



## **Impact of Green Supply Chain Management (GSCM) Practices on Organizational Performance: Review of Global Practice**

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## **ABSTRACT**

The articles were retrieved from Mendeley and 37 peer-reviewed articles were analyzed by applying the PRISMA 2020 screening protocol from 2014 to 2023. The practical question put forward in this review is what impact does GSCM have on the organizations which embrace it and whether the impact is similar across different sectors and settings? To this end, the study documents the drivers of GSCM uptake and advocates the use of a coherent analytical framework when evaluating the drivers and their impacts, ultimately to encourage the use of GSCM as a means of sustainable performance improvements. Two conditions have repeatedly arisen with regard to knowledge: the need for firms to develop relevant knowledge, and the need for the firms to actually put that knowledge into action. Findings based on the literature review demonstrate that companies with established knowledge bases are more responsive to regulatory signals, proactive in predicting market changes and adapting to consumer preferences, which is reflected in their capability to innovate and improve their products continuously. In multiple studies, a firm's self-assessment of its green capabilities seems to mediate the resulting knowledge effects, and how knowledge is applied determines the strength of the resulting confidence leading to GSCM commitment. The message that emerges from the literature reviewed is that GSCM works, and there is a need for more organizations to be using it. While there are challenges, especially in the developing world like Nepal, the evidence gathered here is always consistent that adopting GSCM is associated with better sustainability results. The review also highlights the lack of empirical coverage across the regions, which indicates the importance of expanding the spatial scope of future-oriented research. The insights provide a practical baseline for an organization considering entering GSCM in order to help them raise their sustainability performance and tackle the complexities of increasingly complex global supply chains.

**Keywords:** GSCM, Impact, Organizational performance, Sustainable

## **1. INTRODUCTION**

The recent technological evolution has transformed the manufacturing landscape, and industries are increasingly relying on technology to produce products on a large scale. Capacity has increased and so have the environmental consequences of it. The physical impacts of global warming are now evident and it has taken centre stage in public and scientific discourse (Sharma & Gandhi, 2016). On top of that, world's ecological systems are stressed by the increasing rate of resource exploitation along with pervasive pollution and biodiversity loss (Çankaya & Sezen, 2019). The days of unrestricted access to the territory for raw material extraction, of vast consumption of fossil fuels, and of dumping waste where it is cheapest are no longer viable in the light of climate change. Some of the solutions that have been found are electric vehicles, rooftop solar panels, and biogas



plants, all of which aim to continue commercial production while having a smaller ecological footprint (Khanal et al., 2023). As part of this, companies have focused on a field called the GSCM which expands scope of SCM by integrating sustainability into company operations (Walker et al., 2014).

GSCM includes Environmental Responsibility as one of the Key Considerations of the Supply Chain at all the stages ranging from input sourcing, input processing, product distribution through to product disposal. The goal is to minimise ecological impact and resource consumption, and enhance the efficiency of the operation, while establishing the bases of sustainable operation over time. In the manufacturing sector, sustainability in supply chains has been associated with the long-term value of the company (Ananda et al., 2018).

In a wider context, GSCM brings together the ethical, environmental & social elements of supply chain governance into a single management philosophy (Rostamzadeh et al., 2015; Laari et al., 2016). GSCM has become a mainstream strategic issue in firms' operations, rather than a mere compliance activity, as it is now a major consideration for firms seeking to secure regulatory approval, consumer confidence, profit growth and sustainable market position (Enyinda, 2018). These practical incentives are palpable and many managers are now actively promoting eco-friendly process redesign in their own organisations (Kim et al., 2022).

GSCM has also been analyzed in conjunction with “enterprise resource planning” (ERP) systems with the aim of gaining insight into the combined impact of these two on sustainability. Rizki et al. (2022) showed that both constructs have a significant influence on the sustainability outcomes, proven from 507 Indonesian manufacturers who they had used data from. The link between GSCM and sustainability got further strengthened when environmental conscious was added as a moderating variable. What makes their overlap so strong is the combination of environmental awareness, GSCM and ERP that accounts for 0.903 of the variances in sustainability performance.

With increasing environmental deterioration and growing international climate commitments, Nepal has now taken a much more serious look at sustainability. Notwithstanding this recognition, GSCM adoption is limited due to resource shortages, inadequate infrastructure, and lack of access to technologies. All these are further complicated by budget constraints and a limited supply of specialist knowledge. After analyzing the literature, it was found that there was very limited research in Nepal specifically on GSCM. The literature review found that there is very little GSCM specific research that came from Nepal, which is also worthy of attention.

