Chapter 1
A Conceptual Framework of Green Supply Chain Management: Influential Factors, Green Practices, and Performance

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Abstract The green supply chain management (GSCM) approach has emerged as a response to pressures derived from global interest in environmental protection and sustainability, in order to satisfy the present generation's needs without overlooking those of future generations. Organizations must, consequently, identify those factors that influence GSCM adoption to achieve sustainable performance. Despite the increase in the number of studies that have examined the various factors that influence GSCM adoption, there is not a clear, defined classification thereof. In addition, notwithstanding the importance of GSCM as a means for sustainability achievement, these factors have been established as separate branches. In order to address this gap, the aim of the present chapter is to propose a conceptual framework that integrates those factors that influence GSCM adoption, GSCM practices, and sustainable performance. The framework includes a classification of influential factors, GSCM practices, and vital measures that would enable sustainable performance to support effective GSCM implementation.

Keywords GSCM · Influential factors · Green practices · Performance · Sustainability

1.1 Introduction

A major source of ecosystemic imbalance has been attributed to manufacturing operations (Olugu et al. 2011; Mumtaz et al. 2018), which constitute a threat to human, animal, and plant health and life, as well as to future generations (Savita et al. 2012).

As such, increased pressure has been exerted upon manufacturers, as polluters and resource consumers (Manimaran et al. 2018). Undoubtedly, the impact of manufacturing organizations on the environment is a growing concern, which has led to demands for sustainable practices that fulfill environmental, economic, and social

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needs alike (Zaid et al. 2018). Manufacturing companies are thus now obliged to make more concerted efforts to balance their economic growth with environmental and social concerns (Choudhary and Sangwan 2019b).

These pressures, which initially targeted focal firms, later expanded to the supply chain (Seuring and Müller 2008; Tuni et al. 2018). The World Resource Institute (2009) has concluded that companies apart from focal firms are responsible for up to 80% of overall supply chain emissions. The need to incorporate a green dimension into supply chain management (SCM), from which the green supply chain management (GSCM) concept emerged, has arisen (Saeed et al. 2018).

Carter and Rogers (2008) and Hong et al. (2019) define GSCM as the strategic, transparent, and systematic integration of key interorganizational business processes, throughout the supply chain, for the achievement of both company and supply chain social, environmental, and economic goals. In accordance with Diabat et al. (2013) and Saeed et al. (2018), GSCM may be performed through a set of green practices (GP) which ranges from idea generation to green manufacturing (Mafini and Loury-Okoumba 2018), green distribution (Vachon and Klassen 2006; Saeed et al. 2018), and reverse logistics (Diabat et al. 2013; Rao and Holt 2005; Srivastava 2007).

On the other hand, sustainability has become a dominant trend in both human society and economic development (Yongge et al. 2009). The three principal pillars of sustainable development are as follows: the economy, society, and environment (Yildiz Çankaya and Sezen 2019). In addition, Seuring and Müller (2008), and Zaid et al. (2018) all affirm that, to measure progress toward being truly sustainable, the triple bottom line (TBL) (Elkington 1998), which provides a practical framework for sustainability, based on the measurement of business performance and the success of an organization using economic, social, and environmental pillars, may be employed (Pinto et al. 2018).

GSCM has emerged as a feasible, logical management framework that permits balance between ecological, financial, and social benefits in an enterprise facing competitive, regulatory, and societal pressures (Zhu et al. 2005; Bon et al. 2018; Chin et al. 2015). According to Muduli and Barve (2013), GSCM can lead to cost savings, in terms of reductions in material and energy usage, regulatory fines, waste disposal expenses, and costly environmental accidents, thus increasing profitability. Moreover GSCM enables challenges regarding worker and community safety, associated with accidents and occupational health hazards to be addressed, thus improving the social dimension of sustainable development (Eltayeb et al. 2011).

However, despite the increase in the number of studies that have examined different factors that influence GSCM adoption, there is no clear, defined classification for them (Ali et al. 2017; Choudhary and Sangwan 2019a, b; Yildiz Çankaya and Sezen 2019). Additionally, notwithstanding the importance attributed by scholars and practitioners of the positive effect of GSCM on sustainability, these factors have been established as separate branches (Gong et al. 2019; Tseng et al. 2019). As such, several authors have highlighted the importance for managers and practitioners to understand the driving forces in GSCM practice implementation and its subsequent effect on performance (Ahmed et al. 2019; Sharma and Gandhi 2016; Reddy Maditati et al. 2018).

In this regard, Björklund et al. (2012), Vachon and Klassen (2008), Govindan et al. (2015), and Tseng et al. (2019) add that a significant number of influential papers in the GSCM literature lack sound theoretical support, when it comes to the assessment of the relationship between drivers, practices, and performance. In addition, several authors have mentioned the lack of holistic framework available to represent organizations' practical roadmaps to environmental activities and sustainable performance measurement (Laosirihongthong et al. 2013; Dubey et al. 2017; Yildiz Çankaya and Sezen 2019), as many existing studies consider isolated factors (Laosirihongthong et al. 2013; Sharma et al. 2015; Al-Sheyadi et al. 2019). Therefore, the design of an appropriate framework, that includes the main external factors that influence GSCM, as well as main GSCM practices and performance measurement, provides vital support in strategy development, decision making, and performance improvement (Dey and Cheffi 2013).

Based on the above, the present study aims to answer two primary research questions:

RQ1 What are the key topics (influential factors, green practices, and performance measures) and trends related to GSCM?

RQ2 Is it possible to propose a comprehensive framework for GSCM and its related factors?

In an attempt to answer these questions, this study included a systematic literature review. It will thus be able to address the longstanding dissatisfaction of previous researchers. To this end, the remainder of this paper is organized as follows: In the following section, the research methodology and bibliometric analysis are presented. Section 1.3 discusses the proposed conceptual framework, and finally, the most relevant conclusions and future research lines are presented in Sect. 1.4.

1.2 Research Methodology

A three-stage systematic literature review process occurred in the present study. In Stage 1, two databases were selected for article obtention: Scopus, the largest peer-reviewed journal database in the management and engineering fields (Ahi and Searcy 2013), and ISI Web of Science, which focuses specifically on management (Taticchi et al. 2013). The keywords used for data collection included "GSCM" or "GREEN SUPPLY CHAIN MANAGEMENT" or "GREEN SUPPLY CHAIN" and "PERFORMANCE". Using the "title, abstract, keywords" search in the Scopus and Web of Science databases, journal articles were collected and stored (conference papers, books, and book chapters excluded) for the defined search terms. The initial search attempts resulted in a total of 1,239 articles.

