

# Literature Review on Green Supply Chain Management Practices in the Manufacturing Industry

Zijuan Zhan<sup>1,3</sup> and Ai Chin Thoo<sup>2</sup>

<sup>1,2</sup>Faculty of Management, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia, <sup>3</sup>School of Business, Jiangxi Institute of Fashion Technology, Nanchang, Jiangxi, China

Corresponding Author Email: zhanzijuan@graduate.utm.my

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## Abstract

With the growth of the global population and the emergence of environmental problems such as rising global temperatures, energy shortages and excessive carbon dioxide (CO<sub>2</sub>) emissions have become increasingly prominent as bottlenecks to sustainable development. As a high energy-consuming and high-emissions industry, the manufacturing sector is under pressure from the government, society, customers, and other stakeholders to achieve sustainability and green transformation. In China, equipment renewal and technological transformation are vital to promote the transformation and upgrading of the manufacturing sector. In the context of China's manufacturing industry, it is therefore worth exploring whether the adoption of green supply chain management (GSCM) practices can help improve corporate sustainability. In this study, determining the dimensions of GSCMPs is also another goal. The study results show that green purchasing (GP), eco-design (ECO), internal environmental management (IEM), cooperation with customers (CC), and investment recovery (IR) are the five dimensions most concerned by the implementation of GSCM practices in the manufacturing industry. This paper comprehensively reviews and analyzes existing research on GSCM practices in the manufacturing industry to provide some insights for scholars and practitioners and make recommendations for a future research agenda.

**Keywords:** GSCM Practices, Manufacturing Industry, Green Purchasing

## Introduction

In the period of increasing greenhouse gas emissions, rising global temperatures, and resource depletion, as well as under the pressure of stakeholders, sustainable development practice has gradually become a development strategy for enterprises to maintain market competitiveness (Khan et al., 2022). In this setting, the green initiative has become a key solution for sustainable development. In the early 1990s, the term GSCM was initially proposed receiving growing attention in recent years. This is because GSCM practices address

the irrational consumption of resources, reduction or elimination of waste, emissions (including heat emissions that cause the greenhouse effect), and environmental pollution in the supply chain (Akhmatova et al., 2022). GSCM practices can be used as one of the advantageous strategies for the manufacturing industry to gain an advantage in the market competition (Khan et al., 2020).

GSCMs have always played an important role in protecting the environment and have been the focus of extensive research over the past two decades. However, previous literature has shown that GSCM practices vary in manufacturing practices (Sahoo & Vijayvargy, 2021; Suki et al., 2022). Through the literature review, it is found that the application of GSCM practices in the manufacturing industry has a different impact. In addition, a lack of clarity on the performance improvement effects of the adoption of GSCM practices has hindered a full understanding of the resultant consequences (Esfahbodi et al., 2023). Hence, it is still worth exploring the implementation of GSCM practices in the manufacturing industry by adding other variables (Alghababsheh et al., 2022).

The purpose of this paper is to identify the current state of the application of GSCM practices in the manufacturing industry by reviewing and summarizing the existing literature. It is found that studies on the practical application of GSCM in China's economically underdeveloped provinces are insufficient and need further research and puts forward suggestions for future research.

## **Literature Review**

### **GSCM Practices**

GSCM was first proposed by Green et al. (1996) in the early 1990s, regarding the integration of environmental factors in supply chain management (SCM) and industrial procurement, which evolved from the traditional SCM (Zekhnini et al., 2022). SCM first appeared in the mid-1980s, and then due to environmental concerns, GSCM practices began to attract academic attention (Khan et al., 2023). As an environmental management strategy for the manufacturing industry, GSCM can effectively help enterprises achieve green transformation and high-quality development, attracting scholars and entrepreneurs' attention (Tseng et al., 2019).

In fact, the application fields of the GSCM concept are very broad, so it is difficult to establish a comprehensive framework. Previous literature has also confirmed this problem (as shown in Table 1), that is, there is no unified framework for GSCM practices. In the manufacturing industries around the world, most scholars mainly focus on five aspects of GSCM practices, namely ECO, IEM, GP, CC, and IR (Alghababsheh et al., 2022; Assumpção et al., 2022; Khan et al., 2023; Kirchoff et al., 2016; Micheli et al., 2020; Sahoo & Vijayvargy, 2021; Sharma et al., 2023; Vanalle et al., 2017). These five practices are still the most studied in the previous literature (Khan et al., 2023; Micheli et al., 2020).

The resource-based view (RBV) theory and natural resource-based view (NRBV) provide the necessary theoretical basis for organizations to adopt GSCM practices. Because the implementation of GSCM practices can bring competitive advantages to enterprises, it is in line with the core of RBV theory, that is, enterprises can gain competitive advantages by creating rare and irreplaceable capabilities. As an extension of the resource-based view (RBV) theory, NRBV believes that when companies can manage natural resources well and have the ability to respond to environmental changes, they will gain competitive advantages.

