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Review

A systematic review of sustainable supply chain management in global supply chains

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ABSTRACT

Recurring controversies involving supply chain-related sustainability incidents suggest that firms with a global presence struggle to improve environmental, social and economic outcomes in global supply chains. Sustainable supply chain management has been suggested for improving sustainability outcomes in supply chains, yet global supply chains pose unique challenges. This paper aims to provide a synthesis of the key elements of sustainable supply chain management in global supply chains. To achieve this goal, we conduct a rigorous systematic literature review of articles focused on sustainable supply chain management in global supply chains and apply structured content analysis to * mentioned articles spanning 15 years of research published in English-language, peer-reviewed journals. The research contributes by identifying configurations and governance mechanisms as key elements characterizing sustainable supply chain management in global supply chains and synthesizing their relationship with sustainability outcomes. Overall configurations characterized by a greater connection between the focal firm and multi-tier suppliers, managed directly or through third parties, are increasing trends suggested to better serve sustainability development and offer several areas for future research. The research also contributes to practice by providing managers of focal firms with global supply chains directions for improving sustainable outcomes in their supply chains.

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1. Introduction

Firms are increasingly considered accountable for the environmental, social and economic outcomes caused by their internal operations and by their suppliers' operations (Hartmann and Moeller, 2014). Over the past two decades, sustainable supply chain management (SSCM), which is concerned with integrating environmental, social and economic goals across a focal firm's supply chain processes, has emerged as an approach for firms to improve sustainable (i.e. environmental, social and economic) outcomes in their supply chains (Carter and Rogers, 2008; Seuring and Muller, 2008). Managing sustainability, however, continues to be challenging in Global Supply Chains (GSCs). From Nike struggling with child labor at supplier factories in the 1990's (Lim and Phillips, 2008) to Apple besieged by employee suicides at supplier Foxconn in the early 2000's (Clarke and Boersma, 2017) to pharmaceutical companies coming under pressure for the waste management practices of their Indian suppliers in 2016 (Marriage, 2016), supply chain-related sustainability scandals are recurring for firms with GSCs.

GSCs are complex, composed of different organizations dispersed across multiple tiers and different geographies (Choi and Hong, 2002). Distance between buyers and suppliers in GSCs poses challenges for managing sustainability. Environmental and social outcomes frequently need to be evaluated at the production site (Grimm et al., 2014), and cultural elements can cause divergent expectations regarding sustainability between buyers and suppliers (Wu and Pullman, 2015). Moreover, managers may have no visibility of the supply base beyond the first tier of suppliers and of suppliers located in developing economies where environmental and labor laws are lax or, where laws exist, enforcement is dubious (Carter et al., 2015).

To shed some light on how to develop sustainability in GSCs, we systematically analyzed the literature on SSCM in GSCs. The need for more research on SSCM in GSCs is evidenced by Giunipero et al.'s (2008) call for research on global supply chain management issues and Quarshie et al.'s (2015) call for research into managing sustainability in global supply chains. We heed these calls for research by addressing the following research questions:

RQ1. What are the key elements of sustainable supply chain management in global supply chains studied in the literature? What is the state of research on such elements and sustainability outcomes?

RQ2. What research gaps can guide future studies?

To answer these research questions we conducted a systematic literature review focused on SSCM in GSCs. Systematic literature reviews are appropriate for mapping, assessing and synthesizing disparate pieces of literature to develop the knowledge base within a field (Tranfield et al., 2003). Furthermore, literature reviews offer the possibility of identifying gaps in research and serve for developing new research agendas. We assessed 882 abstracts and selected * mentioned articles for in-depth review.

We contribute to the academic debate on sustainability by consolidating and synthesizing the findings of disparate pieces of literature that consider sustainable outcomes in global supply chains. We identified two crucial elements of SSCM in GSCs as a result of our literature review: the structural dimension of the GSC —namely SSCM configurations, and the relational dimension of the GSC —namely SSCM governance mechanisms. Specifically, studies focused on SSCM configurations investigate the network of actors that compose the global supply chain and the links between these actors to manage sustainability (Parmigiani et al., 2011; Vurro et al., 2009). Studies focused on SSCM governance investigate the relational mechanisms used by focal firms to manage relationships with supply chain members and stakeholders with the objective of implementing SSCM (Formentini and Taticchi, 2016; Sancha et al., 2016). We identify gaps related to both SSCM configurations and SSCM governance mechanisms and propose avenues for future studies to fill these gaps.

2. Sustainable supply chain management in global supply chains

GSCs are supply chains that extend beyond a single country's boundaries. GSCs are thus characterized by focal firms that distribute across multiple countries, locate production facilities abroad or source from offshore suppliers (Caniato et al., 2013). Globalization has led to a rapid rise in the latter, as focal firms seek to secure competitive advantage by employing competent, low-cost suppliers located around the world (Gereffi and Lee, 2014). The distance separating a focal firm and its suppliers is thus greater, as is the number of tiers in the supply chain. Often, focal firms in GSCs are large, well-known organizations that are highly visible to end consumers and scrutinized by stakeholders for whom sustainability outcomes along environmental, social and economic dimensions are a key concern (Seuring and Gold, 2013; Wolf, 2014).

SSCM has been proposed for integrating stakeholder concerns for profit with concerns regarding the impact of a focal firm's internal and supply management operations on ecological and social systems (Pagell and Shevchenko, 2014). Seuring and Muller (2008, p. 1700) define SSCM as "the management of material, information and capital flows as well as cooperation among companies in the supply chain while taking goals from all three dimensions of sustainable development (environmental, social and economic) into account which are derived from customer and stakeholder requirements".

Sustainability outcomes encompass the adoption of environmentally and socially responsible practices as well as the achievement of environmental, social or economic performance. Environmental practices include investments in pollution control and prevention, adoption of environmental management systems and achievement of environmental certifications such as ISO14001 (Awaysheh and Klassen, 2010; Delmas and Montiel, 2009). Socially

responsible practices include compliance with local labor laws and adoption of social standards such as ISO26000 (Castka and Balzarova, 2008).

Performance is generally defined as the successful execution or outcome of work. Environmental performance considers efficiency in resource utilization, recycling and reduction of pollution, waste and emissions (Rao and Holt, 2005). Social performance considers human rights, labor practices and impact on local communities (Yawar and Seuring, 2015). Economic performance can be operationalized in terms of market, operational or accounting-based metrics (Golicic and Smith, 2013).

Preventing negative environmental and social outcomes and improving sustainability performance in GSCs, nonetheless, is challenging. Managerial visibility into the supply base is reduced (Carter et al., 2015), focal firm power is diluted across multiple tiers (Hoejmose et al., 2013) and sustainability expectations can diverge across geographies (Wu and Pullman, 2015).

3. Methodology

The aim of this paper is to systematically analyze the state-of-the-art on SSCM in GSCs identifying its key elements and the relationships studied until now. We accomplish this aim by conducting a systematic literature review based on structured content analysis. Tranfield et al. (2003) advise that systematic literature reviews serve two purposes: consolidating research findings in a specific area by mapping, assessing and synthesizing disparate pieces of literature and identifying research gaps that can guide future research. A systematic literature review also allows for the collection and analysis of a significant amount of evidence in a manner that is transparent, reliable and replicable. To further enhance the rigor of our literature review, we apply structured content analysis as suggested by Seuring and Gold (2012). Structured content analysis is a method used for systematically evaluating the themes of recorded communication. It is useful for producing sound literature reviews because it allows for understanding the focus of written text in a rule-governed way, thus enhancing replicability.

Seuring and Gold (2012) recommend a four-step process for conducting literature reviews based on structured content analysis. The four steps are 1) material collection, 2) descriptive analysis, 3) category identification and 4) material evaluation. We describe each of the four steps in detail below and present the results of the material collection step. The results of the category identification, descriptive analysis, and material evaluation are presented in section 4.