Considering the objective of the present contribution, in Stage 2, titles and abstracts were analyzed, so as to establish the papers' suitability. Peer-reviewed publications addressing topics directly related to GSCM and performance were included in the sample. Gray literature (company/industry reports, market reports, editorials,

and news) and those addressing topics in sectors unrelated to manufacturing were excluded. Further, duplicates found in Scopus and ISI Web of Science were removed. As a result, 376 papers were selected. In Stage 3, all selected papers were analyzed, and those with alternate scopes were removed. Finally, 354 relevant papers were identified to aid in responding to the research questions.

1.2.1 Bibliometric Analysis: GSCM Trends

The third stage of the review procedure was paper classification. The content of said documents was further assessed by means of descriptive analysis. Three main questions were addressed in said section as follows: (1) How are the publications distributed throughout time periods, journals, geographic regions, and influential authors? (2) What are the study trends in GSCM and sustainable performance fields? (3) What are the factors studied regarding the relationship between GSCM and sustainability?

1.2.1.1 Distribution Throughout Time

Paper temporal distribution, as included in the analysis, is depicted in Fig. 1.1. The initiation of the GSCM debate was traced to the 1990s (Seuring and Müller 2008; Srivastava 2007). Thus, it came as no surprise that the oldest paper in the search dated back to 1995 (Hart 1995) and that steady growth ensued until 2010. From 2010, it was clear from Fig. 1.1 that there has been exponential growth, up to the present day. Moreover, the trend line also indicated a pattern increase, which implies that the GSCM literature is still increasing, with its peak publication number reached in 2018, at 63 papers. This indicates increasing concern for and interest in the GSCM topic.

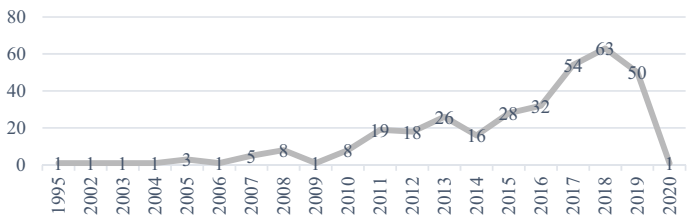

Fig. 1.1 Publications distribution over time

Table 1.1 Journal publication distribution

Journal	Publications
Journal of Cleaner Production	35
Resources, Conservation and Recycling	13
Benchmarking: An International Journal	12
International Journal of Production Economics	11
International Journal of Supply Chain Management	11
International Journal of Production Research	9
Sustainability (Switzerland)	9
International Journal of Operations and Production Management	8
Supply Chain Management	8
Business Strategy and the Environment	7

1.2.1.2 Publication by Journal

Table 1.1 shows the publication distribution among the top 10 journals that published most often regarding GSCM and sustainable performance. It should be noted that the top 20 journals published 173 out of 314 articles, accounting for nearly 56% of all articles yielded. The remaining 44% had published three papers or fewer. Also, the Journal of Cleaner Production published the highest number of papers (35), which constitutes approximately 11% of the total (314 papers). Said journal also has the second highest impact factor (6.395). Resources, Conservation and Recycling Journal was the second most popular journal, with 13 papers published (4.14%); however, it also had the highest impact factor (7.044). Therefore, it may be stated that, although Journal of Cleaner Production is ranked as number one, due to its popularity, the Resources, Conservation and Recycling Journal may be ranked number one, due to its impact. Finally, 79 journals appear only once in the sample, showing the multidisciplinary nature of the field: These journals encompass various disciplines, including mathematics, energy, earth and the environment, science, and computer science.

1.2.1.3 Publications by Geographic Region

Figure 1.2 shows the contribution of each region to the green supply chain management literature. It may be observed that Asia, Europe, and South America are the regions with the highest number of contributions. Note that countries with large numbers of publications include China, India, and Brazil. Compared to other countries in Asia, China accounts for the greatest number of publications (45), representing 16% of the total. It is important to mention that in South America, only Brazilian and Colombian researchers have made contributions to the GSCM approach.

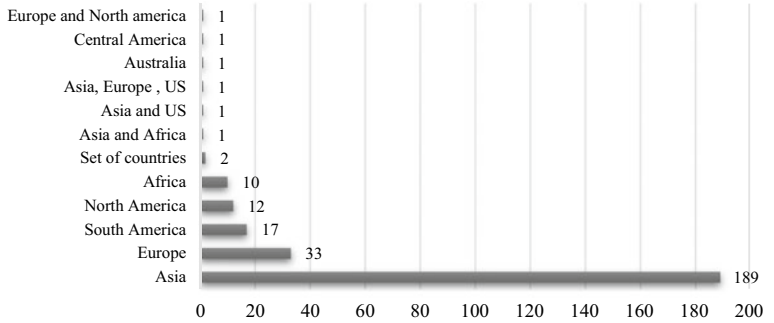

Fig. 1.2 Contributions by region

1.2.1.4 Influential Authors

To a certain extent, the devoted efforts of a researcher may be reflected by their number of publications. Similarly, the extent to which a researcher's publications have been cited by other studies can also represent their influence (Zhu and Wang 2018). The ratio of citations/publications shows the average influence or popularity of each article published. As Table 1.2 shows, in terms of the number of publications, Joseph Sarkis, who published 18 papers on this topic, comes first, followed by Zhu, Q. H. and Tseng, M.-L. From the perspective of citation frequency, Sarkis, J., who has been cited 6468 times, remained the most influential researcher, followed by Zhu, Q. H. with 4627 citations.

Table 1.2 Influential authors in terms of publications and citations

Rk	Author	Publications	Author	Citations	Author	Citations/Publications
1	Sarkis, J.	18	Sarkis, J.	6468	Seuring	1428
2	Zhu, Q.	13	Zhu, Q.	4627	Vachon, S.	610
3	Tseng, M.-L.	7	Lai, K.-H.	2062	Srivastava	545
4	Jabbour, C. J. C.	7	Klassen, R. D.	1505	Lai, K.-H.	515.5
5	Geng, Y.	6	Seuring	1428	Klassen, R. D.	501.7
6	Govindan, K.	6	Rao	1361	Sarkis, J.	359.3
7	Green, K.	6	Vachon, S.	1220	Zhu, Q.	355.9
8	Jabbour A. B. L. D	6	Srivastava	1090	Rao	340.3
9	Lai, K.-H.	4	Geng, Y.	998	Lee, S.-Y.	289.0
10	Rao	4	Govindan, K.	583	Geng, Y.	166.3

Rk Ranking

Table 1.3 Research methodology distribution

Research methodology	Number	Percent of total (%)
Case of study	28	8
Theoretical and conceptual paper	37	11
Literature review	30	9
Mathematical/analytical modeling	76	22
Survey	164	48
Other	7	2

