Resources, Conservation & Recycling 139 (2018) 237–250

Contents lists available at ScienceDirect

Resources, Conservation & Recycling

journal homepage: www.elsevier.com/locate/resconrec

Full length article

Enablers of sustainable supply chain management and its effect on competitive advantage in the Colombian context

Jairo Raúl Chacón Vargas[a,*], Carlos Eduardo Moreno Mantilla[b], Ana Beatriz Lopes de Sousa Jabbour[c]

[a] Escuela Colombiana de Ingeniería Julio Garavito, Facultad de Ingeniería Industrial, Avenida Carrera 45 No. 205-59 (Autopista norte), Bogotá, D.C., Colombia
[b] Universidad Nacional de Colombia, Sede Bogotá, Departamento de Ingeniería de Sistemas e Industrial, Facultad de Ingeniería, Carrera 30 No. 45A-03, Oficina 453-104, Bogotá, D.C., Colombia
[c] Montpellier Business School, Montpellier Research in Management, 2300 avenue des Moulins, 34185, Montpellier, Cédex 4, France

ARTICLE INFO

Keywords:
Sustainable supply chain management
Organizational capabilities
Corporate responsibility
Resource-based view
Sustainable development

ABSTRACT

This article aims to evaluate whether the enablers top and middle management support and strategic purchasing facilitate the development of sustainable supply chain practices, as well as the effect of the latter on competitive advantage. Partial least squares structural equation modelling (PLS-SEM) was applied to test the proposed model based on a sample from companies operating in Colombia. The main hypotheses of the research were supported, implying that a suitable combination between internal enablers and the adoption of sustainable supply chain practices is important to pursue competitive advantage. However, the hypothesis for the expected effect of environmental practices wasn't supported, suggesting that there is a win-win perspective between social practices in supply chains and competitive advantage in the context of emerging economies. And the analysis of the non-supported hypothesis is one of the contributions of the article.

1. Introduction

Currently, businesses and their supply chains are challenged to pursue their objectives and conduct their operations in an increasingly open and unstable world (Winston, 2014). This scenario is particularly demanding when considering stakeholders' requests for economic, social and environmental performance within focal firms' supply chains (Seuring and Muller, 2008). These requests are relative to the application of sustainability to supply chains, that is, sustainable supply chain management (SSCM) (Carter and Rogers, 2008). Recent literature suggests that in response to these requests, companies need to develop new specific capabilities (Bowen et al., 2001; Liu et al., 2013; Meixell and Luoma, 2015; Paulraj, 2011; Sarkis, 2012; Shi et al., 2012).

The above considerations are particularly important for developing or emerging economies, where SSCM practices and corporate social performance have not been widely addressed by the academic and business communities, in comparison to studies conducted in developed countries (Jabbour et al., 2017; Fahimnia et al., 2015; Kusi-Sarpong and Sarkis, 2017; Mani et al., 2018; Silvestre, 2015a, b).

Some of the factors that hinder the adoption of SSCM practices in developing countries are the high complexity and uncertainty of the business environment. In turn, these factors can be associated with institutional voids, corruption, poor infrastructure, poverty, inequality, and informal employment (Silvestre, 2015a). Thus, the study of SSCM in Latin America can address the need for empirical and theoretical work in a context that lacks proper research on the subject (de Morais, 2017, p. 33).

In particular, empirical studies of specific enablers and outcomes of social sustainability adoption in developing countries remain rare (Köksal et al., 2018; Mani and Gunasekaran, 2018, p. 150). Consequently, this article aims to evaluate whether two enablers – top and middle management support, and strategic purchasing – facilitate the development of SSCM practices (considered organizational capabilities), as well as the effect of the latter on the CA of focal firms located in the city of Bogotá, Colombia.

We intend to achieve these objectives by addressing the following research questions:

RQ1: Do top and middle management support and strategic purchasing affect the adoption of SSCM practices in the context of a developing economy?

RQ2: Does any competitive advantage accrue for firms that implement social and environmental supply chain management practices in the context of a developing economy?

* Corresponding author.
E-mail addresses: jairo.chacon@escuelaing.edu.co, jrchaconv@unal.edu.co (J.R. Chacón Vargas), cemorenoma@unal.edu.co (C.E. Moreno Mantilla), a.sousa-jabbour@montpellier-bs.com (A.B.L. de Sousa Jabbour).

https://doi.org/10.1016/j.resconrec.2018.08.018
Received 8 April 2018; Received in revised form 13 August 2018; Accepted 17 August 2018

We expect to contribute to the field of SSCM by providing evidence on whether the development of social and environmental supply chain capabilities benefits from a strategic view of the purchasing function and top and middle management support. Additionally, we intend to fulfil the need for empirical studies that address the relationship between sustainable supply chain practices and competitive advantage in the context of Latin American countries.

The article has been underpinned by the following previous findings and arguments from the literature of the field of SSCM.

Golicic and Smith (2013, p. 82) argue that "specific supply chain practices, such as environmentally related practices, also represent capabilities that contribute to the variation in performance across firms". In turn, CA depends on how well firms develop these capabilities to deal with the natural environment (Fowler and Hope, 2007; Masoumik et al., 2015). Thus, it can be inferred that the adoption of SSCM practices refers to an organizational capability and leads to firm performance. For example, Marshall et al. (2015a) and Lee et al. (2016) conceptualize environmental and social supply chain management with a resource-based logic.

Enablers are factors that facilitate the adoption of SSCM practices by a focal firm (Sancha et al., 2015). SP, understood as organizations' recognition of the strategic relevance of the purchasing function, has been identified as an important enabler of the implementation of more advanced supply management practices (Chen et al., 2004; González-Benito, 2007; Sánchez-Rodríguez, 2009) and SSCM practices (Bowen et al., 2001; Jaenglom and Tariq, 2013; Tay et al., 2015).

On this subject, Large and Thomsen (2011) argue that SP exerts an important effect on facilitating the adoption of green purchasing and environmental collaboration with suppliers. However, with the exception of the studies by Bowen et al. (2001), Knight et al. (2017), Large and Thomsen (2011) and Paulraj (2011), the literature contains little empirical research on the relationship between SP and sustainable supply chain practices. Simultaneously, in many organizations, the purchasing function remains a low priority (Johnsen et al., 2014).

These studies emphasize that one of the main features of SP is a buyer-supplier collaborative relationship characterized by strong inter-organizational interactions as an enabler of sustainability practices in the supply chain. Therefore, the purchasing function plays a significant role in enabling firms to accomplish strategic objectives due to the increase in organizational efficiency through strong collaboration with the firm's suppliers (Knight et al., 2017). Without a strategically orientated purchasing function, organizations cannot take advantage of the specialized capabilities from their suppliers (Johnsen et al., 2014), which is coherent with the work of Kirchoff et al. (2016) and Oelze (2017), who suggest that strategic aspects as enablers have been identified as crucial for the successful implementation of SSCM practices.

Although SP seems to be an important enabler of sustainable supply chain practices, SSCM requires support from top and middle management. Support from top management has an important role in strategy formulation and implementation, as well as in the provision of financial resources to promote social and environmental activities within the organization and in its supply chain (Dubey et al., 2016; Floyd and Wooldridge, 1994; Kor, 2006; Tobescu and Seuring, 2013). Thus, management commitment has been suggested as a central enabler for the sustainable management of supply chains (Mathivathanan et al., 2018; Oelze, 2017, p. 15;), which is coherent with studies that suggest that social and environmental practices in the supply chain have similar organizational antecedents (Marshall et al., 2015b).

In summary, this article aims to evaluate whether two enablers – top and middle management support and strategic purchasing – facilitate the development of SSCM practices (considered organizational capabilities), as well as the effect of the latter on the CA of focal firms located in the city of Bogotá, Colombia.

Colombia is the third largest economy in Latin America and the Caribbean. Although lower oil prices have put a strain on economic growth, Colombia is still one of the region's best economic performers (Jansen and Veeneman, 2016, p. 6). However, despite major economic, environmental and social advances made in Colombia in recent years, the country still has not been able to overcome structural problems associated with the concentration of economic activity in a few sectors, its reliance on products with low technological content, low levels of productivity and high inequality. In particular, social and environmental management activities are conducted primarily within companies but not integrated along value chains (OECD, 2015).

A key challenge for Colombia in the coming years deals with the implementation of signed peace agreements with the main insurgent group after an internal conflict of more than 50 years. The implementation of the agreement – which includes, among other actions, investment in the rural economy, land restitution, and the reintegration of combatants into society – without eroding Colombia's natural and social capital is critical, as Clerici et al. (2016) point out. Thus, the post-conflict environment in Colombia could offer opportunities for companies to redefine their role in society and contribute to sustainable and inclusive economic growth.

In this regard, two important steps to boost the productivity and competitiveness of supply chains and thus contribute to making growth more resilient, greener and socially equitable in Colombia, are strengthening the role of higher-value primary and agriculture sectors, and developing sustainable value chain practices (OECD, 2015; Jansen and Veeneman, 2016). For these reasons, this context appears as a relevant background to study the enablers of sustainable supply chain management and its relationship with CA.

To achieve our research objectives, this paper is organized as follows. First, the hypotheses and the research framework adopted in this study are introduced. The next section describes the sample and research methods. The article continues with the study's findings and a discussion of their implications, and then ends with the conclusions, which also identify the limitations of the study, provide some managerial implications and present directions for future research.

2. Hypotheses and research framework

This section briefly introduces a set of hypotheses that are organized into a conceptual framework that can be empirically tested to explore the stated relationships.

2.1. Internal enablers of SSCM practices

This article focuses on the identification of two internal enablers for the adoption of SSCM practices by focal firms: top and middle management support and strategic purchasing.

2.1.1. Top and middle management support (TMMS)

TMMS addresses the extent to which senior and middle managers understand the importance of environmental protection and are committed to developing human potential and protecting humans from damage or hazards. Thus, TMMS provides an indication of the degree to which middle managers align environmental and social strategies with operations and that to which top managers create awareness related to sustainable production and consumption, and deploy budgetary and other resources to go beyond laws and regulations (Colwell and Joshi, 2013; Chen and Paulraj, 2004; Dubey et al., 2017, 2016; Krause, 1999; McFadden et al., 2009; Mentzer et al., 2000; Monczka et al., 2009).