3.1. Material collection

In this step the material to be analyzed is delimited and the unit of analysis is defined. To ensure that only rigorous studies we captured in our review, we delimited our search to articles published in English-language impact factor journals. We further delimited our search by employing keywords based on the key constructs that inform our research questions: GSCs, SSCM, and later, when specific categories of key SSCM elements in GSCs were identified, SSCM configurations and SSCM governance mechanisms. In the search we targeted papers published in the period ranging from 2003 to June 2018. This starting point was selected based on the publication dates of seminal articles on sustainability in GSCs (Gereffi et al., 2001; Humphrey and Schmitz, 2001). The search was performed on multiple databases including Scopus, ScienceDirect, JSTOR Archival Journals, PLoS, Proquest, Emerald Journals, Arts and Humanities Citation Index, Business Source Premier, Dialnet Plus, Science Citation Index, Social Sciences Citation Index using the following keyword strings:

1. (“global supply chain*” OR “global value chain*” OR “global supply network*”) AND (“sustainable*” OR “green*” OR “social*”)
2. ("sustainable supply chain management*" OR "green supply chain management*" OR "social supply chain management*") AND ("global*")
3. ("sustainable supply chain management*" OR "green supply chain management*" OR "social supply chain management*") AND ("governance*" OR "configuration*")

A total of 2230 articles resulted from the keyword search. After removing duplicates and filtering for peer-reviewed impact factor publications, 882 articles remained for evaluation.

We then proceeded to review the abstracts of these 882 articles to assess if they fit our research questions. Accordingly, only articles with a management focus that addressed sustainability in the context of GSCs were considered relevant for further analysis. Modeling papers were also excluded from further analysis. This reduced the article dataset from 882 to 96 articles considered for further review. The full text of these 96 articles was reviewed in depth by the first author. To enhance the comprehensiveness of our review, we also used references from these 96 articles to locate additional papers relevant to our review. To illustrate how references were used to identify additional articles, we take the article by Huq et al. (2014) as an example. This article was identified through our keyword search. After reading the full article, we identified Jiang (2009a) as a potentially relevant article that was not captured by our keyword search. We acquired and evaluated Jiang (2009a) to assess if it fits our research questions. In this manner we identified 13 additional articles that were considered relevant for our review of SSCM in GSCs. The material collection step thus yielded a dataset composed of 109 articles, all of which were analyzed in-depth.

Subsequently, 43 articles were excluded from the dataset because they did not sufficiently fit our research questions. Therefore, the final article set considered for analysis is composed of * mentioned articles. Fig. 1 summarizes the search, evaluation and inclusion process.

3.2. Descriptive analysis

In the descriptive analysis step the formal characteristics of the articles collected are assessed with the aim of providing background for the subsequent evaluation of each article's content. The formal characteristics assessed for each article included in our review were: publication date, publication outlet, methodology, data analysis technique, and theoretical perspective brought to bear.

3.3. Category identification

In this step the analytic categories that allow for classifying the reviewed material are identified. As suggested by Seuring and Gold (2012), we followed a two-step process combining deductive and inductive approaches for identifying analytic categories. First, we deductively established base analytic categories drawing from Tachizawa and Wong's (2014) framework for SSCM in multi-tier supply chains. This framework, that well represents GSCs, proposes that focal firms follow different approaches to manage sustainability outcomes in multi-tier supply chains. The approaches are composed of supply chain structures, supply chain relational mechanisms, and sustainability outcomes. These three elements were thus established as base analytic categories. Subsequently, the base categories of supply chain structure (i.e., SSCM

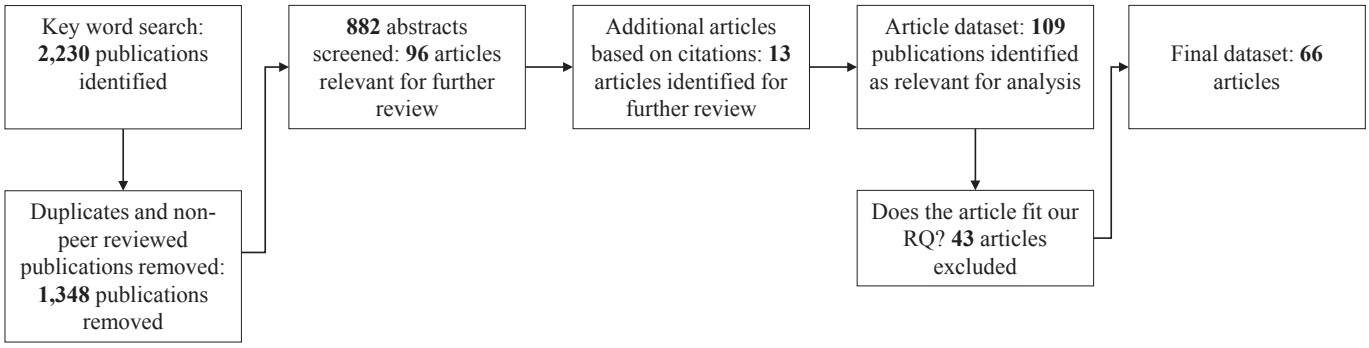

Fig. 1. Article search, evaluation and exclusion process.

configurations), supply chain relational mechanisms (i.e., SSCM governance mechanisms) and sustainability outcomes were inductively and iteratively refined during the analysis of the * mentioned articles.

3.4. Material evaluation

In the material evaluation step all articles were coded against the categories identified in the previous step. Sustainability outcome dimensions were coded to reflect the focus of each article on either the environmental, social or economic dimensions. We also considered combinations of the three sustainability outcome dimensions (e.g. all three dimensions may be considered in a single study).

Once all articles had been coded for sustainability outcomes we identified key elements of SSCM in GSCs and analyzed how literature related them to sustainability outcomes and to each other. To this end, each article was coded to reflect the structure of the supply chain (i.e. SSCM configuration) and the relational mechanisms used by the focal firm to manage sustainability outcomes (i.e. SSCM governance mechanisms). We also identified gaps in extant research that can guide future studies.

4. Results

This section contains the results of the descriptive analysis, category identification, and material evaluation steps. The results of the descriptive analysis present bibliographic data and research design for each article and serve to contextualize the results of the category identification and material evaluation steps. Key elements of SSCM in GSCs (i.e., configurations and governance mechanisms) are identified as a result of the category identification step. Within the material evaluation step we analyze the content of the * mentioned articles and synthesize the state-of-the-art on these key elements.

4.1. Descriptive analysis

We analyzed the trend in publication dates to gain information about the evolution of SSCM research in GSCs across time. All articles were published between September 2003 and January 2018. Rising scholarly interest in sustainability in GSCs is reflected by 61% of the articles published after 2010. Fig. 2 depicts the distribution of articles across the reviewed time period.

We analyzed the outlets for the articles in our dataset to understand the extent to which SSCM in GSCs has been considered by researchers in operations management as well as researchers in other fields of management. The * mentioned articles considered for our review are distributed across 27 journals in multiple

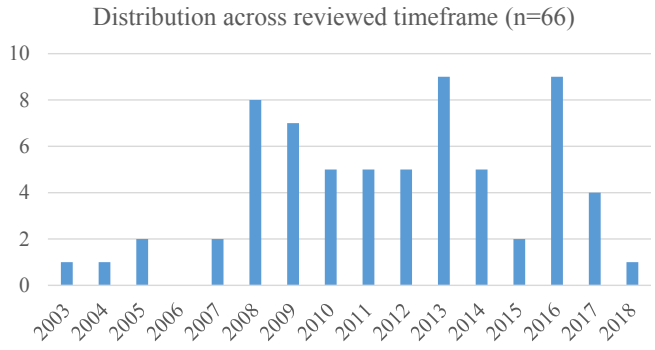

Fig. 2. Article distribution across reviewed timeframe.

research domains. The presence of SSCM research in journals outside the operations management domain may reflect the increasing importance of supply chains in relation to competitive advantage (Cooper et al., 1997) as well as increasing recognition by scholars in different fields of the possibilities that supply chain management presents for addressing sustainability concerns (Quarshie et al., 2015). Table 1 presents the journals considered in our dataset.

Regarding methodology, consistent with previous reviews, we classified articles as conceptual, qualitative, quantitative or mixed-methods. Articles that employ quantitative, qualitative or mixed methods for analyzing empirical data are the most prevalent in the reviewed literature and account for 85% of the total. The remaining 15% are conceptual articles. Table 2 presents a summary of the research methodologies present in our dataset.

We also analyzed the empirical articles in terms of data collection and analysis techniques. Qualitative articles are based on multiple case studies (22 articles), single case studies (11 articles), grounded theory (2 articles) and content analysis (2 articles). Interviews are the main source of data for articles that use case studies and grounded theory, while articles that use content analysis draw data from firm CSR and sustainability reports.

