental accidents (Çankaya & Sezen, 2019; Kholaf & Ming, 2022). At the same time, it is also a measure of the environmental impact of business activities and is essential for sustainable economic production and intergenerational equity (Yong et al., 2020). Manufacturing businesses can achieve environmental performance if they limit solid and liquid waste, carbon emissions, the usage of contaminated and hazardous inputs, the frequency of environmental incidents, and the overall impact of their operations on the environment (Afum et al., 2020).

#### *Social Performance*

Social performance is relevant to all relevant stakeholders and can be examined in terms of practical aspects such as social projects, the welfare of all stakeholders, and educational opportunities for all personnel (Çankaya & Sezen, 2019). It mainly refers to the efforts made by enterprises for the well-being of society and people (Bhattacharya et al., 2019). Hence, social performance is one of the important dimensions of sustainable performance (Azam et al., 2022). Good social performance is beneficial to help enterprises gain a green competitive advantage and maintain sustainable development (Afum et al., 2021).

#### *Green Supply Chain Management Practices*

GSCM was first proposed by Green et al. (1996) in the early 1990s, which refers to the integration of environmental factors based on traditional supply chain management (SCM) (Zekhnini et al., 2022). As an environmental management tool for the green transformation of the manufacturing industry, GSCM has attracted the attention of academia and practitioners (Tseng et al., 2019). GSCM practices are specific actions and initiatives implemented within the supply chain to achieve environmental sustainability goals.

Previous studies found that the relationship between GSCM practices and sustainability performance is not consistent (Çankaya & Sezen, 2019; Nguyen et al., 2023; Rahman et al., 2023; Suki et al., 2022). However, for developing countries, companies have limited knowledge of GSCM practices (Asamoah et al., 2023). Furthermore, Esfahbodi et al. (2023) suggested that more research should be explored on the performance improvement coming from the implementation of green supply chain management practices. Hence, Therefore, it is necessary to explore the potential moderating and mediating factors in the relationship between GSCM practices and sustainability performance.

### Research Methodology

The literature review is a scientific method of sorting and summarizing literature, understanding the development trend of the field, and sorting out knowledge. By reviewing literature related to GSCM practices and SP, this study mainly pays attention to article and conference papers. This study only contains the papers published on Scopus database in English, due to its largest database for peer review indexed. The data is searched on the 8<sup>th</sup> April in 2024 by keywords, such as “sustainability” OR “sustainability performance” OR “sustainable performance” AND “GSCM” OR “GSCM practices”. Papers with these keywords in the title and abstract are screened. Figure 1 shows the literature screening process.