Note Math includes model and evaluation

1.2.1.5 Research Methodologies

Table 1.3 shows the methodology distribution among the 342 selected articles. Five research methodologies were differentiated as follows: (1) theoretical and conceptual papers, (2) case studies, (3) surveys, (4) mathematical/analytical modeling, and (5) literature reviews. It is clear that survey and mathematical/analytical modeling were the most frequently adopted methods, accounting 70% of the total, followed by theoretical and conceptual papers and case studies. The articles that utilized the survey method usually designed a questionnaire based on the proposed research framework and then collected data to confirm or validate research hypotheses (Zhu and Wang 2018). The mathematical/analytical modeling included both optimal programming and specific evaluation methods, such as multi-criteria decision-making methods (MCDM). In addition, 30 papers were literature reviews, conducted to consolidate the existing pool of knowledge. Additionally, 28 articles carried out case studies, which are suitable for exploring newly emergent topics, such as GSCM/SSCM and supply chain risk management. Theoretical and conceptual papers usually aim to develop frameworks and propositions for future empirical tests (Zhu and Wang 2018). Seven articles adopted multiple methods, such as "questionnaire-based surveys + expert interview."

1.2.1.6 Research Topic Analysis

Figure 1.3 summarizes various categories used for the classification of the 336 papers, based on research topics. Seven categories were proposed, namely (i) drivers, pressures, barriers, and success factors, (ii) pressures, practices, and performances, (iii) GSCM assessment and performance evaluation, (iv) environmental management practices, (v) GSCM and other approaches (SSCM, supply chain risk management, circular economy, lean manufacturing), (vi) sustainability, and (vii) theories and challenges.

In accordance with the above, pressures, practices, and performances are currently the most studied category in the literature, with 172 articles (51%), followed

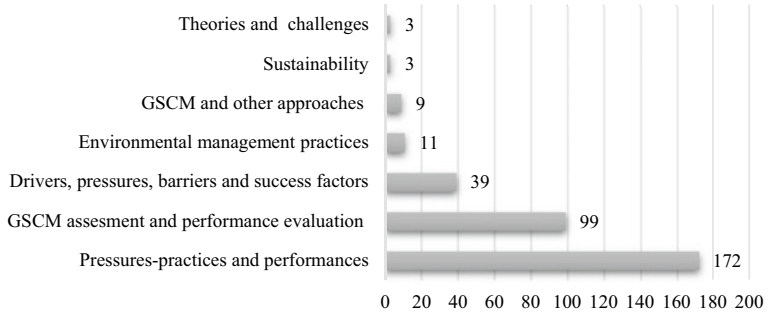

Fig. 1.3 GSCM and sustainable classification themes

by GSCM assessment and performance evaluation, with 99 articles (29%). The pressures, practices, and performances category includes empirical studies that examine the influence of drivers/pressures on the implementation of different environmental practices and, in turn, the effect of environmental practices on organizational performance (economic, operational, export, social, competitive, organizational, and marketing performance). The main methodologies used with this approach were structural equations, modeling, and multiple regression analysis. The GSCM assessment and performance category aims to investigate GSCM implementation and propose performance measurement systems, models, methods, frameworks, and methodologies. The methodologies used in this category are multi-criteria decision methods combined with fuzzy logic.

The third most studied category focused on the identification, classification, and prioritization of drivers (D), pressures (P), barriers (B), and success factors (S) in the GSCM and sustainability implementation process. Also, it has been recognized that the main barriers to GSCM implementation include a lack of support from both regulatory authorities and top management. The main data analysis technique used was interpretative structural modeling (ISM). The environmental management practices category includes studies focused on the exploration of new GSCM practices and the importance thereof. The GSCM and other approach category includes studies that investigate the relationship between the GSCM approach and other new approaches, such as sustainable supply chain management and the circular economy. The sustainability category includes research on new concepts, practices, theories, and challenges. Finally, it should be mentioned that the content analysis reveals that the papers related to theories, conceptual development, and challenges to do with GSCM are the least studied category, which indicates that authors are still adjusting the GSCM concept.

1.3 The Proposed Conceptual Framework

The foundation of the theoretical framework is composed of three elements as follows: (1) pressures/drivers, barriers, and success factors, (2) GSCM practices, and (3) sustainable performance (Fig. 1.4). Pressures are the external determinants for GSCM adoption (Famiyeh and Kwarteng 2018), and drivers are the internal factors that motivate focal firms to adopt the GP (Tachizawa et al. 2015). According to Zhu et al. (2005), Zhu et al. (2013), a stronger presence of pressures and drivers results in more rapid adoption of GSCM practices, given the possibility that companies, being unable to implement GP, see their very existence threatened. In contrast, there are barriers which hinder the GSCM implementation process (Dube and Gawande 2016). Success factors, conversely, are enablers that allow GSCM implementation and ensure success and competitiveness (Chiappetta Jabbour et al. 2017).

According to Tseng et al. (2019), GSCM is conceptual, whereas GSCM practices (GP) are actions. As shown in Fig. 1.4, GP are classified into three types as follows: first, practices that form the supply chain of a given product, from green purchasing and green manufacturing to green distribution, green marketing, use and return of products, components, and materials to focal firms for disposal (reverse logistics) (Diabat et al. 2013; Srivastava 2007). A second type includes those practices such as eco-design, environmental collaboration, and internal environmental management, which, according to Zhu and Sarkis (2004), Jawaad and Zafar (2019), Khan and Qianli (2017) and Bae and Grant (2018), are difficult to copy from competitors, as they involve the development of skills that are difficult to replicate and are essential for implementing other practices at lower levels (Green et al. 2012a, b; Reddy Maditati et al. 2018). Finally, a third type includes those practices that support the

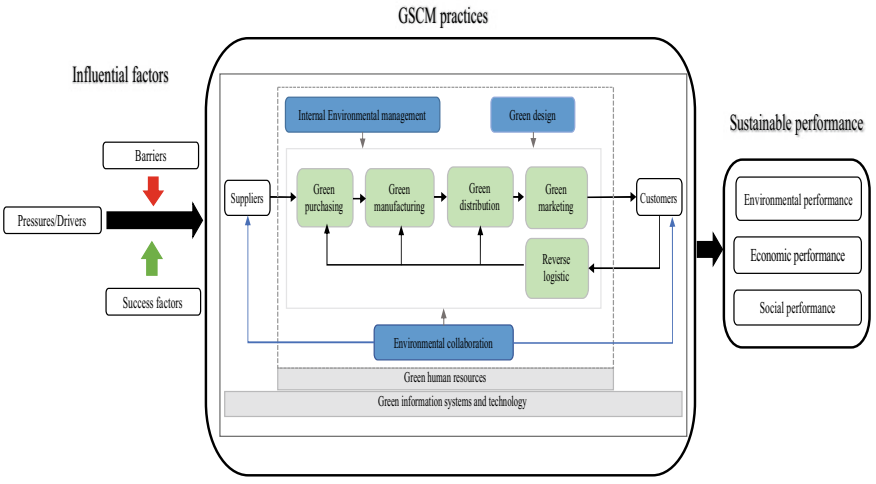

Fig. 1.4 Proposed conceptual framework

organization, allowing for the development and improvement of the remaining practices (Kusi-Sarpong et al. 2015). These include green human resource management (Longoni et al. 2018; Zaid et al. 2018; Singh and El-Kassar 2019) and green information systems and technologies (Green et al. 2012a, b; Bae and Grant 2018; Yang et al. 2018).