Among the articles that employed quantitative techniques, most relied on survey data (15), one relied on secondary data, one is a meta-analysis. Finally, the two articles classified as mixed-methods combined interview and survey data.

We analyzed the theoretical lens brought to bear in each article to understand the different vantage points from which the phenomenon of SSCM in GSCs has been studied thus far. Over half the articles lack a clear theoretical basis (40 articles). The remaining 26 articles draw from a wide range of theories and are split between those that draw from multiple theories simultaneously (10 articles) and those based on a single theoretical perspective (16 articles).

Table 1
Reviewed paper distribution across journals.

Journal Title	Articles (n = 66)
Journal of Business Ethics	13
Business Strategy and the Environment	7
Supply Chain Management: An International Journal	6
Journal of Cleaner Production	6
International Journal of Operations & Production Management	4
Journal of Operations Management	4
Journal of Supply Chain Management	3
International Journal of Production Economics	3
Journal of Business Logistics	2
Corporate Social Responsibility and Environmental Management	1
International Journal of Physical Distribution & Logistics Management	1
Production and Operations Management	1
Journal of Purchasing and Supply Management	1
International Journal of Production Research	1
Journal of Economic Geography	1
Journal of Economics and Management Strategy	1
Journal of Engineering and Technology Management	1
Journal of International Development	1
Ecological Economics	1
European Management Journal	1
International Business Review	1
Organization Studies	1
Production Planning & Control	1
Third World Quarterly	1
Regulation and Governance	1
California Management Review	1
Asia Pacific Business Review	1

Table 2
Research methods.

Research method	# of articles (n = 66)
Conceptual	10
Qualitative	37
Quantitative	17
Mixed methods	2

The most common theoretical lens are transaction cost economics, the resource-based view, and institutional theory.

4.2. Category identification

To structure our analysis of the literature we followed the conceptual framework proposed by Tachizawa and Wong (2014) and established supply chain structure, supply chain relational mechanisms and sustainability outcomes as initial analytic categories. These initial categories were then inductively refined throughout the material evaluation step. The final analytic categories used to synthesize the content of the reviewed articles were thus abductively developed during the process of completing the literature review. As a result, SSCM configurations and SSCM governance mechanisms emerged from our review of the literature as key elements of SSCM in GSCs. Each category is described in Table 3.

All articles were thus coded to reflect the structure of the supply chain (i.e. SSCM configurations) and the relational mechanisms used by the focal firm to manage sustainability outcomes (i.e. SSCM governance mechanisms). Supply chain structure was coded to reflect the existence (or absence) of a link between a *i)* buyer and its direct suppliers; *ii)* a buyer and its sub-suppliers and, *iii)* a buyer and third parties other than suppliers. Relational mechanisms were coded according to the specific practices used by focal firms to coordinate upstream sustainability initiatives.

4.2.1. SSCM configurations

Consistent with Tachizawa and Wong's (2014) conceptual framework, different types of supply chain configurations emerged during our review. We defined SSCM configurations based on the structural arrangement of supply chain actors and the linkages among them in a multi-tier supply chain.

The most prevalent configuration, coded in 45 articles, represents the traditional supply chain, where the buyer has a link only with first-tier suppliers and no direct link to sub-suppliers. Following Mena et al. (2013), who proposed that different supply chain management configurations characterize multi-tier supply chains, we term this SSCM configuration “open”. In open SSCM configurations focal firms make efforts to extend sustainability to their first tier suppliers (Gimenez and Tachizawa, 2012). First tier suppliers, in turn, may be tasked with extending sustainability to their own suppliers (Wilhelm et al., 2016a).

The second configuration that emerged during our review is

Table 3
Category overview and description.

Category	Description	References
Sustainability outcome	Describes adoption of environmentally and socially responsible practices and/or improvement of environmental, social or economic performance.	Foerstl et al. (2015); Golicic and Smith (2013); Yawar and Seuring (2015)
SSCM configurations	Describe the structural arrangement of supply chain actors and the linkages among them.	Mena et al. (2013); Tachizawa and Wong (2014)
SSCM governance mechanisms	Describe the relational mechanisms through which focal firms coordinate sustainability initiatives in their supply chains.	Formentini and Taticchi (2016); Gimenez and Sierra (2013); Gimenez and Tachizawa (2012)

characterized by the inclusion of non-economic actors within the supply chain. Following Tachizawa and Wong (2014), we term this configuration "third party". Coded in 28 articles, in this configuration the buying firm may collaborate with non-economic actors such as NGOs to provide suppliers with training and assistance aimed at improving sustainable outcomes, or delegate the assessment of suppliers to third parties such as standardization organizations.

The third configuration that emerged during our review, termed "closed", is characterized by buyers that establish formal links with both first-tier suppliers as well as sub-suppliers. Coded in only 6 articles, this configuration has only recently been the object of studies (e.g. Grimm et al., 2014; Wilhelm et al., 2016b). The limited evidence available suggests that in closed SSCM configurations, the buyer establishes direct contact with its sub-suppliers and attempts to manage the relationship through formal or informal means to improve upstream sustainability outcomes (Grimm et al., 2016).

The three SSCM configurations identified in our review are summarized in Table 4.

4.2.2. SSCM governance mechanisms

Besides multiple SSCM configurations, a wide range of SSCM governance mechanisms emerged from our review. The most prevalent SSCM governance mechanism, coded in 62 articles, is characterized by the focal firm gathering of information to monitor and evaluate supplier environmental and social performance (Gualandris et al., 2015) as well as adherence to focal firm's codes of conduct (Jiang, 2009a; Mamic, 2005; Yu, 2008) and private standards (Macdonald, 2007). This mechanism has been labeled supplier assessment.

The second most frequent SSCM governance mechanism, coded in 40 articles, is characterized by communication, knowledge sharing, training and support provided by the focal firm to improve supplier capabilities or performance related to environmental, social or economic goals; and it has been labeled supplier collaboration (Andersen and Skjoett-Larsen, 2009; Busse et al., 2016; Gimenez and Sierra, 2013; Sancha et al., 2016). An additional SSCM governance mechanism adopted by focal firms, coded in 7 articles, is to collaborate with other corporations, civil society organizations and other actors such as government, academia or unions to improve supply chain environmental, social or economic outcomes; and it has been labeled multi-stakeholder initiative (Liu et al., 2018).

Furthermore, our review suggests that focal firms also rely on SSCM governance mechanisms developed by third parties to manage sustainability outcomes in GSCs. SSCM governance mechanisms developed by third parties can be industry-specific, such as the Forest Stewardship Council (Mueller et al., 2009; Reinecke et al., 2012). Differently, SSCM governance mechanisms developed by third parties such as ISO26000, SA8000 or Fair Trade are applicable to multiple industries (Castka and Balzarova, 2008; Ciliberti et al., 2009; Mueller et al., 2009).

SSCM governance mechanisms to achieve sustainability outcomes in GSCs have thus been grouped into direct and indirect mechanisms (Gimenez and Sierra, 2013). Direct SSCM governance mechanisms require that the focal firm invest time and resources on managing relationships with suppliers (Klassen and Vachon, 2003). Differently, indirect SSCM governance mechanisms are based on third party standards and do not require that the focal firm invest time and resources on managing its suppliers' sustainability outcomes (Gereffi et al., 2005). Both direct and indirect SSCM governance mechanisms are represented in our review: 55 articles consider direct governance mechanisms and 11 articles consider indirect governance mechanisms.

SSCM governance mechanisms, therefore, can be defined as practices and initiatives used by the focal firm to manage relationships with supply chain members and stakeholders with the aim of improving sustainability outcomes (Formentini and Taticchi, 2016). Table 5 summarizes the SSCM governance mechanisms identified in our review.

4.2.3. Sustainability outcomes

We also analyzed the frequency with which sustainability outcomes were considered along the environmental, social and economic dimensions. The majority of articles reviewed focus on all three dimensions of sustainability (29%) or on the environmental and social dimensions jointly (27%). Fewer articles focus on environmental and economic dimensions jointly (9%) or economic and social dimensions jointly (1%). SSCM studies that consider a single dimension of sustainability in GSCs have focused more on the social

Table 4
SSCM configurations identification.