## **2. RESEARCH QUESTION**



The research questions are:

1. What is the GSCM implementation practice in industrial sectors?
2. How GSCM practices does impact on organizational performance?

### 3. OBJECTIVE OF STUDY

This study sets out to synthesize the published literature on the relationship between GSCM practices & organizational performance. It focuses on what the evidence reveals about how those practices shape, and are shaped by, the performance trajectory of adopting organizations.

### 4. METHODOLOGY

The GSCM implementation practices & their performance impacts are explored. The methodology used was systematic literature review, which used journals published during 10 years (2014-2023) in Google Scholar, PubMed and Scopus databases. Search was carried out using Mendeley interface (<https://www.mendeley.com/search/>). The keywords used were ‘GSCM’ & ‘organizational performance’ and their combination, which led to an extensive number of relevant peer-reviewed journal articles. The first literature search resulted in 643 articles over 10 years:

**Table 1**

*Distribution of Initial Search Results by Publication Year (2014 to 2023)*

| Year                      | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Total |
|---------------------------|------|------|------|------|------|------|------|------|------|------|-------|
| No. of published articles | 18   | 25   | 32   | 88   | 41   | 148  | 177  | 43   | 45   | 26   | 643   |
| %                         | 2.8  | 3.9  | 5.0  | 13.7 | 6.4  | 23.0 | 27.5 | 6.7  | 7.0  | 4.0  | 100.0 |

These above mentioned numbers of articles were gradually screened and reduced based on the screening process having with inclusion and exclusion criteria (see Figure 1).

#### 4.1 PRISMA 2020 flow diagram

This study is methodologically supported by the PRISMA. The Figure 1 illustrates exactly the way the article pool decreased from initial search through to final inclusion, how many records were present at the start, how many were excluded at each filter and why the remaining records were included or excluded. The four stages work as follows.

**Identification:** The online databases were searched using three terms: ‘Sustainable performance’, ‘organizational performance’, and ‘GSCM’, for journal articles published from 2014 to 2023.

**Screening:** Titles and abstracts were judged to determine topical relevance. Each abstract had to include a well defined research goal, method of analysis, research results, and a concluding