Once the firms successfully implement GP, it can expect superior performance (Green et al. 2012a, b). According to the natural resource-based view (NRBV) (Hart 1995), GSCM practices can be regarded as a unique organizational capability that improves firm performance. De Giovanni (2012) and Setyadi et al. (2019) support the idea that GSCM is not just a tool to minimize the environmental impacts of products and operations, but also a unique strategy to provide economic benefits and enhance social welfare. Therefore, enhanced firm performance can be considered improved environmental performance, improved economic performance, and improved social performance (Tseng et al. 2019).

According to the above, Fig. 1.4 shows that pressures/drivers, barriers, and success factors influence focal firms to adopt GSCM. Black arrows represent the positive relationship between pressures/drivers and GP. Similarly, the successful implementation of GP lead to firms improved sustainable performance, as represented in economic, environmental, and social performance, which is indicated by another black arrow. The red arrow indicates the adverse impact of barriers on GP implementation, while the green arrow represents the facilitating role of success factors for GSCM adoption. The smaller black arrows represent the flow of raw materials and products throughout the supply chain, from purchasers to suppliers to distribution to consumers and their return to the company for disposal. The gray arrows indicate the strategic role of internal environmental management, eco-design, and environmental collaboration for the other practices in the supply chain. The dashed lines indicate the need for external collaboration with suppliers and customers to help firms adopt GP (Zhu et al. 2008). Finally, the position of the gray boxes represents the transversal and supportive role of green human resources and green information systems and technology, in the focal firm and its supply chain.

In order to keep the framework simple, the figure does not incorporate all items. However, the lists of pressures, drivers, barriers, success factors, practice aspects, sustainable performance dimensions, and measures employed in the framework are presented below. All of the GP, influential factors and sustainable performance dimensions have been discussed based on different aspects of the literature. Thus, this framework is a contribution to the GSCM literature.

1.3.1 Influential Factors

The first component of the proposed conceptual framework is influential factors for GSCM implementation. Some organizational theories, such as the resource-based view, transaction cost economics, agency network, resource dependence theory (RDT), natural resource-based view (NRBV), and institutional theory, have been used

to understand how companies adopt, assimilate, and develop GSCM operations (Zhu et al. 2005; Laosirihongthong et al. 2013; Lee et al. 2013; Ali et al. 2017). Many authors have identified different internal and external factors from stakeholders that influence GSCM adoption, such as pressures/drivers (Mathiyazhagan et al. 2018; Singh et al. 2018), barriers (Kaur et al. 2019; Majumdar and Sinha 2018), and success factors (Chiappetta Jabbour et al. 2017; Garg et al. 2017; Mauricio and De Sousa Jabbour 2017).

1.3.1.1 Pressures/Drivers

In the literature, the determinants of GSCM adoption and enterprise environmental performance improvement can be broadly divided into: "external factors," mostly linked to stakeholder pressure (Zhu et al. 2005; Zhu et al. 2012) and "internal factors" or "internal drivers" (Testa and Iraldo 2010; Lee et al. 2013; Ali et al. 2017). Institutional theory highlights three kinds of isomorphic pressures as follows: normative, coercive, and mimetic (DiMaggio and Powell 1983). Coercive pressures are exerted by powerful entities by applying imposition and inducement mechanisms (Famiyeh and Kwarteng 2018). Normative isomorphism occurs as a result of professionalization, which is defined as shared norms and standards, formalized by the environment, from a cultural expectation of that environment (Saeed et al. 2018). Finally, mimetic isomorphism occurs when an organization imitates the actions of successful industry competitors (Manimaran et al. 2018; Saeed et al.2018).

Limiting the analysis to only external pressures does not allow for a complete understanding of why organizations operating within the same context (market or sector) pursue different strategies, despite experiencing similar pressures (Testa and Iraldo 2010). According to this, Tseng et al. (2019) define drivers as factors that motivate firms to engage in GSCM initiatives. Pressures and drivers identified in the literature review are shown in Table 1.4.

1.3.1.2 Barriers

A barrier is an obstacle that hinders the implementation GSCM processes (Dube and Gawande 2016). It can be stated that the stronger the presence of said barriers, the poorer the GSCM implementation level is (Tseng et al. 2019). Different authors have classified barriers into governmental, cultural, structural, and contextual categories. The barriers identified in the literature review are shown in Table 1.5.

1.3.1.3 Success Factors

Success factors (SFs) are the organizational actions necessary to ensure successful competitive performance, thus supporting a company's organizational change process (Mauricio and De Sousa Jabbour 2017; Chiappetta Jabbour et al. 2017).

Table 1.4 Pressures and drivers identified in literature review

Coercive pressures	National environmental regulations (such as waste emission, cleaner production)	Zhu et al. (2005, 2007b, 2013), Sharma et al. (2017), Miras-Rodríguez et al. (2018), Famiyeh and Kwarteng (2018) Zhang et al. (2020), Dubey et al. (2015a, b)
	National resource saving and conservation regulations	Zhu et al. (2005, 2007b, 2013), Sharma et al. (2017), Famiyeh and Kwarteng (2018), Zhang et al. (2020), Dubey et al. (2015a, b)
	Regional environmental regulations (such as waste emissions, cleaner production)	Zhu et al. (2005, 2007b, 2013), Sharma et al. (2017), Famiyeh and Kwarteng (2018), Zhang et al. (2020), Dubey et al. (2015a, b)
	Regional resource saving and conservation regulations	Zhu et al. (2005, 2007b, Zhu 2013), Sharma et al. (2017), Famiyeh and Kwarteng (2018), Zhang et al. (2020), Dubey et al. (2015a, b)
	Export countries' environmental regulations	Zhu et al. (2005, 2013)
	Products potentially conflict with laws (such as circular economy, EPR, EHS)	Zhu et al. (2005, 2007b, 2013)
Normative pressures	Export market	Zhu et al. (2007b, 2013), Vanalle et al. (2017), Choi et al. (2018), Zhang et al. (2020)
	Sales to foreign customers	Zhu et al. (2007a, 2013), Vanalle et al. (2017), Zhan et al. (2020)
	Customer awareness	Walker et al. (2008), Miras-Rodríguez et al. (2018), Singh et al. (2018), Zhang et al. (2020)
	The industry associations requirement to plan and implement environmental management practices	Zhu et al. (2005, 2013), Famiyeh and Kwarteng (2018)
	Pressure as of non-government organization (NGO) to put into practice GSCM	Sharma et al. (2017)
	Increased awareness of supply chain partners including suppliers and logistics service providers	Zhu et al. (2007a), Vanalle et al. (2017), Sharma et al. (2017), Tseng et al. (2019)
	Media tracking the industry	Zhang et al. (2020)