Selected References	SSCM Configurations
Rao and Holt (2005); De Marchi et al. (2013); Golicic and Smith (2013); Huq et al. (2014); Turker and Altuntas (2014); Busse et al. (2016); Wilhelm et al. (2016a)	Open
Alvarez et al. (2010); De Marchi et al. (2013); Gold et al. (2013); Vellema and Van Wijk (2015); Wilhelm et al. (2016b); Liu et al. (2018)	Third party
MacCarthy and Jayarathne (2012); Gold et al. (2013); Grimm et al. (2014); Grimm et al. (2016); Wilhelm et al. (2016a); Wilhelm et al. (2016b)	Closed

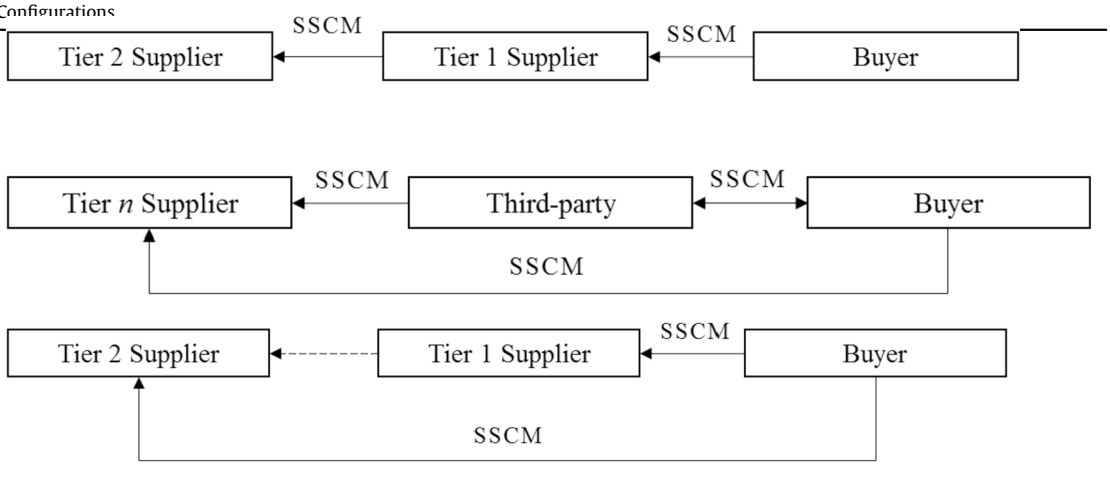

Table 5
SSCM governance mechanisms identification.

Selected References	SSCM Governance mechanisms	
Mamic (2005); Yu (2008); Jiang (2009a); MacDonald (2007); Awaysheh and Klassen (2010); Seuring (2011); Gualandris et al. (2015); Sancha et al. (2016); Formentini and Taticchi (2016); Achabou et al. (2017)	Supplier assessment, codes of conduct and private firm standards.	**Direct**
Andersen and Skjoett-Larsen (2009); Gold et al. (2013); Gimenez and Sierra (2013); Sancha et al. (2016); Formentini and Taticchi (2016)	Supplier collaboration (e.g. training, financial support)	
Von Geibler (2013); Gereffi and Lee (2014); Vellema and Van Wijk (2015); Liu et al. (2018)	Multi-stake holder initiatives (e.g. Roundtable for Sustainable Palm Oil)	
Mueller et al. (2009); Manning et al. (2012); Reinecke et al. (2012)	Third party industry-specific certifications (e.g. FSC).	**Indirect**
Raynolds et al. (2004); Nadvi (2008); Castka and Balzarova (2008); Ciliberti et al. (2009); Delmas and Montiel (2009); Mueller et al. (2009); Simpson et al. (2012); Vermeulen (2013); Kauppi and Hannibal (2017)	Third party multi-industry certifications (e.g. ISO14001, SA8000, ETI, FLA).	

dimension (21%) than on the environmental dimension (12%).

The frequency of each of these 3 constructs (SSCM configurations, SSCM governance mechanisms and sustainability outcomes along environmental, social and economic dimensions) in our literature review is summarized in Table 6.

4.3. Material evaluation

This section presents a summary of the findings on the state of the art of the literature on SSCM in GSCs. We have organized the information according to the key elements identified in section 4.3 (SSCM configurations and SSCM governance mechanisms). We first analyze how each element relates to sustainability outcomes, and then analyze how the elements relate to each other. This analysis provides the foundation for our discussion of the state-of-the-art of SSCM in GSCs and reveals important gaps in the literature which enable us to propose future research directions.

4.3.1. Content analysis: SSCM configurations and sustainability outcome dimensions

The different types of SSCM configurations have been related to different sustainability outcomes dimensions with different frequencies and different results as shown in Table 7.

Specifically, GSCs that display open configurations are characterized by focal firms that engage only first-tier suppliers in sustainability efforts and have no direct contact with sub-suppliers. Of the 45 articles that consider open configurations, 24% focus on all three dimensions of sustainability, 38% focus sustainability considering 2 of the 3 dimensions, and 38% focus on a single dimension.

Table 6
Frequency analysis.

Sustainability outcome dimension (n = 66)	
Environmental, social and economic	19
Environmental and social	18
Environmental and economic	6
Environmental and economic	1
Social	14
Environmental	8
SSCM configuration (n = 79)	
Open	45
Third party	28
Closed	6
SSCM governance mechanisms (n = 66)	
Direct	55
Indirect	11

Note: The total number SSCM configurations coded (79) is greater than the number of articles (**66**) because a single article could be coded for two different configurations. For example, MacCarthy and Jayarathne's (2012) multiple case study analyzes a supermarket's supply chain and a retailer's supply chain. The supermarket's supply chain is coded for an open configuration and the major retailer's supply chain is coded for a closed configuration.

MacCarthy and Jayarathne (2012) find that open configurations are used in GSCs with a higher rate of supplier turnover, which hinders the effectiveness of SSCM efforts. Thus, Wilhelm et al. (2016b) suggest that open configurations are appropriate when buyers have few tier suppliers, and when these suppliers exhibit strong sustainability management capabilities. Accordingly, Wilhelm et al. (2016a) emphasize the role of first tier suppliers in disseminating sustainability to sub-suppliers, and identify both internal and contextual variables that influence first tier suppliers' successfully disseminating customer sustainability requirements to sub-suppliers. Wilhelm et al. (2016b) further suggest that, out of the three dimensions of sustainability, open configurations are more appropriate for managing outcomes in the environmental dimension, because supplier non-compliance with environmental practices is easier to trace (non-compliance with environmental practices can often be detected in end products, for example). Differently, supplier non-compliance with social practices is harder to trace, usually requiring on-site verification. Higher traceability thus makes it easier for the buyer to rely on first-tier suppliers for managing sub-supplier sustainability outcomes.

GSCs that display third party configurations are characterized by the presence of non-traditional actors, such as NGOs or governmental organizations, as part of the supply chain. In these GSCs, the buyer firm either delegates or collaborates with a third party for managing upstream sustainability outcomes. Of the 28 articles that consider third party configurations, 46% focus on all three dimensions of sustainability, while 29% of articles consider 2 of the 3 dimensions and 25% of articles consider a single dimension. Research considering the third party configuration has thus concentrated on sustainability outcomes in all three sustainability dimensions, with fewer papers studying outcomes associated with a single dimension.

The findings in this group of papers are consistent, suggesting that managing supplier sustainability along all three dimensions of sustainability in GSCs requires that buyer firms interact with third parties. The third parties present in our review are NGOs (e.g. Perez-Aleman and Sandilands, 2008), independent auditors (Grimm et al., 2016), independent certifying organizations (Castka and Balzarova, 2008; Ciliberti et al., 2009) and local industry associations (Kauppi and Hannibal, 2017; Lund-Thomsen and Nadvi, 2010; Manning et al., 2012). The most frequently studied third party configuration considers buyer collaboration with NGOs. For example, Alvarez et al. (2010) highlight the importance of a local NGO in the success of Nespresso's SSCM initiative in Central America, while Perez-Aleman and Sandilands (2008) focus on the role of Conservation International in Starbuck's successful SSCM initiative. Third party configurations considering other actors have only recently begun to be explored. Manning et al. (2012), for example, recognize the importance of buyer pressure for supplier adoption of sustainable practices, yet emphasize the importance of local institutions such as producer associations.