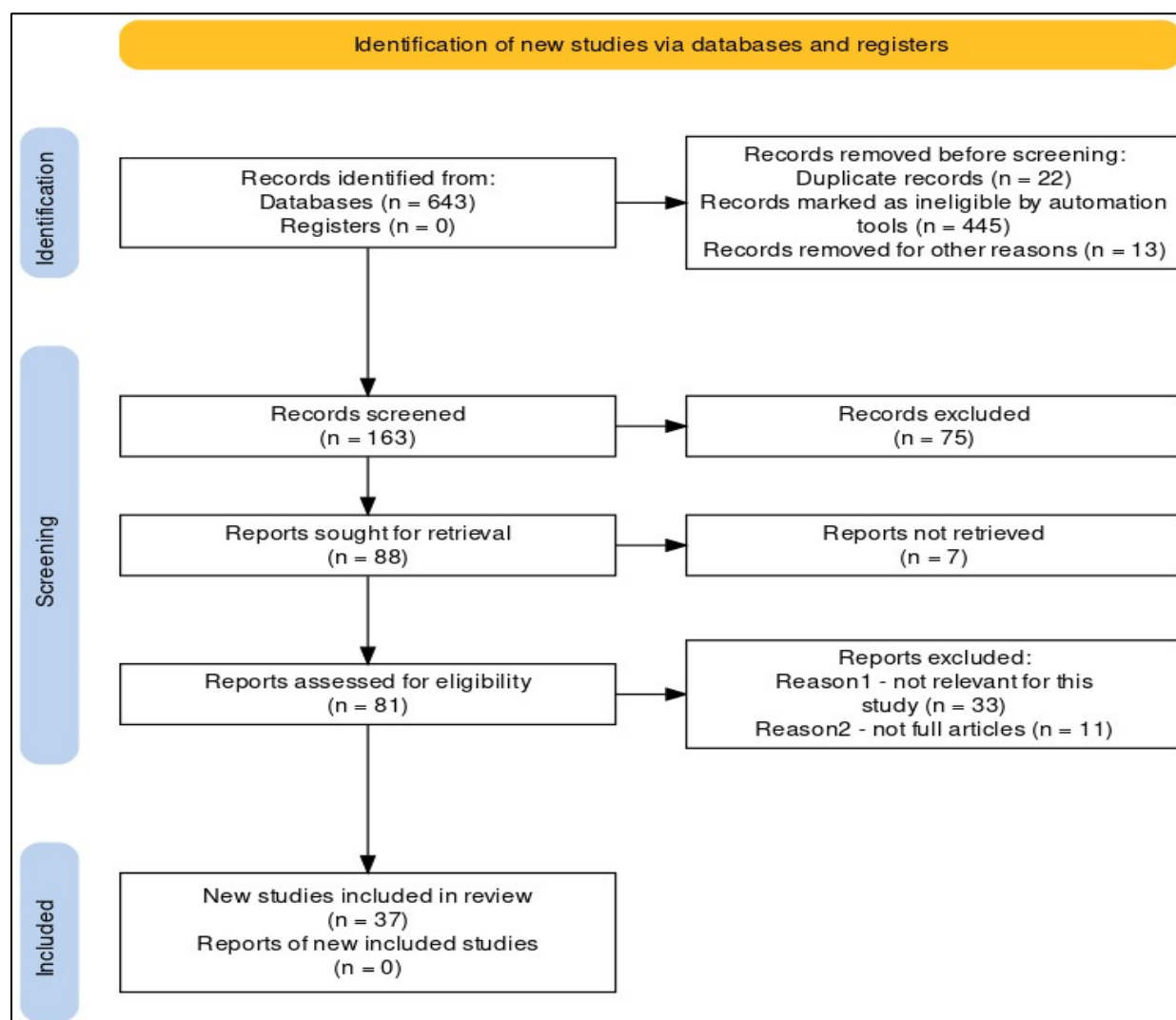


statement that directly related to research in the context of GSCM and its organizational implications.

**Eligibility:** Full-text eligibility criteria were four: (i) the complete article must be accessible and readable via Mendeley; (ii) publication year must be between 2014 and 2023; (iii) the article must be relevant to the Nepalese context; and (iv) the article must discuss the implementation of the GSCM and its association with organizational performance or measurable sustainability outcomes.

**Included:** Included thirty-seven articles that satisfied all four requirements.

**Excluded:** Others were excluded because of topical irrelevancy, methodological weakness or inability to obtain the complete text.



Source: Haddaway, et al. (2022)

Figure 1: PRISMA 2020 pipeline

The final corpus for review after the entire PRISMA process was 37 studies, both theoretical and empirical.

## 4.2 Quality assurance

The review follows the PRISMA framework and a rigorous and transparent selection process is applied in the entire process. The study first recorded its criteria prior to any searching. All retrieved articles were then tested against them – no exceptions! The 643 retrieved articles are broken down year by year alongside the PRISMA diagram helpful for visualizing where scholarly output exploded and where it remained thin. Readings of the articles after all filters were applied



were done in two ways: firstly, to construct the conceptual picture of what GSCM is and where the theory position is; and secondly, to evaluate what the real evidence reveals as regards the impacts on the performance.

#### **4.3 Data analysis and presentation**

The findings from this literature review are synthesized in a narrative manner as it is not a primary study and therefore cannot be pooled statistically. Selection procedures are announced by using the PRISMA flow diagram and the substantive findings are classified into three thematic headings namely: implementation of GSCM in global practice, GSCM in Nepalese industries, and performance consequences of GSCM adoption. Themes were developed by reading closely previous work, by recognizing patterns from across the studies and by cross-referencing where arguments overlaid each other. The paper ends with a summary of the pooled results of all 37 articles.

### **5. FINDINGS FROM SYSTEMATIC LITERATURE REVIEW**

#### **5.1 Implementation of GSCM in global practice**

Twenty years ago “green and sustainable logistics” (G&SL) was a peripheral concept in the thinking of supply chains. It has been shifted to the centre since the times of expansion of trade and increased industrialization. In the last 20 years, there has been a lot of policy discussion and academic research in the area, primarily because of the desire to lower transportation-related externalities and boost supply chain efficiency overall (Ren et al., 2019). The need to reduce emissions of carbon is the most pressing. The key to reducing procurement and distribution is having them working in tandem. To trace the development of ‘low-carbon supply chain’ (LCSC) research, Du and Zhou (2022) studied 754 articles published in the period between 2012 and 2021. It reveals that LCSC growth has been rapid, with China and the United Kingdom as the major output sources and that specialist journals continue to be a major source of output. There has been special interest in Carbon-neutral LCSC in this literature. Overall, the evidence suggests a maturing field, reflecting and partly contributing to the rapidization of globalization & industrialization. The research focus is now on whole-chain coordination, and the shift to LCSC and CLCSC configurations.