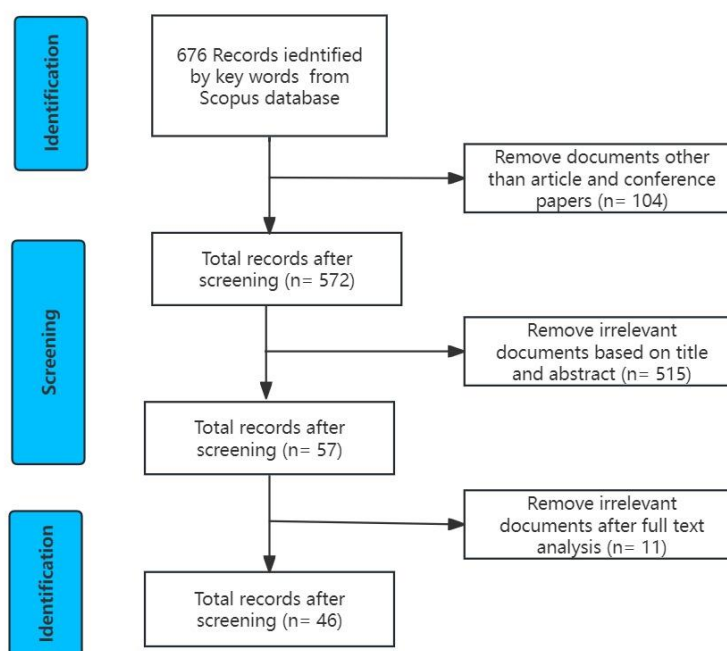


Figure 1. The Screening Process of Literature Review

### Results and Discussions

#### Publication Trend and Distribution by Industry

Figure 2 shows a growing trend in research on the relationship between GSCM practices and SP, indicating the growing importance of researchers on this topic. Empirical research on the impact of GSCM practices on SP is not limited to a specific industry. As shown in Figure 3, the percentage of articles that collect data from specific industry sectors is displayed. Obviously, the majority of the article data comes from the manufacturing industry (61%), followed by the textile industry (9%) and the mining industry (5%). Some articles do not specify a specific industry, then they are summarized to the others category. The reason why most papers focus

on the manufacturing sector is because it is the biggest contributor to social sustainability and environmental issues (Ogiemwonyi et al., 2023).

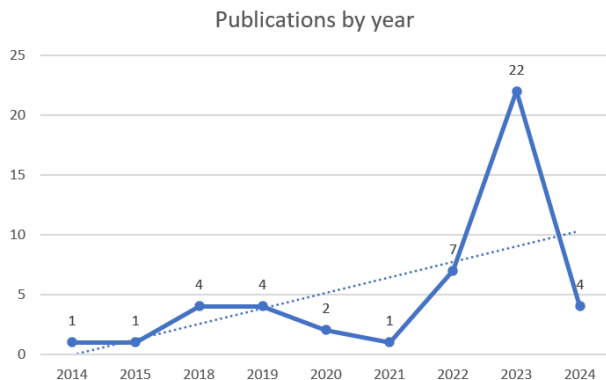


Figure 2. Number of Empirical Papers in GSCM Practices on SP

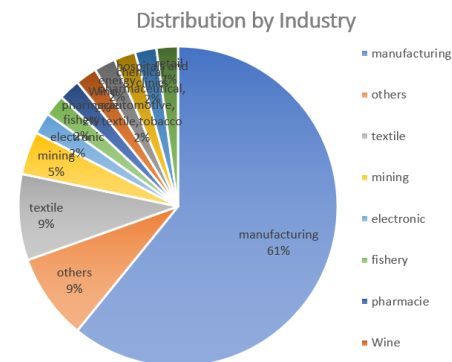


Figure 3. Number of Articles with respect to Industry

### Source Journals and Geographical Application Area

Analyzing the types of literature sources to understand the field situation of the impact of GSCM practices on SP. As shown in Table 1, the selected 46 papers were published in 30 journals in the past. The top three journals are Environmental Science and Pollution Research, Journal of Cleaner Production, and three journals tied for third place, namely Uncertain Supply Chain Management, Frontiers in Psychology and Sustainability (Switzerland).

A country’s analysis of research can reveal research interest in that country. It is clear from Figure 4 that Pakistan has published the largest number of papers on the relationship between GSCM practices and SP, followed by Malaysia and Indonesia. The former accounted for 20%, and the proportion of the latter two was 13%. In addition, countries such as Vietnam, Palestine, and China have also made efforts to implement GSCM practices to improve the sustainability of their businesses. In particular, developed countries have paid less attention to comparison than developing countries. This is because the economic development of developing countries is dependent on high energy consumption and high pollution such as manufacturing, and green practices need to be explored to achieve sustainable development (Susitha & Nanayakkara, 2023; Zaid & Sleimi, 2021).