(continued)

Table 1.4 (continued)

	Public environmental protection awareness	Zhang et al. (2020)
	Internal multinational policies (subsidiaries or divisions of a multinational firm)	Zhang et al. (2020)
Mimetic pressures	Effect of competitor's green strategies to implement GSCM	Zhang and Yang (2016), Sharma et al. (2017), Famiyeh and Kwarteng (2018), Choi et al. (2018)
	Green strategy of substitute product producers	Zhu et al. (2013)
Internal drivers	A corporate image strategy (reputation-led)	Testa and Iraldo (2010), Vanalle et al. (2017), Sharma et al. (2017), Singh et al. (2018)
	Company's environmental mission	Zhu et al. (2007b)
	Presence of ethical leadership	Tseng et al. (2019)
	ISO 14000 compliance requirement	Tseng et al. (2019)
	Environmental awareness among members of the organization	Tseng et al. (2019), Miras-Rodríguez et al. (2018)
	Cost-saving strategy (efficiency-led)	Testa and Iraldo (2010), Tseng et al. (2019)
	Economic benefits	Singh et al. (2018)
	Top management support	Singh et al. (2018), Miras-Rodríguez et al. (2018)
	A product and/or process development strategy (innovation-led)	Testa and Iraldo (2010)

Besides that, CSFs are mechanisms used to plan and identify goals in an organization, assess threats and opportunities, evaluate organizational strengths and weaknesses, assist managers in improving performance, and define a manager information needs (Ab Talib and Muniandy 2013; Mauricio and De Sousa Jabbour 2017). Several authors have pointed out that, when CSFs are not properly managed, they tend to become barriers to organizational success (Luthra et al. 2014). Therefore, CSFs must be effectively identified, assessed, and managed by organizations to facilitate GSCM implementation (Chiappetta Jabbour et al. 2017; Mauricio and De Sousa Jabbour 2017), in order to achieve sustainability (Luthra et al. 2014). The success factors identified in the literature review are shown in Table 1.6.

Table 1.5 Barriers identified in the literature review

Governmental	Inefficient/lack of national and regional government policies and regulations that support GSCM	Walker et al. (2008), Mitra and Datta (2014), Dube and Gawande (2016), Wang et al. (2016), Ghadge et al. (2017), Agyemang et al. (2018)
Structural	Lack of environmental knowledge and understanding	Walker et al. (2008), Kaur et al. (2018), Ghadge et al. (2017), Tseng et al. (2019)
	Cost implications/financial constraints	Muduli and Barve (2013), Dube and Gawande (2016), Wang et al. (2016), Tseng et al. (2019)
	Lack of eco-technology	Tseng et al. (2019)
	Lack of training in GSCM	Walker et al. (2008), Dube and Gawande (2016)
	Lack of technical expertise to implement GSCM	Muduli and Barve (2013), Dube and Gawande (2016), Kaur et al. (2018)
Cultural	Lack of environmental awareness	Muduli and Barve (2013), Ghadge et al. (2017), Tseng et al. (2019)
	Lack of top-level management commitment	Muduli and Barve (2013), Dube and Gawande (2016), Agyemang et al. (2018), Tseng et al. (2019), Majumdar and Sinha (2018)
	Lack of employee commitment	Muduli and Barve (2013), Walker et al. (2008), Tseng et al. (2019)
	Fear of failure	Muduli and Barve (2013), Dube and Gawande (2016), Tseng et al. (2019)
	Focus on cost reductions at expense of green practices	Walker et al. (2008)
	Lack of legitimacy	Walker et al. (2008)
	Focus on short-term strategic goals	Ghadge et al. (2017)
	Resistance to change and adoption	Muduli and Barve (2013), Dube and Gawande (2016)
Contextual	Market competition and uncertainty	Walker et al. (2008), Dube and Gawande (2016), Ghadge et al. (2017), Kaur et al. (2018)
	Poor commitment from partners	Walker et al. (2008)
	Limited supplier capabilities and resources	Ghadge et al. (2017)
	Lack of integrated management information and traceability system	Agyemang et al. (2018), Wang et al. (2016)
	Lack of understanding among supply chain stakeholders	Walker et al. (2008), Dube and Gawande (2016), Agyemang et al. (2018)
	Lack of customer awareness toward GSCM	Dube and Gawande (2016), Wang et al. (2016), Agyemang et al. (2018)

(continued)

Table 1.5 (continued)

	Inadequate support and guidance from industry bodies, NGOs, and development agencies	Dube and Gawande (2016), Agyemang et al. (2018)

Table 1.6 Success factors identified in the literature review

Governmental	Government support	Ab Talib and Muniandy (2013), Gandhi et al. (2016), Luthra et al. (2014), Garg et al. (2017)
	Environmental management certifications	Gandhi et al. (2016)
	International environment agreements	Luthra et al. (2014)
External factors	Supplier management and integration	Gandhi et al. (2016), Garg et al. (2017), Mauricio and De Sousa Jabbour (2017)
	Supply chain members' awareness and literacy	Luthra et al. (2014)
Internal factors	Corporate goal	Gandhi et al. (2016)
	Total involvement of employees	Gandhi et al. (2016), Mauricio and De Sousa Jabbour (2017)
	Organization's values	Gandhi et al. (2016)
	Benchmarking	Gandhi et al. (2016)
	Proper workplace management	Luthra et al. (2014)
	Technology advancement and adaption	Luthra et al. (2014)
	Performance measure	Mauricio and De Sousa Jabbour (2017), Chiappetta Jabbour et al. (2017)
	Information management	Mauricio and De Sousa Jabbour (2017), Chiappetta Jabbour et al. (2017)
	Top management commitment	Mauricio and De Sousa Jabbour (2017), Chiappetta Jabbour et al. (2017)
	Training	Mauricio and De Sousa Jabbour (2017), Chiappetta Jabbour et al. (2017)
	Competencies for greener products and processes	Mauricio and De Sousa Jabbour (2017), Chiappetta Jabbour et al. (2017)

1.3.2 GSCM Practices

GPs are environmentally friendly cooperative activities throughout the supply chain that can reduce firms' impact on the natural environment because of their industrial activities (Balakrishnan and Suresh 2018; Choudhary and Sangwan 2019b) and then capture added value that may emerge from these activities (Ryoo and Koo 2013) without affecting quality, productivity, or operating costs (Vilchez et al. 2017). According to Srivastava (2007) and Diabat et al. (2013), the green supply chain concept covers all phases of a product's life cycle, from the extraction of raw materials through the design, purchasing, production, and green logistics phases, as well as marketing, to the use of the product by consumers and its disposal at the end of the product's life cycle. In addition, Diabat et al. (2013), Mafini and Loury-Okoumba (2018), and Al-Ghwayeen and Abdallah (2018) argue that GSCM encompasses other GPs, such as reverse logistics, environmental collaboration with suppliers, and internal environmental management.