There is a need for knowledge before a firm can be serious in its practice of GSCM. Firms that grasp their regulatory environment, read the market cues early, and know what their customer actually want, are better equipped to act and in turn have a capacity to influence innovation and product improvement based on their understanding of the changing values, regulatory requirements, and signals from the market. Based on knowledge theory, Zhang et al. (2023) conducted a survey of 264 enterprises across eight industries in the central region of China. Their





findings showed that knowledge generation and knowledge seeking positively influence the adoption of GSCM, with green self-efficacy acting as a mediator and knowledge application acting as a moderator. Abbas and Tong (2023) addressed the same issue from a different perspective, under a different lens for coordinating the supply chain, and using a different term: “voice” of the SCM as mechanism for directing financial, information and material flows through dispersed organizational structures. This study showed that introducing GSCM into such structures resulted in some competitive advantages for Chinese automotive manufacturers, which is consistent with the general trend of increasing the attention on environment-related business strategy.

The GDBP-IE model was developed and empirically tested by Li et al. (2020a), it asserts that both internal and external factors impact green behavior, which in turn has an impact on industrial firms' performance in a number of ways. The PLS-SEM analysis for 615 industrial firms revealed that corporate tangible assets, regulations & policies, market factors, institutional environment all had a beneficial impact on green development behavior, as evaluated by GSCM and clean manufacturing practices. The most powerful individual predictor was intangible corporate resources, with a smaller contribution coming from the institutional environment. Whatever the size of the difference, green development behavior always resulted in better economic, social, and environmental performance. The study also broadened scope of GDBP-IE validation to identify opportunities for cross-national replication and provided concrete policy and enterprise recommendations.

Based on the cross-country and cross-period pooling of data from 33 empirical studies conducted in 10 countries and regions, Li et al. (2022) quantitatively analyzed the relative weights of the factors influencing the behavior of enterprise green development. All of their determinants turned out to be positive, but the magnitude of the effects was not consistent: tangible assets had the smallest, intangible assets the largest, and market conditions and the policy and institutional context were consistently of medium size. The pooled data also showed that a firm's size, its location and industry classification moderated the strength of these relationships. The authors combined these patterns to create a four-stakeholder engagement model that involves society, the firm, the market and government, and that is designed to ground sector-specific research on the “why” and “how” of organizational involvement in green development.

The applications of GSCM are wide and can encompass energy and water usage, waste minimization, renewable materials sourcing and supplier and customer environmental auditing. Once established, companies frequently report cost savings, better value chain relationships, and better employee satisfaction. The stakes and the challenges are seen in India's leather industry, one that has a long legacy of pollution, and which is long overdue for moving to a greener paradigm.





Kumar and Rao (2023) used Interpretive Structural Modeling (ISM) to identify the hierarchical relationships between the behavioral elements that drive GSCM adoption in this industry. The framework identifies a separation between drivers and barriers, providing a meaningful structure for practitioners and policy makers to make decisions on where to intervene first.

Guo et al. (2020) conducted a five-year qualitative case study on green procurement in seven hospitals in Ghana that are affiliated with the mining sector. An asymmetry emerged from interviews with procurement and supply chain staff: changes in actual purchasing behavior was more about the extent to which staff was able to "live" the policy in their everyday decisions rather than about awareness of the policy. To know the rules, that is, was less influential than to do them.

Today's supply chain managers have to contend with the conflicting demands of the market, volatile markets, operational disruptions caused by the pandemic and a growing environmental responsibility, while simultaneously making timely decisions that traditional forecasting methods were never meant to assist. Ayyildiz (2023) filled this research gap by incorporating the SCOR model into a multi-level performance hierarchy tailored to GSC resilience performance attributes. The study identified organizational factors that are most relevant to resilience using a combined methodology of the Interval Valued Intuitionistic Fuzzy Analytic Hierarchy Process and the Best Worst Method, and emphasized that these integrated systems are essential to building robust supply chains.

However, the story in developing economies is quite different; it is worthwhile to consider it separately. In emerging market contexts, Dhillon et al. (2023) integrated the disjointed evidence concerning FGSCM and mapped it by using structured review approach combined with the text mining and network analytical techniques developed on the basis of institutional and contingency theories. Their general conclusion was that the literature on FGSCM in these economies is far behind the literature in the rest of the world, perhaps in part due to the salient institutional difficulties that emerging-market firms face. The study identified these contextual pressures in terms of a series of practical strategies and an agenda for further research.