Table 7
SSCM configurations and sustainability outcome dimensions.

	Open SSCM configuration		Third party SSCM configuration		Closed SSCM configuration	
	Article	Results	Article	Results	Article	Results
TBL	Andersen and Skjoett-Larsen(2009); Reuter et al. (2010); Seuring (2011); MacCarthy and Jayarathne (2012); Brockhaus et al. (2013); Huq et al. (2014); Turker and Altuntas (2014); Busse et al. (2016); Lee (2016); Formentini and Taticchi (2016); Wilhelm et al. (2016b)	Open configurations are less structurally stable, used by buyers with fewer first tier suppliers and display less emphasis on environmental outcomes.	Raynolds et al. (2004); Matos & Hall (2007); MacDonald (2007); Perez-Aleman and Sandilands (2008); Alvarez et al. (2010); Reuter et al. (2010); Tate et al. (2010); Seuring (2011); Manning et al. (2012); Huq et al. (2014); Formentini and Taticchi (2016); Wilhelm et al. (2016b); Liu et al. (2018)	Buyer collaboration with third parties facilitates successful implementation of SSCM.	Alvarez et al. (2010); MacCarthy and Jayarathne (2012); Wilhelm et al. (2016a)	Closed configurations are structurally stable and display an emphasis on social and TBL outcomes.
Environmental and Economic	Rao and Holt (2005); Kim and Rhee (2011); De Marchi et al. (2013); Zhu et al. (2012); Golicic and Smith (2013); Zhu et al. (2017)	The use of open configurations to extend environmentally friendly business practices to suppliers benefits buyer environmental and economic performance.	De Marchi et al. (2013)	Buyers with a high number of suppliers are more likely to use a third party configuration.		
Environmental and Social	Jiang (2009b); Vurro et al. (2009); Mueller et al. (2009); Wolf (2011); Parmigiani et al. (2011); Vermeulen (2013); Gualandris et al. (2014); Distelhorst et al. (2015); Wilhelm et al. (2016a); Clarke and Boersma (2017)	Buyers using open configurations often rely on first tier suppliers for extending environmental and social practices upstream.	Nadvi (2008); Simpson et al. (2012); Reinecke et al. (2012); Gold et al. (2013); Von Geibler (2013); Vellema and Van Wijk (2015); Distelhorst et al. (2015)	Buyer engagement with third parties facilitates implementation of SSCM.	Gold et al. (2013); Grimm et al. (2014); Grimm et al. (2016)	Closed configurations are used to manage sub-supplier environmental and social outcomes.
Social and Economic			Gereffi and Lee (2014)	Improving social and economic outcomes increasingly implies interaction with multiple stakeholders.		
Environmental	Klassen and Vachon (2003); Darnall et al. (2008); Gonzalez et al. (2008); Delmas and Montiel (2009); Tate et al. (2011); Gimenez and Sierra (2013); Caniels et al. (2013); Achabou et al. (2017)	Open configurations are associated with supplier investment in environmental practices.				
Social	Mamic (2005); Lim and Phillips (2008); Yu (2008); Keating et al. (2008); Jiang (2009a); Awaysheh and Klassen (2010); Knudsen (2013); Soundararajan and Brown (2016); Sancha et al. (2016); Mzembe et al. (2016)	Open configurations limit a buyer's capacity for addressing social issues in supplier sites.	Castka and Balzarova (2008); Ciliberti et al. (2009); Lund-Thomsen and Nadvi (2010); Knudsen (2013); Soundararajan and Brown (2016); Kauppi and Hannibal (2017)	Third parties exert coercive pressure for buyer and supplier adoption of socially SSCM.		

Direct focal firm sustainability engagement with sub-suppliers (second-tier suppliers, for example) characterizes GSCs that display closed configurations. Of the 6 articles that consider closed configurations, 46% focus on all three dimensions of sustainability and 50% of articles consider 2 of the 3 dimensions. No articles considering closed configurations are focused on a single dimension.

Closed configurations are used in more structurally stable GSCs than the open configurations (MacCarthy and Jayarathne, 2012). Given that supplier non-compliance with socially responsible practices is hard to trace and may require on-site verification, buyers in GSCs use closed configurations to overcome challenges that are specific to managing sub-suppliers sustainability outcomes in the social dimension (Grimm et al., 2014; Wilhelm et al., 2016b).

Overall, the open configuration has been proposed to be effective for environmental outcomes and to be less effective when considering multiple sustainability dimensions jointly. The third party configuration has been suggested to be effective for multiple sustainability outcomes jointly, and the closed configuration has been suggested to be effective for social outcomes. It might be that, differently than environmental outcomes, which are often traceable and can be observed in end products (Foerstl et al., 2015), social aspects and complex situations addressing multiple sustainability outcomes require supply chain structural approaches that facilitate either *i)* a stronger connection between multiple-tier suppliers and buyers (i.e., closed configuration) or *ii)* the support of other parties (i.e., third party configuration).

4.3.2. Content analysis: SSCM governance mechanisms and sustainability outcome dimensions

The direct and indirect governance mechanisms have been associated with different sustainability outcomes dimensions with different frequencies and different results as shown in Table 8.

Direct SSCM governance mechanisms are the most widely studied in the context of SSCM in GSCs. Of the 55 articles that consider direct governance mechanisms, 31% focus on the environmental, social and economic dimensions jointly, 36% consider 2 of the 3 dimensions and 33% consider a single dimension.

The literature agrees that direct SSCM governance mechanisms for achieving outcomes across the three dimensions of

sustainability consist of supplier assessment and supplier collaboration (e.g. Gimenez and Sierra, 2013; Reuter et al., 2010). Several studies have attempted to differentiate the implications of assessment and collaboration on sustainability outcomes. Mamic (2005) finds that implementation of codes of conduct needs to be complemented by collaboration with suppliers. Yu (2008) and Jiang (2009b) find that supplier assessment is ineffective for achieving supplier compliance with codes of conduct, and note the importance of complementing assessment with production incentives to achieve supplier compliance. Lim and Phillips (2008) highlight that collaboration is more effective in achieving supplier compliance with codes of conduct. This work can be linked to Knudsen (2013), who notes that limited resources and a lack of buyer assistance impede suppliers from adopting sustainable practices. Achabou et al. (2017) also find that absence of buyer technical and financial assistance limit the extent to which developing country suppliers improve environmental outcomes. Busse et al. (2016) identify additional contextual barriers that impede collaboration with suppliers for sustainability in global settings and suggest collaboration as a means for overcoming such barriers. Formentini and Taticchi (2016) also find that buyers focused on improving sustainability outcomes along all three dimensions rely on supplier collaboration rather than assessment. Recently, research has also considered buyer firm participation in multi-stakeholder initiatives as a specific type of collaboration. Multi-stakeholder initiatives are characterized by collaboration among a wide range of stakeholders including buyers, suppliers, governments and civil society organizations. Vellema and Van Wijk (2015) find that buyer and supplier participation in multi-stakeholder initiatives improves the effectiveness of international standards. Liu et al. (2018) propose that buyer participation in multi-stakeholder initiatives is important for supporting successful supplier collaboration initiatives.

When considering implementation of direct SSCM governance mechanisms, however, the literature shows that assessment is more frequently used by buyers in GSCs. Brockhaus et al. (2013) find that collaborative governance mechanisms are rare. Instead, firms frequently rely on power to impose assessment on suppliers. Turker and Altuntas (2014) also find that supplier assessment is the most frequently employed governance mechanism for improving sustainability outcomes in textile supply chains.

Regarding the implications of direct SSCM governance mechanisms on sustainability outcomes, literature has considered the relationship with buyer performance and more recently with supplier performance. Rao and Holt (2005) propose that

Table 8
SSCM governance mechanisms and sustainability outcome dimensions.