The SSCM literature frequently highlights that top management support and commitment are important antecedents of the adoption of SSCM practices (Ageron et al., 2012; Bowen et al., 2001; Gavronski et al., 2011; Hoejmose et al., 2012; Krause et al., 2009; Luthra et al., 2018; Luthra and Mangla, 2018; Mathivathanan et al., 2018; Paulraj, 2011). Hence, we hypothesize the following:

H1. Support from top and middle management has a significant and positive effect on the implementation of social practices in the supply chain of the focal firm.

H2. Support from top and middle management has a significant and positive effect on the implementation of environmental practices (ENVPR) in the supply chain of the focal firm.

2.1.2. Strategic purchasing (SP)

The purchasing function is considered a strategic area of the firm and a potential source of valuable firm attributes, such as an improved quality, cost reduction and market growth (Carr and Smeltzer, 1999; Carr and Pearson, 2002; Chen et al., 2004; Esper et al., 2007; Large and Thomsen, 2011; Lawson et al., 2009). According to Lawson et al. (2009), strategic purchasing is understood as a planning process of purchasing activities in order to find opportunities consistent with the focal firm's capabilities to achieve its long-term goals. According to these same authors, strategic purchasing is also "centered on its ability to create collaborative relationships for firm advantage". Concerning this issue, such planning of purchasing activities requires supplier integration, socialization mechanisms (e.g., communication of expectations and sharing of knowledge between the focal firm and its suppliers), and supplier responsiveness (Lawson et al., 2009).

Following Chen and Paulraj (2004, p. 134) and Sánchez-Rodríguez (2009), strategic purchasing can be viewed as an antecedent of supply management. Strategic purchasing can provide the context for SSCM practices because it requires cross-functional management and close relationships with supply chain partners. In turn, this environment allows integrating knowledge from different parties through communication and networking. Developing trustworthy relationships with supply chain members can enhance the focal firm's ability to improve the social and environmental sustainability of its supply chain while decreasing supplier risk (Bowen et al., 2001; Knight et al., 2017; Lee et al., 2016; Paulraj, 2011).

This statement is consistent with Jaenglom and Tariq (2013, p. 779), who suggest that sustainable supply chain practices can be achieved on the supply side by building up a supply network and collaborative relationships between buying firms and their suppliers, which can create shared value. This finding is also coherent with Kirchoff et al. (2016), who suggest that a strategic supply chain orientation is an organizational antecedent of sustainable supply chain management because of its ability to create socially complex and difficult-to-imitate relationships of a collaborative nature.

Based on these arguments, we posit the following hypotheses:

H3. Strategic purchasing has a significant and positive effect on the implementation of social practices in the supply chain of the focal firm.

H4. Strategic purchasing has a significant and positive effect on the implementation of ENVPR in the supply chain of the focal firm.

2.2. The effect of the implementation of environmental and social supply chain practices on competitive advantage

Departing from a resource-based perspective, environmental supply chain practices refer to those proactive practices – involving causally ambiguous and socially complex resources – that include all energy, material consumption, solid, liquid and gaseous wastes related to an organization's in-house processes and environmental collaboration among multiple supply chain members or partners (Shi et al., 2012, pp. 56–57)). ENVPR are operationalized by conceptualizing them as six first-order constructs (Appendix A). These constructs are (Fig. 1): (i) green manufacturing (GM) (Dubey et al., 2015; Shang et al., 2010; Srivastava, 2007); (ii) eco-design (EC) (Boks, 2006; De Sousa Jabbour et al., 2015; Johansson, 2002; Khor and Udin, 2013; Luttropp and Lagerstedt, 2006); (iii) green logistics (GL) (Grant et al., 2013; Islam et al., 2018; McKinnon, 2012); (iv) green purchasing (GP) (Ansari and Kant, 2017; De Sousa Jabbour et al., 2015; Eltayeb et al., 2011; Hoejmose and Adrien-Kirby, 2012; Shen et al., 2017; Zhu and Geng, 2001;); (v) environmental collaboration with customers (ECC) (Chin et al., 2015; Theyel, 2001; Vachon and Klassen, 2008); and (vi) reverse logistics (RL) (Agrawal et al., 2016; Agrawal et al., 2015; Alonso Movilla et al., 2016; Bouzon et al., 2016; García-Rodríguez et al., 2013; Meade and Sarkis, 2002; Rogers and Tibben-Lembke, 2001;), that is, recovery of used products at the end of their life cycle.

Additionally, addressing social issues in the supply chain is essential to corporate social performance. Social issues are subjected to the conditions in which a firm operates, which are related to the dynamic and complex nature of the majority of relevant social issues in supply chains (Yawar and Seuring, 2017; Mani et al., 2018). For this reason, the incorporation of social issues continues to be less researched than the environmental dimension in SSCM (Jabbour et al., 2017). For example, the involvement of multiple suppliers may impact people's health and well-being and directly affect the focal firm's reputation (Marshall et al., 2015a; Yawar and Seuring, 2017).

It is recognized that there are difficulties in defining social sustainability and defining that social issues depend on context and that they change according to societal evolution (Mani et al., 2018; Vallance et al., 2011). Moreover, some features and practices of social responsibility upstream and downstream the supply chain (see, for example, Jabbour et al., 2017; Mangla et al., 2015; Tate et al., 2010) have not been traditionally considered as a starting point in SSCM research. Based on Mani et al. (2016a), Mani et al. (2018) and Marshall et al. (2015a), social supply chain practices include health and safety management systems, the design of products and processes that positively impact the well-being of the consumer and workers, and actions that contribute to improving the welfare of the community in which the supply chain operates.

Thus, social supply chain practices are operationalized by conceptualizing them as four first-order constructs (Appendix A). These constructs are (i) labour practices (LP) (GRI, 2018; Mani et al., 2016b; Rentizelas et al., 2018; Yawar and Seuring, 2017;); (ii) product responsibility (PR) (Klassen, 2009; Peloza and Shang, 2011; GRI, 2000); (iii) community relationships (COMMREL) (Mani et al., 2016a; Burke, 1999; Rentizelas et al., 2018; Tate et al., 2010); and (iv) socially responsible purchasing (SRP) (Mani et al., 2016a; Ahmadi et al., 2017; Leire and Mont, 2010; Maignan et al., 2002).

Some authors suggest that environmentally-driven competitive advantage is a condition under which firms find a relative cost or differentiation benefit with regard to their competitors, obtained through the implementation of green supply chain activities and strategies (Cambra-Fierro and Ruiz Benitez, 2011; Chavan, 2005; Hart, 1995; Wagner et al., 2002). This "green" type of advantage has been called green-based competitive advantage (Arend, 2014), environmental competitiveness (Wagner and Schaltegger, 2004), eco-friendly competitive advantage (Leonidou et al., 2015), and green competitive advantage (Chen and Chang, 2013). Similarly, focal firms may find a superior cost or market performance relative to other competitors as a result of the implementation of social supply chain practices and strategies (Arend, 2014; Klassen, 2009).).

Although the results on the effect of environmental or social supply chain practices on CA are inconclusive (Rao and Holt, 2005; Seuring and Muller, 2008; Wang and Sarkis, 2013; Yawar and Seuring, 2017; Zhu and Sarkis, 2013)), some studies conceptually or empirically suggest a positive relationship between green/social SCM and financial performance (Chiu and Hsieh, 2016; Choi and Hwang, 2015; Green et al., 2012; Hart, 1995; Hoejmose et al., 2014; Parmigiani et al., 2011). Therefore, we hypothesize the following:

H5. The implementation of social practices in the supply chain has a significant and positive effect on the competitive advantage of the focal firm.

H6. The implementation of environmental practices in the supply chain has a significant and positive effect on the competitive advantage of the focal firm.

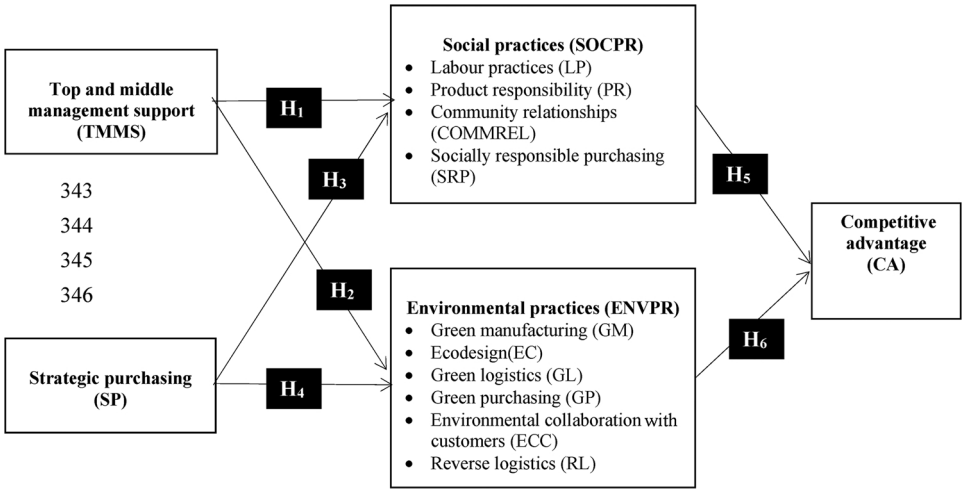

Fig. 1. Proposed research framework.

2.3. Model development

An aim of this study is to identify the *direct* relationships between environmental and social supply chain practices comprising SSCM and CA by departing from the theoretical lens to study this relationship according to the resource-based view. At the same time, there has been an interest in the green supply chain management (GSCM)/SSCM literature to study different types of internal and external drivers and enablers of such practices. In this regard, the other aim of our study is to identify the *direct* relationships between two internal enablers – strategic purchasing, and top and middle management support – and the adoption of SSCM practices.

The integration of these two levels of analysis allows for the testing of the *indirect* relationship between the two enablers and sustainability-driven competitive advantage, which occurs through the mediating role of the adoption of SSCM practices. However, our interest does not rely on the direct and positive effect on CA arising from a strategic focus on supplier relationship management or the top management's commitment to sustainability, although this effect may be present. The resource-based literature says that the adoption of specific environmental or social supply chain practices – which represent organizational capabilities – explains the variation in sustainability-driven performance across firms (Golicic and Smith, 2013, p. 82).