## **5.2 Implementation of GSCM in Nepalese industrial sectors**

In Nepal, Pandey and Jjirojhul (2023) used the PRISMA guided systematic review approach on 31 articles published in Scopus, PubMed and Google Scholar from 2010 to 2022. They were interested in the extent of the spread of GSCM strategies in Nepal's garment industry and the impact these have created. The review identified five recurrent strategies: end-of-life recovery, eco-design, clean production, green sourcing, and green logistics. All of these strategies had a positive impact on sustainability. Environmentally, the reviewed studies observed reductions in



pollutant emissions, waste reduction and improved natural resource conservation. The benefits were also realized in terms of the organization: leaner supply chains, better public image and better staff wellbeing were all cited as benefits. The review was also honest about the ongoing challenges faced by garment factories in Nepal for implementation and urged for further studies.

To gauge the practice of GSCM, Parajuli et al. (2022) surveyed 217 manufacturing enterprises (MEs) in the industrial zones of Balaju, Bhaktapur and Patan in Kathmandu Valley. Their data revealed a clear spread where one-third of firms (33.3%) showed strong GSCM practices, 23.7% showed moderate practices and 19.6% showed weak practices. The fact that only two comprehensive studies mapping these practices were identified in the Nepalese context clearly indicates a significant research gap and calls for further investigation into GSCM development in Nepal.

### **5.3 Impact of GSCM on organizational performance**

From an operational perspective, GSCM extends beyond product design, procurement, manufacturing, distribution & end-of-life recovery to minimizing environmental impacts across all these phases, including energy usage (Tippayawong et al., 2016). Much of the environmental impact will be determined by green procurement: If a company selects suppliers and partners based on their environmental performance, it can help to reduce emissions before they are produced. The research of Zhou et al. (2023) on green procurement of household appliances demonstrated that not only can the emission be reduced at the source, but green procurement can also enhance the competitiveness of products. Their analysis revealed that external pressures, such as regulatory requirements, corporate strategy, and consumer environmental awareness are more important to the behavior of manufacturers than are internal factors. Three macro-level drivers were identified: governmental fiscal policy, individual environmental awareness, and firm green strategic orientation. This would indicate that policy design that is well-targeted could make a significant contribution in accelerating green procurement uptake if diagnostic tools of purchasing behaviour are clearer.

Dzikriansyah et al. (2023) have investigated the relationship between the adoption of GSCM and the environmental performance of 89 owners and managers of SMEs in Indonesia. The  $R^2$  value of the government regulation, internal EM and strategic orientation for GSCM practices was reported as 61.5%. The explanatory power of the model went even higher when the dependent variable was the environmental performance: all the predictors and the GSCM together accounted for 91.3% of the variance. Practitioners are thus encouraged to embrace GSCM, and witness the benefits of improvements in their environmental performance.



Hejazi et al. (2023) used Saudi Arabian context using 250 survey responses through a “partial least squares” (PLS) analysis to determine the implications of green practice adoption on sustainability performance. A statistically significant positive relationship was found that substantiates the idea that companies which engage in green practices produce better sustainability outcomes.

In two separate research projects, the effect of GSCM on EMS and competitive positioning in the unique situation of the COVID-19 crisis was examined. Based on the 283 surveys and structural equation modelling, Zhang et al. (2022) verified the positive link between GSCM and market competitiveness as well as EMS robustness. These positive relationships were further boosted by the “big data analytics and AI” (BDA-AI) level of firms and their environmental visibility. Das et al. (2023) conducted a similar study using 330 Chinese participants and found similar results to GSCM for the supplementary moderation of EMS and supporting competitive position, and for BDA-AI and environmental visibility as amplifying factors. So both studies conclude: when green practices are coupled with analytical tools and environmental reporting in good faith, competitive strength remains when things get tough.

Al-khawaldah et al. (2022) conducted a survey of 181 participants in 46 leading industrial enterprises located in Jordan to check the relationship between green purchasing, green manufacturing and the competitive advantage, and the mediating role played by organizational ambidexterity. The statistical results showed that all the three GSCM dimensions were found to be statistically significant in affecting competitive advantage. In contrast, green purchasing did not influence organizational ambidexterity, while green manufacturing and green marketing did. The investigation presented ambidexterity as an intervening mechanism in the relationship between green manufacturing and green marketing with their competitive effects, but as a mediator mechanism in the affecting GSCM hypothesized in general.