	Direct SSCM Governance Mechanisms		Indirect SSCM Governance Mechanisms	
	Article	Results	Article	Results
TBL	Matos and Hall (2007); MacDonald (2007); Perez-Aleman and Sandilands (2008); Andersen and Skjoett-Larsen(2009); Alvarez et al. (2010); Reuter et al. (2010); Tate et al. (2011); Seuring (2011); MacCarthy and Jayarathne (2012); Brockhaus et al. (2013); Huq et al. (2014); Turker and Altuntas (2014); Busse et al. (2016); Lee (2016); Formentini and Taticchi (2016); Wilhelm et al. (2016b); Liu et al. (2018)	SSCM consists of supplier assessment and collaboration. Supplier collaboration has a positive influence on supplier adoption of sustainable business practices. Improving TBL performance requires collaboration between the buying firm and third parties.	Raynolds et al. (2004); Manning et al. (2012)	Firms obtain financial and capacity-building benefits from third party standards.
Environmental and Economic	Rao and Holt (2005); Kim and Rhee (2011); De Marchi et al. (2013); Zhu et al. (2012); Golicic and Smith (2013); Zhu et al. (2017)	Environmental supplier assessment and collaboration is positively related to buyer firm economic performance.		
Environmental and social	Jiang (2009b); Vurro et al. (2009); Wolf (2011); Parmigiani et al. (2011); Gold et al. (2013); Von Geibler (2013); Grimm et al. (2014); Gualandris et al. (2014); Distelhorst et al. (2015); Vellema and Van Wijk (2015); Grimm et al. (2016); Wilhelm et al. (2016a); Clarke and Boersma (2017)	Supplier assessment is insufficient for solving social and environmental issues in supplier production sites. Supplier collaboration is required for enabling suppliers to remedy shortcomings on environmental and social outcomes. Interaction between buyers, suppliers and third parties firms improve supplier adoption of environmental and social practices.	Nadvi (2008); Mueller et al. (2009); Simpson et al. (2012); Reinecke et al. (2012); Vermeulen (2013)	Third party multi-industry and third party industry-specific standards suffer from transparency and legitimacy issues that limit their effectiveness for governing sustainable supply chains.
Social and Economic	Gereffi and Lee (2014)	Supplier assessment and collaboration must be complemented with stakeholder interaction for improving social and economic outcomes in supply chains.		
Environmental	Klassen and Vachon (2003); Darnall et al. (2008); Gonzalez et al. (2008); Tate et al. (2011); Gimenez and Sierra (2013); Caniels et al. (2013); Achabou et al. (2017)	Supplier assessment and collaboration both have a positive effect on buyer environmental performance. Assessment is an enabler of collaboration.	Delmas and Montiel (2009)	Third party multi-industry standards are adopted by suppliers in close relationships with their customers and by young suppliers located far from their customers.
Social	Mamic (2005); Lim and Phillips (2008); Yu (2008); Keating et al. (2008); Jiang (2009a); Lund-Thomsen and Nadvi (2010); Awaysheh and Klassen (2010); Knudsen (2013); Soundararajan and Brown (2016); Sancha et al. (2016); Mzembe et al. (2016)	Suppliers prioritize achieving operational performance over social performance. Training for buyer and supplier employees is critical for successful development and adoption of socially responsible practices in supply chains. Limited resources and lack of buyer assistance impede SME suppliers from participating in multi-stakeholder initiatives.	Castka and Balzarova (2008); Ciliberti et al. (2009); Kauppi and Hannibal (2017)	Third party multi-industry standards facilitate coordination for improving social outcomes in GSCs.

assessment and collaboration are positively related to buyer environmental and economic performance. Gimenez and Sierra (2013) find evidence that both assessment and collaboration are associated with buyer firm environmental, and economic performance, but that assessment alone is not enough. Gualandris et al. (2014) find that firms that source globally leverage collaboration practices to more effectively manage their GSCs and improve environmental and social performance.

The effects of assessment and collaboration on supplier performance are less clear. Sancha et al. (2016) find that supplier assessment is positively related to buyer social reputation, but not to supplier social performance, and collaboration is positively related to supplier social performance but not to buyer social performance.

Indirect SSCM governance mechanisms have received less attention. Of the 11 articles that consider indirect governance mechanisms, 18% focus on the environmental, social and economic dimensions jointly, 45% operationalize sustainability considering 2 of the 3 dimensions, and 36% operationalize sustainability considering a single dimension.

Raynolds et al. (2004) highlight the benefits for suppliers of complying with third party multi-industry standards. Castka and Balzarova (2008) suggest that firms whose customers value credence attributes and firms in long-term relationships with their buyers adopt indirect governance mechanisms. Similarly, Delmas and Montiel (2009) find that suppliers that have close relationships with their customers and young suppliers located far from their customers adopt third party multi-industry standards. Ciliberti et al. (2009) propose that third party multi-industry standards facilitate coordination in a supply chain by improving the information flows through the supply chain, reducing information asymmetries and building trust between buyers and suppliers. Yet Mueller et al. (2009) – echoing most of the papers reviewed on indirect SSCM governance mechanisms- offer a sharp critique of indirect governance mechanisms, noting that third party multi-industry and third party industry-specific standards suffer from transparency and legitimacy issues that limit their effectiveness for governing sustainable supply chains. In line with this view, Vermeulen (2013) notes that the effectiveness of third party standards for improving environmental and social outcomes is limited to supplier compliance.

Overall, papers on SSCM direct governance mechanisms positively associated them to multiple sustainability outcomes, distinguishing between supplier assessment and collaboration and proposing that the first one is the most frequently adopted, especially in GSCs, but the latter is needed for improving sustainability outcomes. Recent work suggests that multi-stakeholder initiatives may facilitate collaboration between supply chain partners, third parties and other stakeholders for sustainability outcomes. Differently, the literature on SSCM indirect governance mechanisms is more critical on their effectiveness.

4.3.3. Content analysis: SSCM configurations and SSCM governance mechanisms

After understanding the relationship between SSCM configurations and SSCM governance mechanisms with sustainability outcome dimensions respectively, we reviewed the selected papers to understand how SSCM configurations relate to SSCM governance mechanisms, and if there is any frequent combination. Table 9 illustrates the results of this analysis.

We find that open and closed configurations are most frequently associated with direct SSCM governance mechanisms. More specifically, open configurations are most often associated with both supplier assessment and supplier collaboration, while closed configurations are most often associated specifically with supplier collaboration. Awaysheh and Klassen (2010) suggest that buyers using open configurations are more likely to use supplier assessment to manage social outcomes in GSCs. Gimenez and Sierra (2013) suggest that both assessment and collaboration are used and that assessment is an enabler of collaboration. Therefore, it

Table 9
SSCM configurations and SSCM governance.

	Articles	Main results
Open and direct	Klassen and Vachon (2003); Rao and Holt. (2005); Mamic (2005); Darnall et al. (2008); Gonzalez et al. (2008); Lim and Phillips (2008); Yu (2008); Keating et al. (2008); Andersen and Skjoett-Larsen(2009); Jiang (2009a); Jiang (2009b); Vurro et al. (2009); Awaysheh and Klassen (2010); Reuter et al. (2010); Wolf (2011); Kim and Rhee (2011); Tate et al. (2011); Parmigiani et al. (2011); Seuring (2011); De Marchi et al. (2013); MacCarthy and Jayarathne (2012); Zhu et al. (2012); Brockhaus et al. (2013); Gimenez and Sierra (2013); Caniels et al. (2013); Golicic and Smith (2013); Knudsen (2013); Turker and Altuntas (2014); Huq et al. (2014); Gualandris et al. (2014); Distelhorst et al. (2015); Busse et al. (2016); Formentini and Taticchi (2016); Soundararajan and Brown (2016); Lee (2016); Wilhelm et al. (2016a); Wilhelm et al. (2016b); Sancha et al. (2016); Mzembe et al. (2016); Achabou et al. (2017); Clarke and Boersma (2017); Zhu et al. (2017)	Direct SSCM governance mechanisms associated with open configurations are supplier assessment and supplier collaboration.
Open and indirect	Mueller et al. (2009); Delmas and Montiel (2009); Vermeulen (2013)	Indirect SSCM governance mechanisms associated with open configurations are third party multi-industry standards.
Third party and direct	Matos and Hall (2007); MacDonald (2007); Perez-Aleman and Sandilands (2008); Lund-Thomsen and Nadvi (2010); Alvarez et al. (2010); Reuter et al. (2010); Tate et al. (2010); Seuring (2011); De Marchi et al. (2013); Gold et al. (2013); Knudsen (2013); Von Geibler (2013); Gereffi and Lee (2014); Huq et al. (2014); Vellema and Van Wijk (2015); Distelhorst et al. (2015); Formentini and Taticchi (2016); Soundararajan and Brown (2016); Wilhelm et al. (2016b); Liu et al. (2018)	Direct SSCM governance mechanisms associated with third party configurations are buyer collaboration with NGOs and buyer participation in multi-stakeholder initiatives.
Third party and indirect	Raynolds et al. (2004); Castka and Balzarova (2008); Nadvi (2008); Ciliberti et al. (2009); Simpson et al. (2012); Reinecke et al. (2012); Manning et al. (2012); Kauppi and Hannibal (2017)	Indirect SSCM governance mechanisms associated with closed configurations are third party multi-industry standards and third party industry-specific standards.
Closed and direct	Alvarez et al. (2010); MacCarthy and Jayarathne (2012); Gold et al. (2013); Grimm et al. (2014); Grimm et al. (2016); Wilhelm et al. (2016b)	Direct SSCM governance mechanisms associated with closed configurations is supplier collaboration.