In order to relate the internal enablers of the implementation of environmental and social supply chain practices to the relationship of the latter with competitive outcomes, we propose the conceptual model shown in Fig. 1. First, we hypothesized that two internal enablers have a significant and positive effect on the deployment of SSCM practices: (i) *top and middle management support* (TMMS) and (ii) *strategic purchasing* (SP). Furthermore, we posited that these practices (including internally and externally oriented practices) have a direct effect on CA (Ahi and Searcy, 2015; Zhu et al., 2012).

3. Methodology

The study adopts a quantitative research design implemented through the development and application of a self-assessment survey research instrument comprising 69 items (Appendix A). This survey questionnaire incorporates items obtained from both the extant literature and developed from an initial qualitative study that conducted in-depth interviews with company executives from four different firms and performed a content analysis of the data. Departing from an extensive (non-exhaustive) review of the literature in the domain of our proposed model (see Section 2.3), we identified the items that have been used to operationalize the model's theoretical constructs (namely, its latent variables) and established the hierarchy between first-order and second-order constructs. It is important to clarify that only those items that had been validated in the literature were taken into account. One of the advantages of this deductive approach is that it helps to guarantee the content validity of the measurement instrument. Each construct was operationalized using at least three items, as recommended in the literature (Anderson and Gerbing, 1988; Ding et al., 1995; Hair et al., 2010).

The survey questionnaire contains 5 questions (using a 5-point Likert scale) that asked respondents to evaluate the extent of competitive advantage outcomes that might be obtained with the implementation of environmental supply chain practices, and symmetrically, it contains the same questions with respect to social supply chain practices. In choosing a self-assessment approach for the measurement of CA due to the implementation of SSCM practices, we followed Wagner (2011) and Zhu and Sarkis (2013).

Following a multiplicative score rule in the social sciences (Rossiter, 2011, p. 112), we weighted the perceived advantage derived from the implementation of ENVPR by the perceived advantage derived from SOCPR. In this manner, we obtained scores that integrated both sources of advantage into an aggregated performance measure that does not prioritize the contribution of environmental or social aspects. We accordingly refer to this new variable as CA. The CA scores ranged from 1 to 25, with a higher composite performance score indicating a higher competitive performance derived from the simultaneous application of social and environmental practices in the supply chain.

Therefore, this CA measure captures the benefits of implementing a firm's unique value strategy based on the combination of social and environmental practices in its supply chain, which cannot be replicated by competitors. This type of index is recommended as a decision-making tool in the field of sustainable development (Paredes-Gazquez et al., 2016, p. 143) and a reliable performance measure for sustainable supply chains (Hassini et al., 2012). However, some authors criticize the use of composite indices when the high values of one indicator offset the low values of another indicator (Paruolo et al., 2013; Salvati and Zitti, 2009 cited in Paredes-Gazquez et al., 2016). Despite these criticisms, we consider that the proposed composite index is a helpful measurement tool in the context of this study.

The questionnaire also employed a 5-point Likert-type scale to measure the extent to which focal firms apply each practice (at the levels of enablers and of SSCM practices). The survey questionnaire was then sent to a non-probabilistic, convenience sample of 244 firms participating in the two upper levels (out of four) of an assistance and education program developed by Bogotá's Secretary of the Environment (see http://www.ambientebogota.gov.co/es/web/gae/inicio). According to Mook (1983, cited in Peterson and

Merunka, 2014) and Leiner (2017), the reasons for using a convenience sample were the following: (i) our research is intended to derive conclusions about a theoretical framework and not about the population of interest; (ii) the sample was relatively homogeneous, comprising a group of companies for which there is evidence of some extent of environmental or social proactivity; (iii) a group of managers or their equivalent with knowledge and experience of their companies was easily contacted through the internet; and, (iv) the sample can easily be replicated.

Our sample includes a significant share of large (42%) and medium-sized firms (43%), meaning that these firms have a higher profile and are thus more concerned with protecting their reputation with the broader public and with key stakeholders (Kauppi and Hannibal, 2017; Matos et al., 2005;). Additionally, firm size reinforces the likelihood that the firm engages in more advanced GSCM practices in relation to smaller-sized firms (Zhu et al., 2008), namely, in inter-organizational environmental practices (Shi et al., 2012).

A total of 137 questionnaires were returned; of these questionnaires, 11 were incomplete and consequently eliminated. In the end, 126 questionnaires were suitable for the final quantitative analysis, resulting in a response rate of 51.6%, which is considered appropriate in SCM research (Pagell et al., 2004 cited in Lee, 2008; Prahinski and Benton, 2004). According to the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 4) (http://unstats.un.org), the sample included firms from the following sectors: industry (59.5%), services (30.2%), commerce (6.3%), agriculture (1.6%), mining (1.6%), and construction (0.8%).

The respondents included environmental managers, purchasing managers, and corporate social responsibility managers or their equivalent, and there was only one respondent per company who provided responses for all items, including both independent and dependent variables. Our criteria for the selection of respondents are similar to those employed in green or sustainable supply chain management studies (e.g. Green et al., 2012; Holt and Ghobadian, 2009; Zhu and Sarkis, 2013), with a focus on mid-level managers and plant and operations managers. Not only are these respondents likely to have familiarity with the subject matter, but they also usually play a role in the design of the environmental or social supply chain strategy of their firms. Some of the survey items were developed from interviews with potential respondents, ensuring that salient beliefs are assessed and minimizing the emergence of pseudo-attitudes dominated by context effects (Lindell and Whitney, 2001).

Since the data for exogenous and endogenous variables are obtained from the same respondent, the same format of responses, and the same form of data collection, there is a risk that common method bias (CMB) may be present (Bido et al., 2018). CMB occurs when variation in responses is attributable to the instrument rather than to the constructs purportedly represented by the measures (Podsakoff et al., 2003; Reio, 2010). Harman's single-factor score was used to check for CMB, loading all items into one common factor. The results show that a single factor explains only 31.507% of the total variance in our sample. As the total variance explained by this single factor is below 50%, CMB is not a concern in this research (Podsakoff et al., 2003, 2012).

However, due to the substantial limitations of Harman's single factor test (Podsakoff et al., 2003, 2012), we complemented this analysis by examining the Pearson's correlations matrix to establish if any of the correlations among the observed variables of the model were above 0.90. Correlations above this threshold would be strong evidence of the existence of CMB (Lowry and Gaskin, 2014). None of the correlations obtained reached this limit. Hence, based on the above criteria, the likelihood of CMB in this research is low.

The validity and reliability of the theoretical constructs (i.e., the measurement model) were verified through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Several authors suggest executing an EFA before carrying out any structural equation system procedure (Gimenez et al., 2005; Hipólito Bernardes do Nascimento and Alvaro da Silva Macedo, 2016) because EFA helps to achieve construct validity (Goodwin, 1999) and a more parsimonious explanation of the theoretical constructs (see Thompson, 2004 for an explanation in the field of organizational studies). In addition, EFA was used because some of the items that comprise the factors modelled in the PLS-SEM were obtained from interviews with a group of managers, as explained above.

Finally, the validated factors were modelled using reflective indicators, and the structural equation model was tested using partial least squares (PLS). In addition to internal consistency, the convergent and discriminant validity of the measurement model were evaluated. EFA was conducted using a varimax rotation, given that this technique best provides a clearer separation of non-correlated factors (Loehlin, 2004) and to facilitate the interpretation of the factor matrix. Based on the cut-off rules for the Kaiser-Meyer-Olking index and Bartlett's sphericity test, factor analysis was conducted with all 69 items using the SPSS statistical software package for Windows. CFA was also performed to better evaluate the validity of the study's constructs; this procedure is recommended even when the EFA results support construct validity and reliability (Anderson and Gerbing, 1988; Hu and Bentler, 1999). In addition, CFA can be used in exploratory research to eliminate items that may cause poor model-data fit (Schreiber et al., 2006), which is coherent with the objectives of the present research.

A theory on SSCM is still under development (Freise and Seuring, 2015). In accordance with the nature of this study, structural equation modelling (SEM) was performed using PLS for data exploration and model testing (Henseler et al., 2009). The advantages of PLS are as follows (Hair et al., 2014; Peng and Lai, 2012): (i) high levels of statistical power can be achieved with small sample sizes, (ii) it does not require strict assumptions on the normal distribution of data, and (iii) it is useful for complex structural models (with many constructs, many indicators, and hierarchical constructs).

The evaluation of the structural models was performed according to the criteria recommended by the SEM literature (Cordeiro et al., 2010; Hair et al., 2017). Using the G*Power criterion and departing from the reflective structural model shown in Fig. 1, where a maximum of two arrows point to any of the latent constructs, 68 cases would be necessary to attain a power of 0.80 with an alpha level of 0.05 and an effect size of 0.15. Hence, a sample size of 126 guarantees the minimum sample size requirement necessary to use PLS.

4. Results

4.1. Evaluation of the measurement model

Internal consistency reliability, convergent validity and discriminant validity were assessed using composite reliability indices (CR), Cronbach's alpha, average extracted variance (AVE) and cross loadings of the indicators, respectively. All these criteria satisfied the cut-off values suggested in the literature (Fornell and Larcker, 1981; Hair et al., 2014) (Tables 1–3).

4.2. Evaluation of the structural model

To evaluate the structural model, the primary evaluation criteria used were the coefficients of determination (R^2), the significance of the path coefficients, the effect size (f^2), the model's ability to predict (Q^2) and importance-performance matrix analysis (IPMA). According to the PLS-SEM literature, our proposed model has fulfilled all prediction criteria (Hair et al., 2014; Henseler and Fassot, 2010); therefore, we conclude that our model has predictive relevance (Appendices B–D).

The analysis of the results provides support for all the hypotheses (Fig. 2 and Table 4) with the exception of H6, which is not supported by our results. According to Chin (1998), the relationships between the constructs are considered robust if they are associated with path coefficients higher than 0.2. The coefficients associated with the relationships between the latent variables are above this value and statistically significant at the 0.05 level, thus confirming H1 to H5. As a

Table 1
Convergent validity for the 1st and 2nd order constructs.