Eco-design, also called design for the environment (Eltayeb et al. 2011; Rostamzadeh et al. 2015), includes activities that aim to minimize negative impacts caused during products' entire life cycles (Rostamzadeh et al. 2015; de Sousa Jabbour et al. 2015), such as minimizing the consumption of materials, water, and energy, as well as promoting positive environmental practices, such as the reuse, recycling, and recovery of component materials and parts (Choi et al. 2018). The above is done without compromising other essential criteria, such as functionality, quality, or cost (Green et al. 2012a, b; Saeed et al. 2018). This practice systematically involves life cycle analysis (Govindan et al. 2015), environmental risk management, product safety, pollution prevention (Diabat et al. 2013), waste and resource management, and conservation (Srivastava 2007). The main benefit of adopting eco-design is its ability to offer advanced and proactive solutions to environmental problems and increase product value and usefulness (Hartmann and Germain 2015). Likewise, companies can reduce ecological risks and operational costs (Mumtaz et al. 2018), increase profitability (Khan and Qianli 2017), and improve innovation capabilities (Saeed et al. 2018).

Internal environmental management is the practice of incorporating GSCM into an organization's strategy and showing their commitment through environmental policies, environmental management systems, environmental impact assessments, quantifiable environmental objectives, action plans, training activities, responsibilities, and environmental auditing, in order to monitor, control, and evaluate the effect of the organization's actions on the environment (Zhu et al. 2008; de Sousa Jabbour et al. 2015). The main measure of this practice, as stated by Zhu and Sarkis (2006) and Green et al. (2012a, b), is commitment and support from top management, since without this, environmental programs are destined to fails and are much less likely to be initiated. Other measures include the middle management involvement and support and the establishment of cross-functional teams (Zhu et al. 2005; Saeed et al. 2018). Also, this practice includes the efforts to create an organizational culture, in

which organization members share a set of values and beliefs related to environmental protection (Fraj et al. 2013).

Environmental collaboration refers to the involvement of an organization with its suppliers and customers in joint planning for environmental solutions, including shared environmental knowledge (Kusi-Sarpong et al. 2015), joint product development, and green innovations (Govindan et al. 2015), the exchange of information (de Soussa Jabbour et al. 2015), diffusion of new capabilities (Vachon and Klassen 2008; Bae and Grant 2018), and willingness to learn about each other's operations in order to plan and set environmental improvement objectives (Diabat et al. 2013). Likewise, the main objective of this practice is to increase mutual trust, commitment among members of the supply chain, and work in synergy to resolve conflicts and obtain mutual benefit (Vachon and Klassen 2006; Vachon and Klassen 2007). In this way, environmental collaboration promotes direct long-term benefits, such as rapid development of environmental products, savings in company inventory management costs, and increases in customer satisfaction (Kusi-Sarpong et al. 2015; Dubey et al. 2015a, b).

Green purchasing includes eco-conscious activities, based on the purchase of inputs, parts, products, materials, and equipment that meet environmental needs, in terms of reduction of waste, recycling, reuse, resource reduction, and material substitution (Diabat et al. 2013; Lin 2013; Eltayeb et al. 2011; Younis et al. 2016). Since green purchases are located at the beginning of the flow of materials within an organization, they play a key role in the ecological transformation of products and activities (Eltayeb et al. 2011). Thus, company ecological performance can be affected by the selection, evaluation, and auditing of suppliers (Liu et al. 2018; Younis et al. 2016). Therefore, among the factors that suppliers have evaluated are environmental certifications (Zhu et al. 2008), the products purchased do not contain environmentally undesirable items like lead and other harmful or noxious materials (Laosirihongthong et al. 2013; Younis et al. 2016; Zaid et al. 2018), and likewise, are easy to recycle, remanufacture, or reuse (Eltayeb et al. 2011; Rostamzadeh et al. 2015).

Green manufacturing is also called green production and is associated with production practices mixed with advanced energy-efficient technologies (Sangode and Metre 2019), in order to provide maximum output, using more environmentally friendly resources (Dubey et al. 2015a, b; Mafini and Loury-Okoumba 2018), less energy and resources, and at the same time, causing the least possible amount of environmental pollution and waste during the production process (Yildiz Çankaya and Sezen 2019). The implementation of the above activities promotes the reduced use of raw materials (Rao and Holt 2005), lower environmental, and occupational safety expenses (Rostamzadeh et al. 2015) and, finally, efficiency, quality, and production performance increases, at a minimum cost, with little or no waste (Dubey et al. 2015a, b).

Green distribution is defined as the integration of green packaging practices and the use of energy-efficient transportation methods that minimize energy usage, carbon emissions, and transportation costs (Rao and Holt 2005; Mutingi et al. 2014; Yildiz Çankaya and Sezen 2019; Hutomo et al. 2018). According to Chin et al. (2015), Rao and Holt (2005) and Mutingi et al. (2014), green packaging includes activities such as

the use of environmentally friendly materials, recycled packaging, saving energy in warehouses, cooperating with vendors to standardize packaging, minimize material uses, time to unpack, and the adoption of returnable containers. Green transportation and logistics to reduce CO2 emissions include activities such as the consolidation of deliveries and route optimization and rearranged loading patterns. Yongge et al. (2009) state that green distribution provides benefits such as reducing the use of materials, increasing the use of warehouse and container space, reducing the amount of handling required, and reducing logistics costs.

Green marketing is the initiative that an organization takes to involve the incorporation of environmental criteria into product and services marketing and promotion so as to reduce negative environmental impacts (Deng et al. 2018; Malviya and Kant 2017). Green marketing activities include voluntary eco-labeling, green alliances, participation in community activities to learn its point of view in the development of green products, franchising, licensing, pricing activities, and the use of ecological issues in the company's global message (Fraj et al. 2013; Deng et al. 2018; Abu Seman et al. 2019).