Note: No articles consider closed configuration and indirect SSCM governance mechanisms.

seems that both these direct SSCM governance mechanisms are combined with open configurations to manage sustainability outcomes in GSCs.

Differently, third party configurations have been associated with both direct and indirect SSCM governance mechanisms. When third party configurations are associated with direct SSCM governance mechanisms buyer-NGO partnerships and buyer participation in multi-stakeholder initiatives are the prevalent SSCM governance mechanisms (Liu et al., 2018). When associated with indirect SSCM governance mechanisms, buyer reliance on third party multi-industry or third party industry-specific standards is common (Ciliberti et al., 2009).

Thus, there might be a fit between different SSCM configurations and SSCM governance mechanisms that makes their combination more effective in a synergistic way. However, we are not aware of studies taking a configurational approach to understand the effectiveness of different combinations on sustainability outcomes.

We thus propose a conceptual framework for SSCM in GSCs. As illustrated in Fig. 3, our framework relates SSCM configurations and SSCM governance mechanisms to sustainability outcomes.

5. Discussion and future research directions

The aim of this review was to identify key elements of SSCM in GSCs, to shed light on the state of research on the development of sustainability in GCSs and to guide future research. We conducted a systematic literature review of * mentioned articles and performed structured content analysis to address two research questions: *RQ1. What are the key elements of sustainable supply chain management in global supply chains studied in the literature? What is the state of research on such elements and sustainability outcomes? RQ2. What research gaps can guide future studies?* Given that no previous reviews have considered SSCM in GSCs, our study contributes to the SSCM literature by identifying key elements characterizing sustainability development in GSCs: SSCM configuration and SSCM governance mechanisms. Our analysis also offers valuable insights into the areas that have been covered by extant literature and those that have not. We discuss these areas in the following paragraphs referring to each element of our conceptual framework, identifying gaps in the literature and suggesting future research directions that may contribute towards filling these gaps. We this section with a discussion of the managerial implications of our research.

5.1. SSCM configurations and sustainability outcomes

To answer RQ1 our review identifies SSCM configurations, which reflect the structural arrangement of actors that form the GSC, to be key elements of SSCM in GSCs. Focal firms increasingly need to engage with suppliers across multiple tiers to improve sustainability outcomes in GSCs (Awaysheh and Klassen, 2010). SSCM configurations affect SSCM by allowing focal firms to engage with sub-suppliers and third parties during the development and adoption of initiatives aimed at improving sustainability outcomes in GSCs in different ways. Furthermore, focal firm engagement with different types of actors is associated with specific environmental and social capabilities, which impact focal firm environmental and social performance (Parmigiani et al., 2011).

Different SSCM configurations have been unevenly studied by extant SSCM literature in GSCs, with a larger focus on open configurations and environmental outcomes. Yet the “ideal” SSCM configuration for achieving sustainability in GSCs remains elusive, with different configurations having been associated with different outcomes. Despite this, recent literature seems to point towards both third party and closed configurations for the joint improvement of multiple sustainability outcome dimensions.

Pagell and Wu (2009) have previously suggested that improving sustainability outcomes in supply chains requires that firms re-conceptualize the actors that are part of the chain. Our review proposes third party configurations as a way for focal firms in GSCs to incorporate non-traditional actors, such as NGOs or governmental organizations, into the supply chain. We find that buyer interaction with third parties such as NGOs or local trade associations is positive for improving sustainability outcomes in GSCs. Busse et al. (2016) highlight limited cross-cultural understanding as a contextual barrier to sustainability management in GSCs. By involving a third party that is familiar with the supplier's local conditions, third party configurations may foster cross-contextual

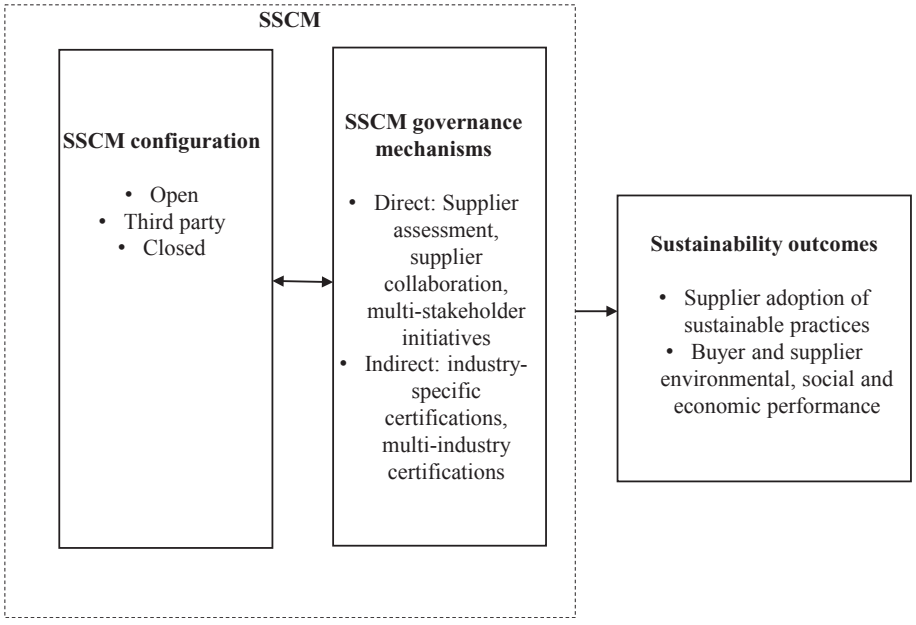

Fig. 3. Research framework of SSCM in GSCs.

understanding between the focal firm and suppliers, facilitating the success of the adoption of sustainable practices and improving sustainability outcomes.

Differently, in closed configurations, suppliers benefit from knowledge and technology transfer directly from global buyers, which facilitates their adoption of sustainable practices. On the other side, buyers benefit by obtaining localized knowledge from their suppliers' context, which facilitates alignment of environmental and social goals (Wilhelm et al., 2016b). Only a few articles consider closed configurations in relation to sustainability outcomes in GSCs. These studies have focused mainly on exploring the drivers, enablers, and barriers associated with closed configurations in GSCs (Grimm et al., 2014).

As an answer to RQ2 in relation to SSCM configurations, we suggest future research to further investigate closed and third party configurations. Focusing specifically on third party configurations unveils questions regarding the characteristics and impacts of third parties on supply chain sustainability outcomes. For instance, what non-traditional actors currently collaborate with firms in managing supply chain sustainability? As mentioned above, research has begun to explore collaborations with NGOs. Yet in the context of supplier collaboration initiatives, Liu et al. (2018) underscore the importance of collaborating with different types of third parties at different stages of the supplier collaboration initiative, given that the most successful supplier collaboration initiatives are those where such collaborations take place. Thus, future research can consider other non-traditional actors such as government institutions, producer associations, chambers of commerce, social enterprises or non-profit financial organizations.

Another avenue of research can explore the goals of non-traditional actors in SSCM configurations and the opportunities/challenges that collaboration entails for SSCM. Future studies along these lines can build on the work of Rodríguez et al. (2016), which suggests that achieving inter-organizational fit in third party configurations is key to the creation of social and economic value in the supply chain.