Habib et al. (2021) explored the relationship between entrepreneurial orientation, market orientation, knowledge management orientation, and adoption of GSCM by the textile manufacturers in Bangladesh. The results of the path coefficient estimates revealed that GEO had a direct positive effect on market orientation and GSCM practices, and knowledge management orientation. The pathway of market orientation had a positive impact on GSCM in turn and the pathway of path of knowledge management orientation was not significant. GSCM itself was positively associated with economic performance and environmental performance. The entrepreneurial and market orientations of firms are correlated with their approach to GSCM and are positively correlated with the financial and environmental benefits.



In another study, Li et al. (2020) polled construction industry personnel to investigate the impact of GSCM on environmental and cost factors in project settings. Positive associations between GSCM and environmental performance were confirmed, indicating that green practices can help reduce on-site ecological consequences. However, no significant association was found between GSCM and project-cost performance, indicating that financial benefits of “going green” in construction might be realized over a longer time span rather than on the spot.

To complete the empirical evidence, Vijayvargy et al., (2017), asked whether the size of the firms influences the moderation of GSCM adoption and its performance effects in the Indian industry. Questionnaire responses from 161 firms indicated that the majority of the environmental practices are in satisfactory levels with the only significant exceptions being tier-II supplier evaluation & supplier ISO 14001 certification. Medium-sized and large companies monitored each other closely in most GSCM aspects. More importantly, effect of GSCM on standard operations was found similar for both small and large enterprises, suggesting that GSCM is not limited to large enterprises.

## **6. CONCLUSION AND RECOMMENDATION**

The pattern is clear from the 37 studies explored, which were conducted in a variety of countries between 2014 and 2023, including the UK, USA, China, India, Ghana, Jordan, Qatar, Indonesia, Saudi Arabia, Bangladesh, and Nepal. These studies collectively present GSCM as a comprehensive collection of environmental policies that range from initial design stages to product reclamation and aim to reduce resource consumption and minimize ecological damage. Green procurement is also one of the highest leverage elements: it can reduce emissions at source and enhance the competitiveness of products and services, while the regulatory instruments and consumer awareness of environmental issues are the most influential external drivers of green procurement uptake. The firm’s level of aggressive green development of the firm is determined by the tangible and intangible resources possessed by the firm, competitive environment, and policy climate.

As a whole, the evidence is compelling that GSCM is a win on both the environmental and the economic fronts. The results of the studies conducted by the Indonesian and Saudi Arabian, showed that there have been measurable environmental benefits after the implementation of GSCM. While construction is ongoing, artifacts and reports from the construction industry in Qatar have spoken for the improvement of the environment; data from India indicate that benefits from operational performance are found, irrespective of the size of the enterprise involved. Research during the COVID-19 era further strengthened this argument as GSCM continued to reinforce environmental management systems and competitiveness, while analytical tools, artificial



intelligence and easy-to-visualize environmental reports enhanced efforts. A second piece of evidence, collected from the Bangladeshi textile industry, shows that entrepreneurial and market orientations are important factors that contribute to the adoption of GSCM and sustainable performance of the firms in economic and environmental terms. The common finding here is that GSCM is a credible and well-documented method for organizations to achieve environmental benefits and enhanced organizational effectiveness, regardless of the country or sector.

In Nepal, there are some preliminary yet significant evidence base such as Pandey and Jjirajhul (2023) garment sector study and Parajuli et al. (2022) manufacturing survey. The two studies taken together demonstrate that GSCM strategies are delivering tangible sustainability benefits, as well as making a company's supply chain more efficient and improving the company's image. The two studies are honest about the hurdles that must be overcome before this can be completely realized, indicating Nepal needs to continue the investment in research and specific practical measures to transform GSCM to realize its full potential in the country's industrial sector.

The present review has three contributions. The first method is to assess the rate of GSCM adoption and its impacts on small, medium, and large companies to determine where each type of company is on the GSCM adoption maturity curve. Second, it identifies the specific areas in which the industrial sectors are lacking and needs GSCM intervention, and suggests the concrete works to be done to fill the gaps. Thirdly, it strengthens the argument for supply chains to be both green and resilient, systems that will withstand environmental and market shocks whilst maintaining operational performance. Combined, these observations provide both evaluators of GSCM investment and researchers interested in filling the remaining empirical voids with a structured starting point.

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