1st order constructs	Composite reliability	Cronbach's Alpha	AVE	R^2 (Endogenous latent variables)
Top and middle management support (TMMS)	0.927	0.894	0.759	–
Strategic purchasing (SP)	0.885	0.804	0.720	–
Environmental practices (ENVPR)	0.916	0.903	0.362	0.303
Social practices (SOCPR)	0.885	0.853	0.438	0.329
Ecodesign (EC)	0.919	0.883	0.740	0.676
Environmental collaboration with customers (ECC)	0.895	0.825	0.741	0.670
Green logistics (GL)	0.880	0.797	0.710	0.431
Green manufacturing (GM)	0.847	0.730	0.649	0.492
Green purchasing (GP)	0.865	0.764	0.681	0.602
Reverse logistics (RL)	0.881	0.819	0.649	0.258
Socially responsible purchasing	0.910	0.851	0.771	0.650
Health and safety at work and in the product (HSWP)	0.830	0.694	0.621	0.601
Firm committed to its community (FCC)	0.849	0.766	0.586	0.759
Competitive advantage (CA)	–	–	–	0.301

consequence, in terms of direct relationships, the results for H1 to H4 suggest that top and middle management support and strategic purchasing, as internal enablers, are correlated with the adoption of social practices and environmental practices in the supply chain.

With regard to H5, the results showed a positive and significant relationship between social supply chain practices and CA. These findings are consistent with those of McWilliams and Siegel (2011, p. 1492), who suggest that firms can capture some of the value of social goods, such as through the effect on the firm's reputation. Conversely, the results for H6 apparently contradict the notion that environmental supply chain practices may influence CA, as proposed by Esty and Simmons (2011), Hart (1995), and other authors. In terms of the evaluation of mediated relationships, the two internal enablers are statistically significantly related (at the 0.05 level) to CA through the mediated effect of environmental and social practices (Appendix E).

Regarding the coefficients of determination (R^2), Chin (1998) states that reference values of 0.67, 0.33, and 0.19 can be considered substantial, moderate, and weak, respectively. Our results indicate that the two organizational antecedents explain 30.3% of the variance in ENVPR, whereas these same two organizational antecedents explain 32.9% of the variance in SOCPR. Similarly, the reflective model shows that the ENVPR construct explains more than 60% of the variation in EC, ECC, and GP, while 43% and 49.6% of the variance in GL and GM, respectively, are explained by the same latent construct. The variation in RL is least explained by the same construct, as evidenced by an R^2 value of 0.258.

However, the SOCPR construct explains more than 60% of the variance in socially responsible purchasing, health and safety (work and product), and community relations. Thus, all social activities incorporated into the research model are determined more or less equally by the capability to manage social issues in the supply chain. Based on the same R^2 values, CA is not largely dependent on the deployment of environmental and social practices (30.1%).

In terms of the assessment of effect sizes (f^2), Chin (1998) suggests that values between 0.19 and 0.33 indicate weak explanatory capacity, those between 0.33 and 0.67 indicate moderate capacity, and those higher than 0.67 indicate substantial capacity. However, these conventions should be applied with caution in the face of the measurements used, the study design and the practical or organizational importance of the findings. In other words, not only the magnitude of the effect but also its practical or organizational value must be considered (Durlak, 2009, p. 922). Although the evaluation of f^2 is an important component of good research, scholars who have conducted research in the SSCM field using SEM techniques have not typically included effect sizes in their research results or indicated the values without providing a discussion of or explanation for them. Thus, it is difficult to assess whether the results of the size of effects were adequate in our research. However, from a more conventional perspective, the obtained effect sizes show that strategic purchasing and top and middle management support exhibit small effects on ENVPR and SOCPR (Appendix B).

The model's predictive relevance was tested through the Stone-Geisser Q^2-value test (Stone, 1974; Geisser, 1975; Chin, 2010). $Q^2 > 0.0$ is a measure of a predictive model (Hair et al., 2014; Henseler and Fassot, 2010). The resulting Q^2 values (Appendix C) indicate that the proposed model has predictive relevance. With respect to the direct effects, the IPMA results of CA (Appendix D) indicate that SOCPR are of relevance for achieving CA, and their performance is somewhat superior to that of ENVPR. In comparison, ENVPR have low importance but relatively high performance. With regard to the indirect effects of TMMS and SP on CA, these constructs have similar importance.

Table 2
Discriminant validity for 1st order constructs: Inter construct correlation matrix and the square root of AVE (Fornell-Larcker criterion).

	TMMS	ECC	SP	SRP	GP	EC	FCC	RL	GL	GM	ENVPR	SOCPR	SHWP	CA
TMMS	0.871													
ECC	0.309	0.861												
SP	0.481	0.405	0.849											
SRP	0.239	0.449	0.348	0.878										
GP	0.411	0.600	0.367	0.562	0.825									
ECC	0.362	0.583	0.286	0.242	0.530	0.860								
FCC	0.552	0.566	0.491	0.534	0.564	0.438	0.765							
RL	0.117	0.387	0.363	0.233	0.281	0.248	0.265	0.805						
GL	0.347	0.449	0.401	0.334	0.416	0.404	0.380	0.331	0.842					
GM	0.406	0.450	0.364	0.240	0.510	0.576	0.439	0.146	0.349	0.806				
ENVPR	0.455	0.817	0.490	0.469	0.776	0.824	0.617	0.508	0.656	0.704	0.602			
SOCPR	0.495	0.638	0.489	0.806	0.661	0.489	0.871	0.315	0.475	0.437	0.699	0.662		
HSWP	0.425	0.555	0.337	0.453	0.490	0.531	0.536	0.276	0.463	0.385	0.635	0.775	0.788	
CA	0.449	0.437	0.437	0.339	0.402	0.386	0.513	0.112	0.205	0.383	0.460	0.536	0.454	0.867

Table 3
Indicator reliability results.

Constructs	Indicators	Indicator reliability
Strategic purchasing (SP)	SP5	0.761
	SP6	0.898
	SP8	0.881
Top and middle management support (TMMS)	TMMS1	0.898
	TMMS2	0.868
	TMMS3	0.829
	TMMS4	0.889
Ecodesign (EC)	EC2	0.855
	EC3	0.839
	EC4	0.887
	EC5	0.859
Environmental collaboration with customers (ECC)	ECC2	0.891
	ECC3	0.902
	ECC4	0.784
Green logistics (GL)	GL2	0.854
	GL3	0.845
	GL4	0.829
Green manufacturing (GM)	GM2	0.809
	GM6	0.794
	GM7	0.814
Green purchasing (GP)	GP1	0.774
	GP3	0.845
	GP4	0.855
Reverse logistics (RL)	RL1	0.798
	RL2	0.868
	RL3	0.754
	RL4	0.798
Socially responsible purchasing (SRP)	SRP1	0.870
	SRP2	0.867
	SRP3	0.896
Health and safety at work and in the product (HSWP)	LP1	0.790
	LP2	0.854
	RP1	0.713
Firm committed to its community (FCC)	LP4	0.799
	LP5	0.830
	CR1	0.690
	Cr4	0.736
Competitive advantage (CA)	CA1	0.812
	CA2	0.828
	CA3	0.912
	CA4	0.890
	CA5	0.890

To summarize, the main results of the study are the following: (a) TMMS and SP have served as internal enablers of the adoption of SSCM practices; (b) as a consequence of the first finding, it can be argued that social SSCM practices constitute an organizational capability since their adoption leads to CA (CA captures the benefits of implementing a firm's unique value strategy based on social supply chain practices that cannot be easily replicated by competitors); and (c) the non-significant relationship between the adoption of environmental supply chain practices and CA needs to be interpreted in the light of the features of the sample, which corresponds to a developing country setting.

5. Discussion

Rooted in a resource-based perspective and a review of the extant SSCM literature, this research evaluated whether two enablers – top and middle management support and strategic purchasing – facilitate the development of sustainable supply chain practices (organizational capabilities), as well as the effect of the latter on CA. The literature claims that social issues are lacking from most SCM analyses and that much work needs to be done to incorporate them into future research and practice. Our study contributes to the SSCM literature (Marshall et al., 2015a; Mitra, 2014; Wong et al., 2015; Zhang et al., 2018; Mani and Gunasekaran, 2018; Mani et al., 2018; Luthra et al., 2018) by advancing the implementation of these emerging research topics, particularly for the case of supply chains in Latin America (Caiado et al., 2017; Chiappetta Jabbour and De Sousa Jabbour, 2014; Delmonico et al., 2018; Silvestre, 2016; Wieland et al., 2016).

The extension of SCM theory to address sustainable development is in an exploratory stage and therefore has not reached scientific maturity (Mathews et al., 2016; Stiller and Gold, 2014). Based on these considerations, this research can be viewed as oriented towards incremental theory building (Eisenhardt, 1989) in at least two respects: first, with regard to the extension of the range of SCM capabilities, specifically those associated with a response to the social concerns of the focal firm's stakeholders (Kirci and Seifert, 2015), and second, by identifying and analysing the causal relationships between internal enablers and the building of SSCM capabilities.

This study confirms the results of the vast body of studies that consistently remark on the importance of top and middle management support in the implementation of a sustainability strategy within the supply chain's focal organization (Kealey, 2013; Sajjad et al., 2015). The current results also provide empirical support for the enabling role of strategic purchasing with respect to sustainable supply chain capabilities, which has been suggested in the literature (Bowen et al., 2001; Lintukangas et al., 2013).

We obtained evidence that social supply chain practices displayed by focal firms significantly and positively influence the firm's competitiveness. Meanwhile, environmental supply chain practices do not have a statistically significant relationship with CA. These results seem to contradict the findings of other studies, which show a positive link between ENVPR and financial performance/competitive advantage (Azevedo et al., 2011; Green et al., 2012; Rao and Holt, 2005; Zhu and Sarkis, 2004). However, the results of this research are in accordance with previous studies that have not found such a positive association, including those for developed economies (e.g., Eltayeb et al., 2011; Esfahbodi et al., 2016; Mitra and Datta, 2014).

The literature seems to indicate that, in general, a positive effect can be predicted between proactive environmental strategies and superior performance or CA (Appolloni et al., 2014; Aragón-Correa and Sharma, 2003; Choi and Hwang, 2015; Rao and Holt, 2005; Song et al., 2017). We interpret the non-significant association between environmental supply chain practices and advantage to be a result of the particular features of our sample. On one hand, Colombian companies are making efforts to translate their CSR policy into sound water use, CO_2 reduction and waste management, but they are doing so mostly within the company and not at the value chain level, as evidenced in a recent report commissioned by The Netherlands Enterprise Agency (Jansen and Veeneman, 2016). In this same report, representatives from two large companies in the food sector indicate that there is more room for the development of sustainability initiatives at the supply chain level, including food production, transportation, and manufacturing. They also manifest "the need for technology, knowledge and resources for these developments" (Jansen and Veeneman, 2016, p. 17).