Regarding closed configurations, we highlight that all the studies conducted thus far recognize that global buyers must increasingly manage sub-supplier sustainability outcomes (Grimm et al., 2014). Yet very little is known regarding the implications of closed configurations for sustainability outcomes. While extant research assumes that sustainability outcomes will be positive, this may not always be the case. In a study of the effects of different supply chain structures on supplier economic sustainability, Cho and Lim (2016) found that closed configurations prevent suppliers from upgrading to higher value-added activities. Whether this result may be paralleled in terms of sustainability outcomes is an open question that can be tackled by future research (e.g. do closed configurations prevent suppliers from engaging in environmental or social innovations?). We thus suggest that future research explore the implications of closed configurations on buyer and supplier sustainability outcomes.

5.2. SSCM governance mechanisms and sustainability outcomes

Also answering RQ1, this review identifies SSCM governance mechanisms, which encompass the practices and initiatives used by the focal firm to manage relationships with supply chain stakeholders for improving sustainability outcomes, as key elements of SSCM (Formentini and Taticchi, 2016). Engaging suppliers across multiple tiers requires specific governance mechanisms, yet different SSCM governance mechanisms have different implications for sustainability outcomes in GSCs.

Our analysis shows that direct SSCM governance mechanisms have been extensively studied both in terms of supplier assessment and supplier collaboration and related to multiple sustainability dimensions. Differently, multi-stakeholder initiatives have received less attention. We find agreement in the literature regarding the need for buyers to complement supplier assessment with collaboration to improve sustainability outcomes. Formentini and Taticchi (2016) find that buyers that strive to improve environmental, social and economic sustainability outcomes use collaborative governance to relate to their suppliers. Yet we also find evidence that suggests that collaboration is not prevalent; buyers most frequently rely on assessment to manage sustainability outcomes in GSCs (Turker and Altuntas, 2014). Recent research proposes that buyer firm participation in multi-stakeholder initiatives can ease the burden of collaboration and support supplier adoption of environmental and social practices (Vellema and Van Wijk, 2015). Few studies, however, have focused on multi-stakeholder initiatives.

We also find that there is tension in the literature regarding direct SSCM governance mechanisms and sustainability outcomes. While the implications of direct SSCM governance mechanisms for buyer firm sustainability performance are clear, the implications for supplier performance are debated (Sancha et al., 2016).

Differently, we find that indirect SSCM governance mechanisms have received much less attention in SSCM research in GSCs. A benefit of indirect governance mechanisms based on certifications is that suppliers avoid having to conform to multiple, possibly conflicting or overlapping, private standards or codes of conduct (Reinecke et al., 2012). Yet our review shows that indirect governance mechanisms are seldom associated with improved sustainability outcomes in GSCs. There is consistent agreement in the literature that relying standards alone fails to produce evidence of performance improvement (Vermeulen, 2013). Furthermore, the standards themselves have been called into question. Mueller et al. (2009) find that voluntary management standards (ISO14001, SA8000) lack supply chain transparency and legitimacy, as they do not require firms to take responsibility for the environmental or social conditions in their suppliers. Industry-specific and multi-industry certifications work better, requiring that at least a percentage of the SC be monitored. So, relying on standards to govern global supply chains seems risky for focal firms, given that standards may cover only a portion of the chain or a portion of the potential sustainability issues.

Therefore, to answer RQ2 in relation to SSCM governance mechanisms we note that more research is needed to shed light on buyer firm participation in multi-stakeholder initiatives. Multi-stakeholder initiatives can facilitate collaboration initiatives, which in turn have been proposed as key for achieving sustainability outcomes in GSCs. Future research can explore when and why focal firms engage in multi-stakeholder initiatives to manage supply chain sustainability, and the mechanisms through which participation in such initiatives facilitates collaboration. Also, we suggest future research to investigate if indirect SSCM governance mechanisms can complement direct SSCM governance mechanisms.

5.3. SSCM configurations and governance mechanisms

Finally, to answer to RQ1 we investigated the state of the art regarding the relationship between the two crucial elements of SSCM in GSCs identified in our literature review. Previous literature shows that any potential combinations of these two elements can be pursued, however, we highlighted more frequent combinations such as the associations between open configurations and supplier assessment and collaboration, closed configurations and supplier collaboration, and third party configurations with supplier assessment or indirect SSCM governance mechanisms.

This finding might suggest that there might be a better fit between some SSCM configurations and SSCM governance mechanisms. However, answering RQ2, we consider that the effectiveness of these combinations is relatively under-investigated compared to the effectiveness of these elements separately. Thus, future studies might investigate the effectiveness of the different combinations highlighted in the literature review and their equifinality. It might be, in fact, that the different combinations are similarly effective but better answer to different organizational contexts. Research taking a configurational perspective (Misangyi et al., 2016) may help uncover the complex causal relationships between SSCM configurations, SSCM governance mechanisms, and sustainability outcomes.

5.4. Implications for practice

Our review also yields several valuable implications for the professional community and for managers. Focal firms with GSCs are increasingly beset by supply chain-related sustainability issues. Our review shows that SSCM configurations and SSCM governance mechanisms should be extremely relevant for buyer firms seeking to improve sustainability outcomes in their suppliers' operations, especially when the suppliers are located in distant countries.

Specifically, open configurations and assessment might not be sufficient to deal with complex sustainability issues related to multiple sustainability outcomes in GSCs. Alternative combinations of SSCM configurations and governance mechanisms might be more effective.

Supply chain managers must find ways to directly engage with multi-tier suppliers and collaborate with them through supply chain configurations and governance mechanisms. However, managerial attention appears to be focused on assessment and indirect management of suppliers beyond the first tier. A recent report by Dutch consultancy VBDO based on 40 European firms considered sustainability leaders found that 90% use assessment of suppliers as the prevalent SSCM governance mechanism (VDBO, 2014). Our review suggests that managers should consider SSCM more broadly, composed not only of assessment but as a strategic initiative that involves collaboration with suppliers. Thus, firms might adopt closed configurations and direct SSCM governance mechanisms such as collaboration with their multi-tier suppliers.

However, if the complexity of their GSC is high due to supplier numerosity, geographical and cultural distance, firms might consider partnering with third parties in their GSCs, such as NGOs, to support them in the development of sustainability initiatives. These actors might be part of their GSC and constitute a third party configuration adopting both direct and indirect governance mechanisms enacted by third parties. Managers thus far have frequently viewed NGOs and other non-profit actors as enemies. Our review suggests that managers should instead collaborate with non-profits and other third actors, as this will facilitate the achievement of sustainability outcomes in their GSCs.

6. Conclusion

Firms in GSCs are under pressure to achieve positive outcomes along the environmental, social and economic dimensions. Establishing SSCM to manage sustainability in GSCs, however, remains elusive. This review takes a step towards addressing this challenge by identifying key elements of SSCM specific in GSCs and providing avenues for future research to further develop the field. Our systematic literature review of * mentioned articles reveals that SSCM configurations and SSCM governance mechanisms are key elements for achieving sustainable outcomes in GSCs.

We contribute to the discourse on sustainability in GSCs by consolidating and synthesizing literature focused on these elements in GSCs. We contribute to the supply chain management literature by highlighting that SSCM configurations and SSCM governance mechanisms are key elements of SSCM in GSCs. We also contribute to the field of SSCM by identifying shortcomings in our current understanding of SSCM and suggesting avenues for future research and prospective research questions to address these gaps.

This study has limitations that must be considered. The review was based on a keyword search, which limits the results to combinations of keywords. A second limitation is that the selection of articles for review might be subject to researcher biases. Although the criteria for article selection was explicit, the final selection remains subjective. Structured content analysis of papers was also subject to the same subjectivity. Although the analysis criteria were explicitly developed ex-ante and are grounded in extant research, validity threats associated with a single coder remain. Furthermore, this study only considers published articles in a subset of peer-reviewed journals as sources of literature. Other sources of relevant literature such as industry reports, Ph.D. theses, and non-english publications were not considered. Finally, being most of the current SSCM literature focused on focal firms or buyer-supplier dyads rather than multi-tier supply chains, it might be that the larger presence of open configuration studies in our review is due to the fact that few studies focused on the interaction between the buyer and sub-suppliers, despite the possible presence of a relationship between the buyer or the first tier supplier with second and third tier suppliers in the case analyzed. However, this further confirms the need to engage in future studies investigating more complex supply chain approaches. Nonetheless, and considering these limitations, we believe this review is thorough and contributes towards advancing knowledge of GSC sustainability.

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[1] The * mentioned articles that compose the dataset of reviewed literature are numbered in square brackets.

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