Table 1

Source Type of Papers

List of journals	Count.
Environmental Science and Pollution Research	5
Journal of Cleaner Production	4
Uncertain Supply Chain Management	3
Frontiers in Psychology	3
Sustainability (Switzerland)	3
Business Strategy and the Environment	2
Cleaner Logistics and Supply Chain	2
International Journal of Quality and Reliability Management	2
Agriculture (Switzerland)	1
TQM Journal	1
2023 4th International Conference on Computing, Mathematics and	1
IEEE Transactions on Engineering Management	1
Environmental Science and Pollution Research	1
Knowledge and Process Management	1
Systematic Reviews in Pharmacy	1
International Journal of Financial Research	1
Journal of Manufacturing Technology Management	1
International Journal of Supply Chain Management	1
Expert Systems with Applications	1
Proceedings of the International Conference on Industrial Engineering	1
IOP Conference Series: Earth and Environmental Science	1
Advanced Materials Research	1
Procedia CIRP	1
Journal of Governance and Regulation	1
International Journal of Energy Economics and Policy	1
Economic Research-Ekonomiska Istrazivanja	1
Journal of Industrial Engineering and Management	1
Journal of Environmental Planning and Management	1
Journal of Asia Business Studies	1
Technovation	1
Management of Environmental Quality: An International Journal	1
<b>Total</b>	<b>46</b>

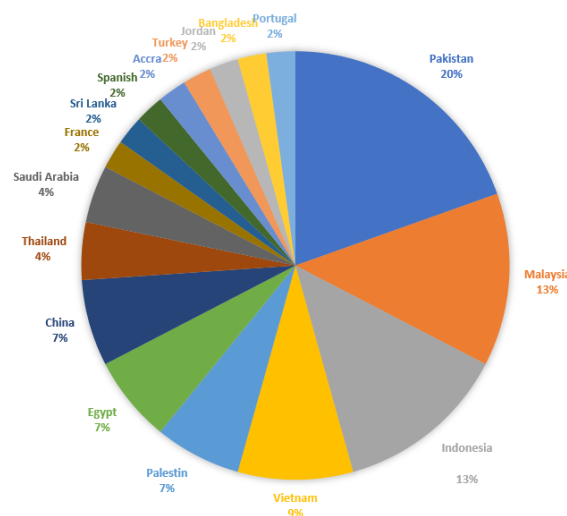


Figure 4. Geographical Application Area of GSCM Practices on SP



*Impact of GSCM Practices on SP*

Suki et al. (2022) indicated that GSCM practices are an important antecedent for improving sustainability performance. GSCM practices, a strategy that involves all members of the supply chain working together, can lead to more sustainable development in the long term (Le et al., 2022). For instance, GSCM practices improve SP of enterprises by reducing their environmental impact at all stages of the supply chain (e.g., green purchasing, internal environmental management, product eco-design, cooperation with customers, and return on investment) (Khan et al., 2022; Nguyen et al., 2023; Wang & Ozturk, 2023). Kholaf and Ming (2022) found that GSCM practices can promote societal benefits, such as improved company image, environment, and satisfaction in society. Because this environmentally friendly green supply chain, from the source of the supply chain, i.e. green purchasing, through green product design, green manufacturing, green marketing and finally recycling, focuses on reducing the energy consumption of materials, recycling and reusing parts to minimise environmental damage and create value for the company (Jum'a et al., 2024; Zaid & Sleimi, 2021).

However, some empirical studies have also shown that GSCM practices do not always coincide with the results of sustainability performance. For example, Esfahbodi et al. (2023) reported a negative relationship between eco-design and economic performance. This is due to the lack of adequate green knowledge and resources when it comes to eco-design (Green et al., 2012). Another study found similar results, with the lack of effective information systems affecting the effectiveness of communication among supply chain partners, resulting in a negative correlation between collaborative practices with customers and sustainability performance (Esfahbodi et al., 2023; Foo et al., 2018). According to Çankaya and Sezen (2019), green purchasing is not related to sustainability performance. This is because green purchasing is an external dimension of GSCM's practices and requires collaboration with suppliers. Notably, it is more difficult for external green supply chain management practices to achieve sustainability performance, especially economic performance (Amjad et al., 2022; Foo et al., 2018; Kholaf & Ming, 2022). This is because it not only includes internal company activities, but also extends to the upstream and downstream areas of the supply chain, such as green procurement, cooperation with customers, and reverse logistics. GSCM practices transcend the boundaries of an individual business and require close collaboration with supply chain partners to achieve its goals (Çankaya & Sezen, 2019; Novitasari et al., 2023). Therefore, there is still controversy about the impact of GSCM practices on SP, and further research is needed on the potential moderating and mediating factors in the relationship between GSCM and SP to determine the link between them (Rahman et al., 2023).