On the other hand, entrepreneurs in Colombia, especially those from smaller companies, recognize the pertinence of improving their environmental performance, but they do not think that their consumers will appraise the ecological value added to products when making purchasing decisions (Echeverri Cañas, 2010). The picture that emerges from these two dimensions of the issue is one in which companies are not fully embracing sustainable practices that could lead to enhanced performance, e.g., reducing indirect material inefficiencies at the supply chain level, while customers and investors seem to not yet reward these efforts.

In contrast with the previous finding, our results from a developing economy context indicate a positive effect of social supply chain practices on CA. This finding is consistent with Smith (2007), Gimenez et al. (2012), and Mani and Gunasekaran (2018), and it suggests that there is a linkage between supply chain social sustainability and the improvement in the focal firm's corporate reputation. According to the RBV, incorporating social issues into the supply chain involves a combination of activities such as the integration of stakeholders from outside and

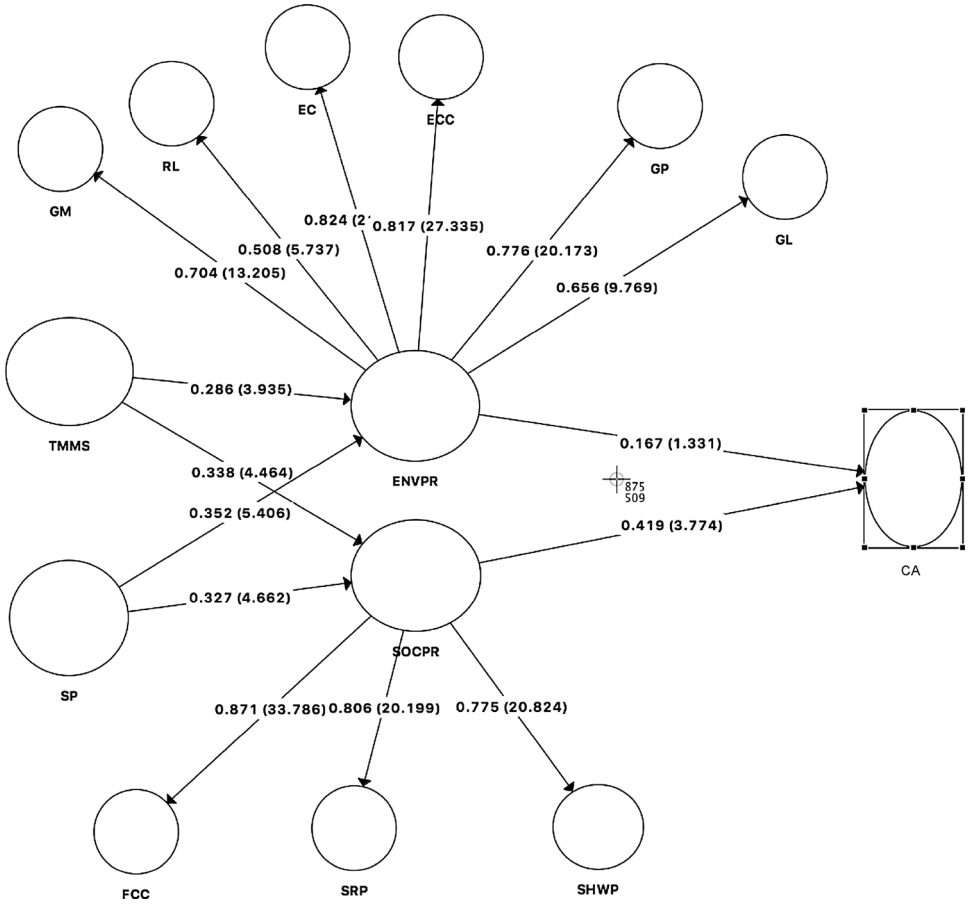

Fig. 2. Statistical significance of the path coefficients.

inside the supply chain and the firm's ability to adjust to stakeholders' social expectations. This combination adds greater complexity to the supply chain strategy, contributing to CA due to the socially complex and causally ambiguous nature of these practices, which makes them difficult for a competitor to imitate (Smith, 2007, p. 188).

When a focal firm improves the working conditions of its employees and other companies in its supply chain or achieves good relations with the community, such actions lead stakeholders to perceive the focal firm positively (Alsop, 2004; Carroll and Shabana, 2010). Similarly, when injuries are a key performance indicator of a highly visible company and the company reduces work-related injuries, the company's reputation improves (Alsop, 2004; Coors and Winegarden, 2005). For example, based on a sample of 54 small and medium enterprises in Colombia, Aya Pastrana and Sriramesh (2014) find that the main benefits that these firms received from their CSR practices refer to improving organizational culture, attracting and maintaining the best employees, improving image reputation, and improving customer loyalty. However, of note, the study of Wang and Sarkis (2013) does not show evidence that socially responsible SCM is associated with corporate financial performance. Similarly, McWilliams and Siegel (2011) suggest that results on this relationship are inconclusive.

6. Conclusions

Drawing from a theoretical framework rooted in the RBV, this article aimed to evaluate whether two enablers – top and middle management support and strategic purchasing – facilitate the development of sustainable supply chain practices (organizational capabilities), as well as the effect of the latter on the CA of a group of 126 focal firms in the city of Bogotá, Colombia. The testing of the proposed framework indicated positive relationships between the factors involved, with the exception of the link between environmental supply chain practices and CA.

Due to the purposive selection of the sample and its relatively small size, our findings cannot be extended to the performance of the whole industry of Colombia or other developing countries. Caution should

Table 4
Results of hypothesis testing.

Relationships	Path coefficients	Standard error	T statistics	p values	Final results
H1: TMMS = > SOCPR	0.338	0.076	4.464	0.000	Supported
H2: TMMS = > ENVPR	0.286	0.073	3.935	0.000	Supported
H3: SP = > SOCPR	0.327	0.070	4.662	0.000	Supported
H4: SP = > ENVPR	0.352	0.065	5.406	0.000	Supported
H5: SOCPR = > CA	0.419	0.111	3.774	0.000	Supported
H6: ENVPR = > CA	0.167	0.126	1.331	0.183	Not supported

The statistical significance of the path coefficients was assessed using a bootstrap procedure with 5000 re samples. Path coefficients are statistically significant at a level of $\alpha = 0.05$ (p value < 0.05 or T statistic > 1.96).

also be taken, given the diversity of the chosen sample, as it comprises firms from different industrial sectors and organizational cultures, two factors whose eventual effect on the studied relationships might be taken into account from a contingent perspective. Additionally, no interdependencies between social and environmental practices were considered (see Wang and Sarkis, 2013; Wolf, 2014).

This article sheds light on the importance of being engaged in SOCPR within supply chains for organizations to obtain CA. The relationship between SOCPR in sustainable supply chains and CA has not been extensively explored to date, especially in the context of emerging economies. Another contribution of this article is to study two internal enablers of SSCM practices (i.e., strategic purchasing, and top and middle management support). Empirical evidence provided by this study indicates that these enablers are influential in the adoption of SOCPR that result in CA and in the adoption of ENVPR that do not confer advantage.

In this regard, a practical implication of the study is that the identification of a suitable combination between internal enablers and the adoption of sustainable practices could be critical to pursuing competitive advantages. In particular, senior managers should promote the strategic nature of the purchasing function in order to serve as a facilitator of the deployment of social and environmental practices in the supply chain. Our results also show managers the importance of building organizational capabilities (i.e., technology, knowledge, resources, and relationship management) that translate corporate social responsibility policies into environmentally and socially sustainable practices at the supply chain level.

Future research can offer further insights on how the joint implementation of these practices enhances or constrains sustainability in the supply chain (Pfeffer, 2010) or on how they evolve over time (Zhang et al., 2018). Similarly, future research can help explain the extent to which organizational antecedents and firm capabilities to engage in socially responsible corporate behaviour depend on sector affiliation, the type of customers in the chain, different products, or variations across countries. Finally, much research is needed in social sustainability in particular, whose understanding evolves over time and depends on contextual factors even more than environmental sustainability does (Campbell, 2007; Dempsey et al., 2011; Miemczyk et al., 2012).

Acknowledgements

The authors are very thankful to Escuela Colombiana de Ingeniería Julio Garavito. Universidad Nacional de Colombia and Montpellier Business School for their research support.The researchers would like to also thank the companies and participants from industry and government who took the time to be involved in this research. Finally, the authors are also very much thankful to the anonymous peer reviewers for their valuable comments.