Reverse logistics is defined as the process of planning, execution, and efficient control of the flow of raw materials, inventory in process, finished products, and related information, from the point of consumption to manufacturing sites, in order to recover product and material value (Sarkis 2003; Srivastava 2007; Mafini and Loury-Okoumba 2018). Thus, reverse logistics redesigns the traditional ssupply chain (Olugu and Wong 2012), by including the collection of end user products and returning them to the factory for inspection and classification (Pourjavad and Shahin 2018; Srivastava 2007), followed by disposal activities such as reuse, remanufacturing, and recycling (Diabat et al. 2013; Eltayeb et al. 2011).

Green human resources are defined as the management of work and people toward desired environmental targets (Longoni et al. 2018). It includes activities such as green hiring, green training, involvement, green performance, and compensation (Zaid et al. 2018). Sarkis et al. (2010) suggest that in order to adopt GSCM initiatives, it is important to offer necessary organizational knowledge to all employees in the organization. For this, it is necessary to develop effective environmental awareness policies in the hiring processes (Bon et al. 2018), performance evaluation (Jabbour et al. 2013), and training and education programs (Zaid et al. 2018). These initiatives can facilitate the evolution of knowledge capabilities, skills, and competencies among employees and their "green empowerment" (Sarkis et al. 2010).

Green information systems and technologies have been primarily associated with hardware and software to address energy conservation, pollution control, and waste reduction. Examples of green IT include green data centers, virtualization software, server consolidations, and energy-saving devices (Kusi-Sarpong et al. 2016; Yang et al. 2018; Ryoo and Koo 2013). They are also used to summarize and communicate information about the environmental impact of the materials, parts, and components of the products and their available alternatives (Kusi-Sarpong et al. 2016). Green information systems, "Green IS," concern the establishment of systems and practices to support and promote organizational environmentally friendly operations for sustainable development and green innovation (Kusi-Sarpong et al. 2016; Yang et al.

2018) and monitor the results of their application (Green et al. 2012a, b). Examples of "Green IS" include environmental information systems, groupware, teleconferencing, environmental auditing systems, monitoring and control systems for orders, material flows, transport, and routes, among others (Kusi-Sarpong et al. 2016; Yang et al. 2018).

1.3.3 Sustainable Performance

Sustainability or sustainable development has received increasing attention since the release of *Our Common Future* by Brundtland (1987), where it was defined as the use of resources, progress, and advancements to meet the needs of the present generations without compromising the ability of future generations to meet their own needs (Seuring and Müller 2008). However, due to the ambiguity and vagueness of this concept, Elkington (1998) proposed a more specific and measurable conceptualization of sustainability, which differentiates social, environmental, and economic performance dimensions, commonly referred to as the triple bottom line (TBL). According to Malviya et al. (2018), organizations should endeavor to perform well on all three dimensions of the TBL.

In recent decades, organizations have realized the need to integrate the principles of sustainability and TBL into their strategy and decision-making process, as well as the importance of the relationship between sustainability and performance (Dubey et al. 2015a, b; Ahi and Searcy 2015). In the world of business, the term "performance" generally relates to the accomplishment of a given task, as measured against predetermined standards of accuracy, cost, speed, and completeness (Mafini and Loury-Okoumba 2018). In addition, performance measurement is the process of collecting, analyzing and/or reporting information, monitoring, controlling, and achieving specific objectives and outcomes (Sahu et al. 2015; Kazancoglu et al. 2018). It provides a directive for the company to implement the desired practices, evaluate their execution, reveal the effects of the implementation, and determine future actions or corrective plans (Savita et al. 2016). Also, performance measures are tools to help us to understand, manage, and improve that which organizations do (Sahu et al. 2018).

However, scholars assert that focusing only on profits or economic performance fosters short-term thinking within the organization (Sundram et al. 2018; Ghadimi et al. 2019). Therefore, firms should identify sustainable performance measures classified into the three groups as follows: economic, environmental, and social performance, using the TBL approach (Aital and Vijai 2015; Reddy Maditati et al. 2018). For sustainability, in order to achieve a balance in economic, social, and environmental processes, all businesses must succeed in these performance dimensions. However, due to the complexity thereof and their relationship to each other, it is complex to successfully achieve this balance (Yildiz Çankaya and Sezen 2019).

Environmental performance (EP), according to Dubey et al. (2015a, b), is the relationship between the organization and the environment. Specifically, it refers to the

impact of organizational activities on the environment (Choudhary and Sangwan 2019a). This relationship then includes the environmental effects of resources consumed, the environmental impacts of organizational process, the environmental implications of its products and services, the recovery and processing of products, and meeting legal environmental requirements (Dubey et al. 2015a, b). In addition, some authors (Green et al. 2015; Zhu et al. 2008; Jawaad and Zafar 2019; Luthra et al. 2014; Bae and Grant 2018) agree with the statement that EP reflects attempts by manufacturing organizations to reduce the environmental impacts of their manufacturing processes and the effectiveness of the ecological initiatives of a firms' commitment to social concerns about the natural environmental preservation.

On the other hand, Govindan et al. (2015) and Abu Seman et al. (2019) affirm that EP describes and evaluates the positive effects of GSCM practice implementation on the natural environment. According to Hervani et al. (2005) and Al-Ghwayeen and Abdallah (2018), although EP indicators are essential requirements for GSCM, EP measurement is difficult and complex because of the multiple EP indicators. Some of the widely used EP indicators in the literature include reduced air, carbon dioxide, sulfur dioxide (SO_2), and nitrogen oxide (NO) emissions, decreased solid and effluent waste, less use of water and fuel, reduction of water and air pollution, lessening energy/resource utilization, reduction of hazardous and toxic materials, improved employee and community health, as well as lowering the frequency of environmental accidents, which reduces organizational environmental risk (Zhu et al. 2008; Kazancoglu et al. 2018; Namagembe et al. 2019; Eltayeb et al. 2011; Zhu and Sarkis 2004; Setyadi et al. 2019; Vijayvargy et al. 2017). In addition, environmental performance is also measured through management performance indicators, such as the approval rate of management systems (Diabat et al. 2013), environmental plans, actions, policies and measures (Zhu and Sarkis 2004; Diabat et al. 2013), community relation enhancement, improved organizational image (Lin 2013), and reports of firm environmental performance (Saeed et al. 2018).

Economic performance is an outcome that influences an organization to be environmentally oriented (Ahmed et al. 2019). Academics agree that, in order to be competitive and to improve business benefits, firms need to address environmental problems (Saeed et al. 2018; Ahmed et al. 2019). In this sense, economic performance outcomes expected financial benefits that result from GSCM practice adoption (Eltayeb et al. 2011; Luthra et al. 2014). Studies on the economic advantages of green supply chain initiatives recognized different results. According to Choudhary and Sangwan (2019a), the economic benefits gained by companies as a result of GSCM practice implementation are called positive economic performance. However, negative GSCM adoption results are called negative economic performance (Zhu and Sarkis 2004).