**Green Purchasing**

The concept of GSCM practices can be traced back to GP first, and then gradually extended to other dimensions (Khan et al., 2021). GP is considered an environmentally friendly procurement strategy that consciously reduces waste and recycles and recycles to achieve environmental goals (Khan et al., 2023; Khan & Qianli, 2017). Moreover, GP is also a procurement strategy that aims to choose the best suppliers, cut waste at the source by buying raw materials, and work cooperatively with suppliers on environmental issues (Assumpção et al., 2022).

**Internal Environmental Management**

IEM is an important part of GSCM practices, supported by middle and senior management (Jabbour & de Sousa Jabbour, 2016; Khan et al., 2021). IEM, as a green practice, has become the strategic plan of the enterprise (Narimissa et al., 2020). IEM is defined as a sustainable management approach consisting of a series of environmental policies, including internal policy formulation, environmental impact assessment, environmental target measurement, action plan, and responsibility formulation, and regular audits (Abdallah & Al-Ghwayeen, 2020). This is a practice within the organization to obtain the support of top management, and cross-functional cooperation for environmental system planning (Geng et al., 2017).

**Cooperation with Customers**

In the market competition environment, enterprises pay increasing attention to the needs of customers, and their environmental awareness is getting much stronger, so CC has gradually become another important practice of GSCM (Foo et al., 2018). CC refers to actively cooperating with customers on environmental issues based on the downstream of the supply chain (Fu et al., 2023; Yu et al., 2019). According to Assumpção et al. (2022), cooperation with customers to develop cleaner production processes, use green packaging to produce environmentally friendly products, and create a relationship of partnership with customers.

**Eco-design**

The ECO claims that consumption of material and energy use be minimized in the manufacture of products, that materials be reused, recycled, and recovered, and that the use of hazardous products be avoided or reduced (Sahoo & Vijayvargy, 2021). This is an active environmental management measure that requires the integration of green concepts into the initial stage of product design and restricts or prohibits the use of harmful or prohibited chemicals or materials (Foo et al., 2018). In addition, it needs internal cross-functional cooperation together with collaboration with supply chain partners (Abdallah & Al-Ghwayeen, 2020). This is because ECO that meets customer needs is more in line with stakeholder expectations and can effectively reduce resource waste (Assumpção et al., 2022).

**Investment Recovery**

IR refers to the recovery, redeployment, and resale of excess products, materials (including scrap), and capital equipment in a closed-loop supply chain (Liu et al., 2018). This kind of recovery activity can make full use of resources and create part of profits for enterprises (Sharma et al., 2023). Moreover, good cooperation with upstream and downstream supply chain partners can promote the implementation of IR (Kirchoff et al., 2016).

## Manufacturing Industry

As one of the contributors to environmental pollution, the manufacturing industry has caused great damage and harm to the environment (Wang & Yang, 2021). However, manufacturing activities have made significant contributions to the economic growth of various countries around the world, and are the pillar industries of national development (Abdul-Rashid et al., 2017). Therefore, the adoption of green measures for sustainable development has received wide attention in the manufacturing industry (Wang & Yang, 2021). Under the constraints of production standards and regulations, China's manufacturing industry began to seek green practices to achieve sustainable development (Khan et al., 2020).

## Research Methodology

A literature review is a commonly used analytical method for organizing and summarizing theoretical concepts and research status in the field of study. By systematically reviewing literature related to GSCM practices in manufacturing, this study mainly focuses on articles and conference papers published in English from the Scopus database, as it is the largest database for peer review indexed. The retrieved data is mainly carried out by keywords, such as "GSCM", "GSCM practices", "manufacturing", and "manufacture". Papers with these keywords in the title and abstract are sorted. Figure 1 shows the process of literature screening.

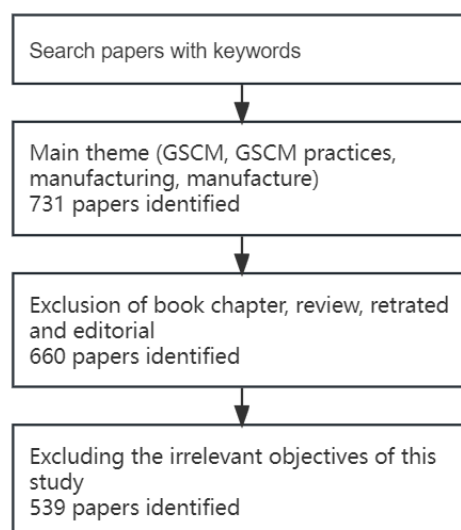


Figure 1. The Process of Literature Review Searching Criteria

## Results and Discussions

### Publication Trend

According to Figure 2, research on GSCM practices in the manufacturing industry shows that researchers' attention to GSCM practices has continued to rise between 2001 and 2020. Although the number of published documents has declined slightly in the past three years, the published works are still considerable. This indicates that future scholars can continue to conduct in-depth research on GSCM practices (Rizzi et al., 2023).