Appendix A. Constructs and measures ofthe proposed framework

Scale and items
Environmental practices
Please indicate how often your company does the following activities.
Green manufacturing
Adoption of environmental management systems (e.g., ISO 14001)[b]
Modification of processes/operations to reduce materials and energy
Modification of processes/operations to replace hazardous or non-biodegradable materials[b]
Modification of processes/operations to reuse, to use recycled material or to recover used resources[b]
Modification of processes/operations to reduce the generation of non-hazardous wastes[c]
Modification of processes/operations to reduce the generation of hazardous wastes
Modification of processes/operations to improve efficiency in water consumption
Training of employees to engage them in the reduction of wastes[a]
Rewards to employees for the best pollution prevention/reduction initiatives[b]
Monitoring of the environmental information of processes/operations[b]
Ecodesign
Design/modification of products/packaging to reduce/avoid hazardous or toxic materials[a]
Design/modification of products/packaging to reuse, recycle and recover materials/parts
Design/modification of products/packaging to reduce the release/generation of pollutants to air, water or soil during all stages of the product life cycle
Design/modification of products/packaging to reduce consumption of energy and water during all stages of the product life cycle
Design/modification of products/packaging to reduce consumption of raw materials (that are not toxic or dangerous) during all stages of the product life cycle
Green logistics
Proper maintenance of means of transport used for distribution[a]
Optimization of delivery routes and logistics
Optimization of truck load
Implementation of activities for the efficient use of energy in the warehouses used for the logistics and distribution of products[a]
Elimination of excess packaging materials and shipping
Green purchasing
Selection of suppliers or subcontractors based on specific environmental criteria
Checks on the suppliers to have a certified EMS/14001 standard[a]
Environmental training and awareness seminars for suppliers
Environmental audits of suppliers
Collaborative work with suppliers on the reduction of the environmental impacts in the focal firm's facilities[b]
Environmental collaboration with customers
Collaborative work with clients to reduce the environmental impact of packaging and the packing of products[b]
Collaborative work with clients to use less energy during the transportation of products

Collaborative work with clients to reduce the environmental impact of products during their use
Collaborative work with clients to facilitate the return and collection of post-consumer wastes/used packaging

Reverse logistics

Recovery of used products/packaging to repair/remanufacture them to sell them on the market again
Recovery of used products/packaging to recover materials/components
Recovery of used products/packaging to give them a proper final disposal
Recovery of used products/packaging to return them to their owners[b]

Social practices

Labour practices

Implementation of a safety and health management system (e.g., OHSAS 18001)
Implementation of programs to promote safe and healthy conditions in all operations[b]
Promotion of the inclusion of and employment generation for vulnerable people[a]
Adoption of health and social welfare programs for employees other than those required by national laws and regulations
Training programs/seminars on international labour standards and human rights

Product responsibility

Design/modification of products/packaging to avoid causing damage to the health or safety of the end user
Design/modification of products/packaging to reduce hazards to workers throughout the focal organization's supply chain[b]
Placement of additional information on product packaging to educate end users on how to use, consume and dispose of/remove the product properly[a]
Allowing the end user to monitor the product for its carbon footprint[a]

Community relationships

Open dialogue with the neighbouring community[b]
Support for the welfare programs for the community[b]
Donations to non-profit organizations[a]
Incorporation of the low-income community in the plant's supply chain activities

Socially responsible purchasing

Safety and occupational health audits of suppliers
Audits of key suppliers regarding the existence and implementation of codes of conduct and anti-corruption policies
Collaborative work with suppliers on labour issues and human rights

Strategic purchasing

Use of guidelines/contract policies known by suppliers[a]
Activities for purchasing personnel to be highly qualified/trained to properly develop its functions and responsibilities[a]
Purchasing function involved in strategic management processes[b]
Collaboration with suppliers on customer demand planning and forecasting[a]
Quick and effective response of the supply chain to the rapidly changing needs of customers and suppliers
Very quick response of the supply chain to the changing strategies of competitors
Purchasing function working collaboratively with other departments/functions of the company on social and environmental projects[b]
Use of information and communications technologies in supply management

Top and middle management support

Top management's full commitment to environmental protection, the development of human potential and the protection of humans against damage or hazards
Top management's general allocation of resources that are requested for environmental management and the safety and health of workers
Middle management support for environmental and social strategies
Top management's commitment to go beyond compliance with social and environmental laws and regulations

Competitive advantage

Please indicate how much you agree or disagree with each of the following statements according to the adoption of the above social and environmental practices:
Lower production costs relative to the company's main competitors
Avoidance of breaching the applicable laws relative to the company's main competitors
Access to new markets relative to the company's main competitors
Design and product development relative to the company's main competitors
Improvement of the company's reputation relative to its main competitors

Appendix B. Effect sizes–f^2

Endogenous construct	f^2
SP = > EVPR	0.1363
SP = > SOCPR	0.1201
TMMS = > ENVPR	0.0889
TMMS = > SOCPR	0.1305

Appendix C. Prediction relevance test (Stone-Geisser Q^2 test)

Constructs	Q^2
ECC	0.469
SRP	0.479
GP	0.387
EC	0.475
FCC	0.416
RL	0.158
GL	0.286
ENVPR	0.298
SOCPR	0.081
SHWP	0.130
CA	0.355

Appendix D. IPMA results

Factors	Competitive advantage (CA)	
	Importance (Total effects)	Performance (Index values)
Environmental practices (ENVPR)	0.161	56.146
Social practices (SOCPR)	0.425	60.478
Top and middle management support (TMMS)	0.189	86.431
Strategic purchasing (SP)	0.196	71.357

Appendix E. Statistical significance of mediated relations

Relationships	Path coefficients	Standard error	T statistics	p values	Final results
TMMS = > ECC	0.233	0.061	3.850	0.000	Yes
TMMS = > SRP	0.272	0.061	4.479	0.000	Yes
TMMS = > GP	0.222	0.058	3.794	0.000	Yes
TMMS = > EC	0.235	0.061	3.829	0.000	Yes
TMMS = > FCC	0.294	0.069	4.262	0.000	Yes
TMMS = > RL	0.145	0.043	3.382	0.001	Yes
TMMS = > GL	0.187	0.052	3.635	0.000	Yes
TMMS = > GM	0.201	0.058	3.455	0.000	Yes
TMMS = > SHWP	0.262	0.061	4.284	0.000	Yes
TMMS = > CA	0.189	0.052	3.657	0.000	Yes
SP = > ECC	0.288	0.055	5.277	0.000	Yes
SP = > SRP	0.264	0.059	4.454	0.000	Yes
SP = > GP	0.274	0.052	5.243	0.000	Yes
SP = > EC	0.290	0.054	5.363	0.000	Yes
SP = > FCC	0.285	0.061	4.694	0.000	Yes
SP = > RL	0.179	0.051	3.500	0.000	Yes
SP = > GL	0.231	0.050	4.637	0.000	Yes
SP = > GM	0.248	0.051	4.895	0.000	Yes
SP = > SHWP	0.253	0.056	4.526	0.000	Yes
SP = > CA	0.196	0.045	4.385	0.000	Yes

References

Ageron, B., Gunasekaran, A., Spalanzani, A., 2012. Sustainable supply chain management: an empirical study. Int. J. Prod. Econ. 140, 168–182.

Agrawal, S., Singh, R.K., Murtaza, Q., 2016. Outsourcing decisions in reverse logistics: Sustained balanced scorecard and graph theoretic approach. Resour. Conserv. Recycl. 108, 41–53.

Agrawal, S., Singh, R.K., Murtaza, Q., 2015. A literature review and perspectives in reverse logistics. Resour. Conserv. Recycl. 97, 76–92.

Ahi, P., Searcy, C., 2015. Measuring social issues in sustainable suppluy chains. Meas. Bus. Excell. 19 (1), 33–45.

Ahmadi, H.B., Kusi-Sarpong, S., Rezaei, J., 2017. Assessing the social sustainability of supply chains using best worst Method. Resour. Conserv. Recycl. 126, 99–106.

Alonso Movilla, N., Zwolinski, P., Dewulf, J., Mathieux, F., 2016. A method for manual disassembly analysis to support the ecodesign of electronic displays. Resour. Conserv. Recycl. 114, 42–58.

Alsop, R.J., 2004. Corporate reputation: anything but superficial-the deep but fragile nature of corporate reputation. J. Bus. Strategy 25 (6), 21–29.

Anderson, J.C., Gerbing, D.W., 1988. Structural equation modeling in practice: a review and recommended two-step approach. Psychol. Bull. 103 (3), 411–423.

Ansari, Z.N., Kant, R., 2017. Exploring the framework development status for sustainability in supply chain management: a systematic literature synthesis and future research directions. Bus. Strategy Environ. 26 (7), 873–892.

Appolloni, A., Sun, H., Jia, F., Li, X., 2014. Green procurement in the private sector: a state of the art review between 1996 and 2013. J. Clean. Prod. 85, 122–133.

Aragón-Correa, J.A., Sharma, S., 2003. A contingent resource-based view of proactive corporate environmental strategy. Acad. Manage. Rev. 28 (1), 71–88.

Arend, R., 2014. Social and environmental performance at SMEs: considering motivations, capabilities, and instrumentalism. J. Bus. Ethics 125 (4), 541–561.