**Discussion of the Mediating and Moderating Factors**

Table 2 lists the impact of four mediating factors, including green innovation, employee and environmental performance, reflective moral attentiveness, and organizational learning capabilities. According to Ali et al. (2024) and Wongleedee (2020), GSCM practices can improve sustainability performance through employee satisfaction and motivation. Similarly, through conscious reflection on environmental issues by employees, GSCM practices can be better performed, achieving sustainable development (Mughal et al., 2023). Furthermore, GSCM practices can effectively adapt to the internal and external environment, gain competitive advantages, and improve sustainable performance through the continuous acquisition of new knowledge related to the environment (Hutomo et al., 2018).

Through the review of moderating effects, it was found that the moderating factors between GSCM practice and SP were mainly of the following types (as shown in Table 2). The first is the size and duration of the organization. Because the size and the duration of the enterprise are different, it would also lead to different levels of resource capacity (Susitha and Nanayakkara, 2023). The second is stakeholder pressure, such as institutional pressure, which can affect a company's environmental strategy (Ahmad et al., 2022). The third is organizational strategies, such as total quality management, environmental management practices, leadership support and organizational citizenship behaviors towards the environment, where the relationship between GSCM practices and SP is affected (Azam et al., 2022; Jermstittiparsert et al., 2019; Jum'a et al., 2024; Susitha & Nanayakkara, 2023). Apart from this, green knowledge sharing and employees' green behaviors help employees to come up with new ideas, solve problems, and achieve performance transformation when dealing with environmental issues (Nguyen et al., 2023). Other studies are given attention to research in green agriculture (Martínez-Falcó et al., 2023).

Table 2  
*Mediators and Moderators of GSCM Practices on SP*

Author	Mediator	Moderator
Ali et al. (2024); Wongleedee (2020)	Employee performance, environmental performance	
Mughal et al. (2023)	Reflective moral attentiveness	
Hutomo et al. (2018)	Organizational learning capability	
Jum'a et al. (2024)		Environmental management practices
Susitha and Nanayakkara (2023)		Organisation size/duration
Chen et al. (2023)		Leadership support
Nguyen et al. (2023)		Green knowledge sharing and employee green behavior
Martínez-Falcó et al. (2023)		Green agriculture
Ahmad et al. (2022)		Institutional pressures
Azam et al. (2022)		Organizational citizenship behavior toward environment
Jermstittiparsert et al. (2019)		Total quality management

**Conclusions**

This paper attempts to provide an overview of how GSCM practices can promote sustainability performance outcomes. We reviewed all relevant articles in Scopus, which helped us identify existing research results and research gaps in this field. In recent years, the number of studies in international journals on the implementation of GSCM practices to promote sustainable development has gradually increased. Moreover, it is especially popular in the manufacturing industry. Previous studies have shown that GSCM practices have a positive impact on sustainability performance (Çankaya & Sezen, 2019; Rahman et al., 2023; Suki et al., 2022). However, the potential moderators and mediators in the relationship between GSCM and SP are also worth further exploring (Rahman et al., 2023). Through



literature review, it was found that the existing research on the mediators and moderators of GSCM practices and SP.

In the future, more potential mediators or moderating factors can be explored, such as social control (Mughal et al., 2023), environmental dynamism (Micheli et al., 2020), knowledge management (Chen et al., 2023), environmental awareness (Rizki et al., 2022), innovative culture (Anwar et al., 2022), supply chain responsibility (Azam et al., 2022). It can be seen that the conclusions of reviewing the existing literature have certain research significance for future research directions. Furthermore, this paper has certain limitations. First, the study collects articles from the Scopus database, and some relevant papers may not be included in the analysis. Second, this paper is limited to articles published in the English language.

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