In addition, previous studies on the implementation of GSCM practices in China's manufacturing industry were mostly concentrated in economically developed coastal provinces (Xie et al., 2022; Yu et al., 2019). There is a paucity of studies on developing provinces in central China, such as Jiangxi province. However, previous research has shown

that the adoption of GSCM practices in the manufacturing industry can improve corporate performance, it is not certain about other resource capabilities that enhance the competitive advantage of manufacturing companies and improve company performance (Phuong et al., 2022).

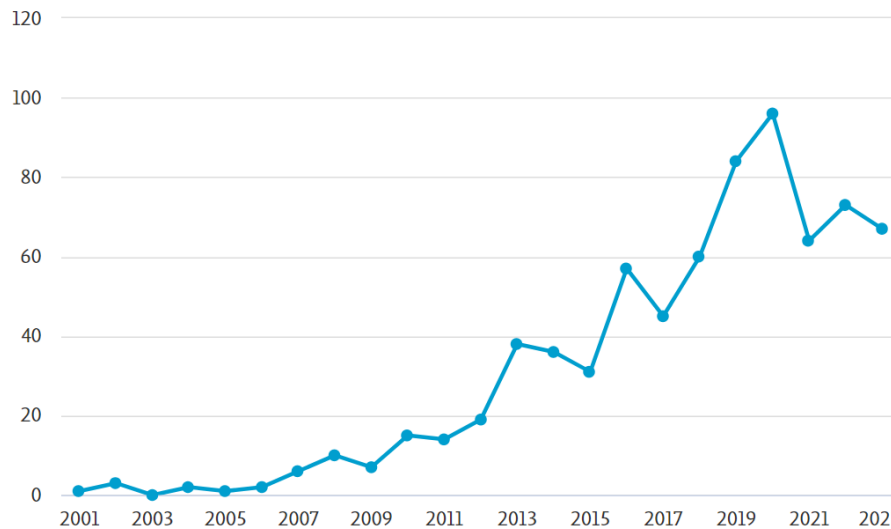


Figure 2. Number of Annual Publication in GSCM Practices in Manufacturing Industry

### Discussion on the Practices of GSCM

There is still no consensus on the taxonomy of GSCM practices in the previous literature (Assumpção et al., 2022). As shown in Table 1, 12 papers among the selected articles adopted a one-dimensional framework to study GSCM practices as a whole. For example, since the implementation of GSCM practices requires the participation of knowledge, it is difficult to achieve when the search and generation of knowledge and their relationship are studied (Zhang et al., 2023). In addition, it can be seen from Table 1 that the five dimensions, namely, GP, ECO, IEM, CC, and IR are the most frequently applied dimensions in the GSCM practice literature. This is because that these five dimensions include both internal and external practices of GSCM (Micheli et al., 2020).



According to Silva et al (2019), GSCM is a broad strategy for managing supply chains to protect the environment and minimize the effects of environmental degradation. Because by improving the level of GSCM practice, enterprises can achieve green innovation and further achieve sustainable development of enterprises (Suki et al., 2022). Moreover, under the influence of GSCM practices, total quality management activities can be better implemented in order to provide consumers with high-quality eco-friendly products and services (Zaid & Sleimi, 2021). However, the implementation of GSCM practices does not have a significant effect on the economic development of enterprises (Naseer et al., 2023). Under the regulation of external pressure, their relationship improved (Hashmi & Akram, 2021).

Moreover, previous studies on GSCM practices in China's manufacturing industry have mostly focused on a few of these five dimensions, and few have studied these five dimensions together. Obviously, there is not enough research on China's manufacturing industry adopting GSCM practices to achieve green development. Furthermore, research on GSCM practices for China's manufacturing sector is also insufficient. Hence, this study investigates the manufacturing industry in Jiangxi Province, China, aiming at the effect of GSCM practices on the manufacturing industry.

### **Conclusions**

This study's objective is to conduct a comprehensive review of the literature to understand the application of GSCM practices in the manufacturing industry. GSCM practices as a set of green environmental protection strategies, in the competitive environment of economic globalization, can make the manufacturing industry reduce polluting waste and respond to the green supply chain initiative. Furthermore, GSCM has been widely discussed in research and adopted in practice (Feng et al., 2022). However, the relationship between GSCM practice and performance should still be explored in order to obtain more comprehensive results (Birasnav et al., 2022). Moreover, for research in China, GSCM practices generally target some dimensions of GP, ECO, CC, and IEM. Therefore, this study measures the possibility of application of GSCM practices in China's manufacturing industry. Future studies could consider other factors, such as top management support, organizational culture, and green knowledge, to explore the influence of GSCM practices in the manufacturing industry.

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