Aya Patrana, N.A., Sriramesh, K., 2014. Corporate social responsibility: perceptions and practices among SMEs in Colombia. Public Relat. Rev. 40 (1), 14–24.
Azevedo, S.G., Carvalho, H., Machado, V.C., 2011. The influence of green practices on supply chain performance: a case study approach. Transp. Res. Part E 47 (6), 850–871.
Bido, D.S., Mantovani, D.M.N., Cohen, E.D., 2018. Destruction of measurement scale through exploratory factor analysis in production and operations research. Gest. Prod. 25 (2), 384–397.
Boks, C., 2006. The soft side of the ecodesign. J. Clean. Prod. 14, 1346–1356.
Bouzon, M., Govindan, K., Taboada Rodriguez, C.M., Campos, L.M.S., 2016. Identification and analysis of reverse logistics barriers using fuzzy Delphi method and AHP. Resour. Conserv. Recycl. 108, 182–197.
Bowen, F.E., Cousins, P.D., Lamming, R.C., Faruk, A.C., 2001. The role of supply management capabilities in green supply. Prod. Oper. Manage. 10 (2), 174–189.
Burke, E.M., 1999. Corporate Community Relations: The Principle of the Neighbor of Choice. Praeger, Westport.
Caiado, N., Guarnieri, P., Xavier, L.H., Chaves, G.L.D., 2017. A characterization of the Brazilian market of reverse logistic credits (RLC) and an analogy with the existing carbon credit market. Resour. Conserv. Recycl. 118, 47–59.
Cambra-Fierro, J., Ruiz_Benitez, R., 2011. Sustainable business practices in Spain: a two-case study. Eur. Bus. Rev. 23 (4), 401–412.
Campbell, J.L., 2007. Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. Acad. Manage. Rev. 32 (3), 946–967.
Carr, A.S., Pearson, J.N., 2002. The impact of purchasing and supplier involvement on strategic purchasing and its impact on firm's performance. Int. J. Oper. Prod. Manag. 22 (9), 1032–1053.
Carr, A.S., Smeltzer, L.R., 1999. The relationship of strategic purchasing to supply chain management. Eur. J. Purch. Supply Manag. 5, 43–51.
Carroll, A.B., Shabana, K.M., 2010. The business case for corporate social responsibility: a review of concepts, research and practice. Int. J. Manag. Rev. 12 (1), 85–105.
Carter, C.R., Rogers, D.S., 2008. A framework of sustainable supply chain management: moving toward new theory. Int. J. Phys. Distrib. Logist. Manag. 38 (5), 360–387.
Chavan, M., 2005. An appraisal of environment management systems A competitive advantage of small businesses. Manag. Environ. Qual. Int. J. 16 (5), 444–463.
Chen, Y.S., Chang, C.H., 2013. Enhance environmental commitments and green intangible assets toward green competitive advantages: an analysis of structural equation modeling (SEM). Qual. Quant. 47 (1), 529–543.
Chen, I.J., Paulraj, A., 2004. Towards a theory of supply chain management: the constructs and measurements. J. Oper. Manag. 22 (2), 119–150.
Chen, I.J., Paulraj, A., Lado, A., 2004. Strategic purchasing, supply management, and firm performance. J. Oper. Manag. 22, 505–523.
Chiappetta Jabbour, C.J.C., De Sousa Jabbour, A.B.L., 2014. Latin America: research opportunities on management for sustainable. Latin Am. J. Manage. Sustain. Dev. 1 (1), 1–6.
Chin, W.W., 1998. The partial least squares approach to structural equation modeling. In: Marcoulides, G.A. (Ed.), Modern Methods for Business Research. Lawrence Erlabaum Associates, Mahwah, New Jersey, pp. 295–336.
Chin, W.W., 2010. How to write up and report PLS analyses. In: Esposito Vinzi, V., Chin, W.W., Henseler, J., Wang, H. (Eds.), Handbook of Partial Least Squares: Concepts, Methods and Applications. Springer, Heidelberg, Dordrecht, London, New York, pp. 655–690.
Chin, T.A., Tat, H.H., Sulaiman, Z., 2015. Green supply chain management, environmental collaboration and sustainability performance. 2015. Procedia CIRP 26, 695–699.
Chiu, J.-Z., Hsieh, C.-C., 2016. The impact of restaurants' green supply chain practices on firm performance. Sustainability 8 (42), 2–14.
Choi, D., Hwang, T., 2015. The impact of green supply chain management practices on firm performance: the role of collaborative capability. Oper. Manag. Res. 8, 69–83.
Clerici, N., Richardson, J.E., Escobedo, F.J., Posada, J.M., Linares, M., Sanchez, A., Vargas, J.F., 2016. Colombia: dealing in conservation. Science 354 (6309), 190.
Colwell, S.R., Joshi, A.W., 2013. Corporate Ecological Responsiveness: antecedent effects of institutional pressure and top managment commitment and their impact on organizational performance. Bus. Strategy Environ. 22 (2), 73–91.
Coors, A.C., Winegarden, W., 2005. Corporate social responsibility-or good advertising? Regul. Spring 2005, 10–11.
Cordeiro, C., Machás, A., Neves, M.M., 2010. A case study of a customer satisfaction problem: boostrap and imputation tecniques. In: Esposito Vinzi, W., Chin, W.W., Henseler, J., Wang, H. (Eds.), Handbook of Partial Least Squares: Concepts, Methods and Applications. Springer, New York, pp. 279–287.
de Morais, D.O.C., 2017. Social sustainability in supply chains: a framework and a Latin America illustrative case. J. Oper. Supply Chain Manage. 10 (2), 32–43.
De Sousa Jabbour, A.B.L., de Oliveira Frascareli, F.C., Jabbour, C.J.C., 2015. Green supply chain management and firm's performance: understanding potential relationships and the role of green sourcing and some other green practices. Resour. Conserv. Recycl. 104 (Part B), 366–374.
Delmonico, D., Chiappetta Jabour, C.J., Farias Pereira, S.C., de Sousa Jabbour, A.B.L., Renwick, D.W.S., Tavares Thomé, A.M., 2018. Unveiling barriers to sustainable public procurement in emerging economies: evidence from a leading sustainable supply chain initiative in Latin America. Resour. Conserv. Recycl. 134, 70–79.
Dempsey, N., Bramley, G., Power, S., Brown, C., 2011. The social dimension of sustainable development: defining urban social sustainability. Sustain. Dev. 19, 289–300.
Ding, L., Velicer, W.F., Harlow, L.L., 1995. Effects of estimation methods, number of indicators per factor, and improper solutions on structural equation modeling fit indices. Struct. Equ. Model. A Multidiscip. J. 2 (2), 119–143.
Dubey, R., Gunasekaran, A., Papadopoulos, T., Childe, S.J., 2015. Green supply chain management enablers: mixed methods research. Sustain. Prod. Consum. 4, 72–88.
Dubey, R., Gunasekaran, A., Childe, S.J., Papadopoulos, T., Wamba, S.F., Song, M., 2016. Towards, a theory of sustainable consumption and production: consructs and measurement. Resour. Conserv. Recycl. 106, 78–89.
Dubey, R., Gunasekaran, A., Papadopoulos, T., 2017. Towards a theory of sustainable consumption and production: constructs and measurement. Resour. Conserv. Recycl. 106, 78–89.
Durlak, J.A., 2009. How to select, calculate, and interpret effect sizes. J. Pediatr. Psychol. 34 (9), 917–928.
Echeverri Cañas, L.M., 2010. Inserción del mercadeo verde en prácticas empresariales en Colombia (Casos de estudio). Revista Luna Azul 31, 122–138.
Eisenhardt, K.M., 1989. Building theories from case study research. Acad. Manage. Rev. 14 (4), 532–550. https://doi.org/10.5465/amr.1989.4308385.
Eltayeb, T.K., Zailani, S., Ramayah, T., 2011. Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: investigating the outcomes. Resour. Conserv. Recycl. 55, 495–506.
Esfahbodi, A., Zhang, Y., Watson, G., 2016. Sustainable supply chain management in emerging economies: trade-offs between environmental and cost performance. Int. J. Prod. Econ. 181 (Part B), 350–366.
Esper, T.I., Fugate, B.S., Davis-Sramek, B., 2007. Logistics learning capability: sustaining the competitive advantage gained through logistics leverage. J. Bus. Logist. 28 (2), 57–81.
Esty, D.C., Simmons, P.J., 2011. The Green to Gold Business Playbook: How to Implement Sustainability Practices for Bottom-line Results in Every Business Function. Wiley, New Jersey.
Fahimnia, B., Sarkis, J., Davarzani, H., 2015. Green supply chain management: a review and bibliometric analysis. Int. J. Prod. Econ. 162, 101–114.
Floyd, S.W., Wooldridge, B., 1994. Dinosaurs or dynamos? Recognizing middle of management strategic role". Acad. Manage. Exec. 8 (4), 47–57.
Fornell, C.G., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. J. Mark. Res. 18 (1), 39–50.
Fowler, S.J., Hope, C., 2007. Incorporating sustainable business practices into company strategy. Bus. Strategy Environ. 16 (1), 26–38.
Freise, M., Seuring, S., 2015. Social and environmental risk management in supply chains: a survey in the clothing industry. Logist. Res. 8 (1), 1–12. https://doi.org/10.1007/s12159-015-0121-8.
García-Rodríguez, F.J., Castilla-Gutiérrez, C., Bustos-Flores, C., 2013. Implementation of reverse logistics as a sustainable tool for raw material purchasing in developing countries: the case of Venezuela. Int. J. Prod. Econ. 141, 582–592.
Gavronski, I., klassen, R.D., Vachon, S., Machado do Nascimiento, L.F., 2011. A resource-based view of green supply management. Transp. Res. Part E Logist. Transp. Rev. 47 (6), 872–885.
Geisser, S., 1975. The predictive sample reuse method with applications. J. Am. Stat. Assoc. 70 (350), 320–328.
Gimenez, C., Large, R., Ventura, E., 2005. SCM research methodologies: employing structural equation modeling. In: Kotzab, H., Seuring, S., Müller, M., Reiner, G. (Eds.), Research Methodologies in Supply Chain Management. Physica-Verlag, Heidelberg, pp. 155–170.
Gimenez, C., Sierra, V., Rodon, J., 2012. Sustainable operations: their impact on the triple bottom line. Int. J. Prod. Econ. 140 (1), 149–159.
Golicic, S.L., Smith, C.D., 2013. A meta-analysis of environmentally sustainable supply chain management practices and firm performance. J. Supply Chain Manage. 45 (2), 78–95.
González-Benito, J., 2007. Information technology investment and operational performance in purchasing: the mediating role of supply chain management practices and strategic integration of purchasing. Ind. Manage. Data Syst. 107 (2), 201–228.
Goodwin, L.D., 1999. The role of factor analysis in the estimation of construct validity. Meas. Phys. Educ. Exerc. Sci. 3 (2), 85–100.
Grant, D.B., Trautrims, A., Wong, C.Y., 2013. Sustainable Logistics and Supply Chain Management. KoganPage, London.
Green Jr., K.W., Zelbst, P.J., Meacham, J., Bhadauria, V.S., 2012. Green supply chain management practices: impact on performance. Supply Chain Manage. Int. J. 17 (3), 290–305.
GRI. 2000 2000-2010. "Indicator Protocols Set. Product Responsibility (PR). Food Processing. Sector Supplement". Global Reporting Initiative, Accessed 20 March.
GRI, 2018. G4 Sustainability Reporting Guidelines. Global Reporting Initiative http://www.saiplatform.org/uploads/Modules/Library/FPSS%20Product%20Responsibility%20Indicator%20Protocols-2.pdf, https://www.globalreporting.org/information/g4/Pages/default.aspx. Accessed 20 March.
Hair Jr., J.F., Black, W.C., Babin, B.J., Anderson, R.E., 2010. Multivariate Data Analysis. Prentice Hall, Upper Saddle River.
Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., 2014. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). SAGE, Thousand Oaks.
Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., 2017. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), second edition. SAGE, Thousand Oaks.
Hart, S.L., 1995. A natural-resource-based view of the firm. Acad. Manage. J. 20 (4), 986–1014.
Hassini, E., Surti, C., Searcy, C., 2012. A literature review and a case study of sustainable supply chains with a focus on metrics. Int. J. Prod. Econ. 140 (1), 69–82.
Henseler, J., Fassot, G., 2010. Testing moderating effects in PLS path models: an illustration of available procedures. In: Esposito Vinzi, V., Chin, W.W., Henseler, J., Wang, H. (Eds.), Handbook of Partial Least Squares: Concepts, Methods and Applications. Springer, New York, pp. 713–735.
Henseler, J., Ringle, C.M., Sinkovics, R.R., 2009. The use of partial least squares path modeling in international marketing. Adv. Int. Mark. 20 (1), 277–319.