Positive economic performance is based on the assessment of firm cost reduction in material purchasing, energy consumption, waste treatment and discharge, and accident occurrence (Lin 2013; Kazancoglu et al. 2018), revenue growth (Eltayeb et al. 2011), increase in market share contribution (Zhu and Sarkis 2004, Green et al. 2012a, b), profit maximization (Vijayvargy et al. 2017), increase in return on assets (Setyadi et al. 2019), productivity improvement (Govindan et al. 2015), increased

firm competitiveness (Luthra et al. 2014), and additional market opportunities (Diabat et al. 2013). In contrast, negative economic performance is reflected in operational cost, the cost of buying environmentally friendly materials, and investment costs (Zhu and Sarkis 2004; Lin 2013; Govindan et al. 2015).

Social performance has not received much attention as an outcome of GSCM (Eltayeb et al. 2011; Laosirihongthong et al. 2013), unlike economic and environmental performance, because it is relatively new to the field of supply chain management (Seuring and Muller 2008). In addition, since social aspects depend on the perceptions, preferences, and values of the different people involved, the quantity, variety and diversity of social features complicate the identification, classification, and measurement process (Guang Shi et al. 2012). However, it is a fact that social performance measurement has become an obligation for organization to guarantee business durability (Yildiz Çankaya and Sezen 2019).

In this regard, social performance can be defined as firms' capability to contribute positively to society, creating health and welfare for people by translating institutional social goals into action, in line with accepted social values (de Giovanni 2012). Then, social performance includes employee health and safety, the improvement of occupational health and safety in the workplace, developing health and safety performance measurement systems (Guang Shi et al. 2012), social responsibility toward clients, employees, and the community (Setyadi et al. 2019), education, training, and human resource advancement (Kazancoglu et al. 2018), improving the economic and social conditions of clients (de Giovanni 2012). Also, it refers to the real effects of green practices on social aspects, such as enhanced product image and company image (Luthra et al. 2014), improved stakeholder relationships (Laosirihongthong et al. 2013), perceived firm goodwill by stakeholders (suppliers customers, employees, and community) (Eltayeb et al. 2011; Setyadi et al. 2019), employee satisfaction and development (Younis et al. 2016), customer loyalty and satisfaction (Laosirihongthong et al. 2013), and improved firm acceptance by local communities (Silva et al. 2019).

The sustainable performance dimensions and measures are shown in Table 1.7.

1.4 Conclusions

GSCM has emerged as a unique organizational strategy for the reduction of environmental impacts that provide both economic benefits and social welfare. In this sense, organizations need to be able to identify the pressures and drivers that influence GSCM adoption, remove the major barriers, and identify factors for success that facilitate GSCM implementation, hence the improvement of sustainable performance.

The bibliometric analysis revealed that The Journal of Cleaner Production was most popular in the knowledge field. However, the Resources, Conservation and Recycling Journal had the greatest impact. Also, the study showed that Joseph Sarkis, Zhu, Q.H and Seuring, and Muller were the most influential authors in GSCM,

Table 1.7 Sustainable performance dimensions and measures

Variable	Measures	Authors
Environmental performance	Reduction of air emission Reduction of water and/or solid Decrease of consumption for hazardous/harmful/toxic materials Reduction of amount of energy used Lower frequency of environmental accidents and health hazards Improve enterprise's environmental situation	Zhu et al. (2005, 2007, 2013), De Giovanni and Esposito Vinzi (2012), Diabat et al. (2013), Dubey et al. (2015a, b), Al-Ghwayeen and Abdallah (2018), Yildiz Çankaya and Sezen (2019), Choudhary and Sangwan (2019a, b)
Social performance	Improvement in customer satisfaction Improvement in its image in the eyes of its customers, suppliers, employees Improvement in investments on social projects (education, culture, sports) Improvement in relations with community stakeholders, e.g., non-governmental organizations (NGOs) and community activists Improved awareness and protection of the claims and rights of people in community served Improvement in employee satisfaction Improvement in occupational health and safety of employees Improvement in overall stakeholder welfare or betterment	Eltayeb et al. (2011), De Giovanni (2012), Diabat et al. (2013), Laosirihongthong et al. (2013), Ahi and Searcy (2015), Yildiz Çankaya and Sezen (2019), Zhang et al. (2020)
Economic performance	Decrease of cost for materials purchasing Decrease of cost for energy consumption Decrease of fee for treatment and waste discharge Decrease of fine for environmental accidents Average return on sales and investment over the three years Average profit and profit growth over the past three years Average growth in market share over the past three years	Zhu et al. (2005, 2007b, 2013), Diabat et al. (2013), Younis et al. (2016), Balakrishnan and Suresh (2018), Silva et al. (2019), Yildiz Çankaya and Sezen (2019), Zhang et al. (2020)

in terms of numbers of publications and citations. The countries with the largest numbers of publications included China, India, and Brazil, and the industrial sectors with the most studies were the automotive industry and electrical and electronics industry, due to their strict regulations. Moreover, survey and mathematical/ analytical modeling were the most frequently adopted investigative methods. The present study also identified four collaborative network clusters. Surprisingly, theoretical and conceptual papers category is the category furthest behind, which indicates that GSCM is still an open field, from this research perspective.

In accordance with the findings derived from the literature review, the proposed conceptual framework encompasses the relationship between three main components as follows: influential factors, green practices, and performance. Regarding influential factors, three aspects were identified as follow: pressures/drivers, barriers, and success factors. Pressures/drivers are related to external determinants and firms' internal motivators for GSCM adoption. Said relationship is influenced by barriers, which may hinder GSCM adoption, and their counterbalance, success factors, which act as enablers for GSCM practice implementation.

Based on these triggers, companies can implement GSCM practices from three perspectives as follows: strategic, operational, and supportive practices. Strategic practices refer to the unique capabilities that differentiate an organization from its competitors. Operational practices encompass the main activities involved in supply chain echelons (sourcing, manufacturing, and distribution). Finally, supportive practices allow for the development and improvement of strategic and operational practices. The literature review provided several insights into the positive effect of green practice adoption on environmental, economic, and social performance. Along these lines, the proposed conceptual framework is a contribution that may be useful to support firm strategy development, decision making, and performance improvement.

In terms of future research directions, the proposed conceptual framework could be used to study the relationship between influential factors, GSCM practices, and sustainable performance. Also, future studies could examine aspects related to the conceptual framework in emerging economies, such as those of countries in South America and Africa. The proposed framework may further be extended, considering that environmental and social metrics are topics that require additional investigation. Finally, from content analysis, a lack of theoretical and conceptual background is evident. This should be considered in future research into the GSCM approach.

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