Hipólito Bernardes do Nascimento, J.C., Alvaro da Silva Macedo, M., 2016. Modelagem de equações estruturais com mínimos quadrados parciais: um Exemplo Da Aplicação do SmartPLS® em pesquisas em Contabilidade. Revista de Educação e Pesquisa em Contabilidade 10 (3), 282–305.
Hoejmose, S.U., Adrien-Kirby, A.J., 2012. Socially and environmentally responsible procurement: a literature review and future research agenda of a managerial issue in the 21st century. J. Purch. Supply Manage. 18 (4), 232–242.
Hoejmose, S., Brammer, S., Millington, A., 2012. Green" supply chain management; the role of trust and top management in B2B and B2C markets. Ind. Mark. Manage. 41, 609–620.
Hoejmose, S.U., Roehrich, J.K., Grosvold, J., 2014. Is doing more doing better? The relationship between responsible supply chain management and corporate reputation. Ind. Mark. Manage. 43, 77–90.
Holt, D., Ghobadian, A., 2009. An empirical study of green supply chain management practices amongst UK manufacturers. J. Manuf. Technol. Manage. 20 (7), 933–956.
Hu, L.T., Bentler, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct. Equ. Model. 6 (1), 1–55.
Islam, Md.S., Tseng, M.-L., Karia, N., Lee, C.-H., 2018. Assesing green supply chain practices in Bangladesh using fuzzy importance and performance approach. Resour. Conserv. Recycl. 131, 134–145.
Jabbour, C.J.C., Janeiro, R.C., de Sousa Jabbour, A.B.L., et al., 2017. Social aspects of sustainable supply chains: unveiling potential relationships in the Brazilian context. Ann. Oper. Res. https://doi.org/10.1007/s10479-017-2660-7.
Jaenglom, K., Tariq, Z., 2013. The role of purchasing management towards sustainable supply chain: a lifecycle perspective. IEEE Interantional Conference on Industrial Engineering and Engineering Management. pp. 776–780.
Jansen, H., Veeneman, P., 2016. CSR in Colombia: Observations and Recommendations. The Netherlands Enterprise Agency, The Hague.
Johansson, G., 2002. Success factors for integration of ecodesign in product development: a review of state of the art. Environ. Manage. Health 13 (1), 98–107.
Johnsen, T.E., Howard, M., Miemczyk, J., 2014. Purchasing and Supply Chain Management: a Sustainability Perspective. Routledge Taylor & Francis Group, New York.
Kauppi, K., Hannibal, C., 2017. Institutional pressures and sustainability assessment in supply chains. Supply Chain Manage. Int. J. 22 (5), 458–472.
Kealey, T., 2013. Do Middle Managers Contribute to Their Organisation's Strategy? IAM (Irish Academy of Management) Conference.
Khor, K.S., Udin, Z.M., 2013. Reverse logistics in Malaysia: investigating the effect of green product design and resource commitment. Resour. Conserv. Recycl. 81, 71–80.
Kirchoff, J.F., Tate, W.L., Mollenkopf, D.A., 2016. The impact of strategic organizational orientations on green supply chain management and firm performance. Int. J. Phys. Distrib. Logist. Manage. 46 (3), 269–292.
Kirci, M., Seifert, R., 2015. Dynamic capabilities in sustainable supply chain management: a theoretical framework. Supply Chain Forum Int. J. 16 (4), 2–15.
Klassen, R.D., 2009. Improving Social Performance in Supply Chains: Exploring Practices and Pathways to Innovation. August. Flanders DC.
Knight, A.K., Blessner, P., Olson, B.A., Blackburn, T.D., 2017. Strategic sourcing and corporate social responsibility: aligning a healthcare organization's strategic objectives. J. Purch. Supply Manage. 23 (2). https://doi.org/10.1016/j.pursup.2017.01.002.
Köksal, D., Strähle, J., Müller, M., Freise, M., 2018. Social sustainable supply chain management in the textile and apparel industry—a literature review. Sustainability 10 (4), 1–35.
Kor, Y.Y., 2006. Direct and interaction effects of top manageent team and board compositions on R&D investment strategy. Strateg. Manage. J. 27 (11), 1081–1099.
Krause, D.R., 1999. The antecedents of buying firms' efforts to improve suppliers. J. Oper. Manage. 17 (2), 205–224.
Krause, D.R., Vachon, S., Klassen, R.D., 2009. Special topic forum on sustainable supply chain management: introduction and reflections on the role of purchasing management. J. Supply Chain Manage. 45 (4), 18–25.
Kusi-Sarpong, S., Sarkis, J., 2017. Virtual Special Issue on sustainable supply chains and emerging economies: call for papers. Resour. Conserv. Recycl. A6–A7.
Large, R.O., Thomsen, C.G., 2011. Drivers of green supply management performance: evidence from Germany. J. Purch. Supply Manage. 17 (3), 176–184.
Lawson, B., Cousins, P.D., Handfield, R.B., Petersen, K.J., 2009. Strategic purchasing, supply management practices and buyer performance improvement: an empirical study of UK manufacturing organisations. Int. J. Prod. Res. 47 (10), 2649–2667.
Lee, S.-Y., 2008. Drivers for the participation of small and medium-sized suppliers in green supply chain initiatives. Supply Chain Manage. Int. J. 13 (3), 185–198.
Lee, J.S., Kim, S.K., Lee, S.-Y., 2016. Sustainable supply chain capabilities: accumulation, strategic types and performance. Sustainability 8 (503), 1–16.
Leiner, D.J., 2017. Our research's breadth lives on convenience samples A case study of the online respondent pool "SoSci Panel". SCM Stud. Commun. Media 5 (4), 367–396.
Leire, C., Mont, O., 2010. The implementation of socially responsible purchasing. Corp. Soc. Responsib. Environ. Manage. 17 (1), 27–39.
Leonidou, L.C., Leonidou, C.N., Fotiadis, T.A., Aykol, B., 2015. Dynamic capabilities driving an eco-based advantage and performance in global hotel chains: the moderating effect of international strategy. Tour. Manage. 50, 268–280.
Lindell, M.K., Whitney, D.J., 2001. Accounting for commong method variance in cross-sectional research designs. J. Appl. Psychol. 86 (1), 114–121.
Lintukangas, K., Hallikas, J., Kähkönen, A.-K., 2013. The role of green supply management in the development of sustainable supply chain. Corp. Soc. Responsib. Environ. Manage. 22 (6), 321–333.
Liu, Y., Srai, J.S., Evans, S., 2013. An empirical investigation of the relationship between supply chain capabiities and green logistics. 17th Cambridge International Manufacturing Symposium.
Loehlin, J.C., 2004. Latent Variable Models. Lawrence Erlbaum Associates, London.
Lowry, P.B., Gaskin, J., 2014. Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: when to choose it and how to use it. IEEE Trans. Prof. Commun. 57 (2), 123–146.
Luthra, S., Mangla, S.K., 2018. When strategies matter: adoption of sustainable supply chain management in an emerging economy's context. Resour. Conserv. Recycl. 138, 194–206.
Luthra, S., Mangla, S.K., Shankar, R., Prakash Garg, C., Jakhar, S., 2018. Modelling critical success factors for sustainability initiatives in supply chains in Indian context using Grey-DEMATEL. Prod. Plan. Control. 1–24. https://doi.org/10.1080/09537287.2018.1448126.
Luttropp, C., Lagerstedt, J., 2006. Ecodesign and the ten golden rules: generic advice for merging environmental aspects into product development. J. Clean. Prod. 14, 1396–1408.
Maignan, I., Hillebrand, B., McLister, D., 2002. Managing socially responsible buying:how to integrate non-economic criteria into the purchasing process. Eur. Manage. J. 20 (6), 641–648.
Mangla, S.K., Kumar, P., Barua, M.K., 2015. Risk analysis in green supply chain using fuzzy AHP approach: a case study. Resour. Conserv. Recycl. 104 (Part B), 375–390.
Mani, V., Gunasekaran, A., 2018. Four forces of supply chain social sustainability adoption in emerging economies. Int. J. Prod. Econ. 199, 150–161.
Mani, V., Gunasekaran, A., Papadopoulos, T., Hazen, B., Dubey, R., Dubey, R., 2016a. Supply chain social sustainability for developing nations: evidence from India. Resour. Conserv. Recycl. 111, 42–52.
Mani, V., Agarwal, R., Gunasekaran, A., Papadopoulos, T., Dubey, R., Childe, S.J., 2016b. Social sustainability in the supply chain: construct development and measurement validation. Ecol. Indic. 71, 270–279.
Mani, V., Gunasekaran, A., Delgado, C., 2018. Enhancing supply chain performance through supplier social sustainability: an emerging economy perspective. Int. J. Prod. Econ. 195, 259–272.
Marshall, D., McCarthy, L., Heavey, C., McGrath, P., 2015a. Environmental and social supply chain management sustainability practices: construct development and measurement. Prod. Plan. Control. 26 (8), 673–690. https://doi.org/10.1080/09537287.2014.963726.
Marshall, D., McCarthy, L., McGrath, P., Claudy, M., 2015b. Going above and beyond: how sustainability culture and entrepreneurial orientation drive social sustainability supply chain practice adoption. Supply Chain Manage. Int. J. 20 (4), 434–454.
Masoumik, S.M., Abdul-Rashid, S.H., Olugu, E.U., Ghazilla, R.A.R., 2015. A strategic approach to develop green supply chains. Procedia CIRP 26, 670–676.
Mathews, L., Power, D., Touboulic, A., Marques, L., 2016. Building bridges: towards alternative theory of sustainable supply chain management. J. Supply Chain Manage. 52 (1), 82–94.
Mathivathanan, D., Kannan, D., Haq, A.N., 2018. Sustainable supply chain management practices in Indian automotive industry: a multi-stakeholder view. Resour. Conserv. Recycl. 128, 284–305.
Matos, S., Fergus, A., Vredenburg, H., Hall, J., 2005. "Es su empresa socialmente vulnerable? Harvard Business Review, pp. 36–45 (Edición América Latina) 83 (8) (Ejemplar dedicado a: El factor social).
McFadden, K.L., Henagan, S.C., Gowen III, C.R., 2009. The patient safety chain: transformational leadership's effect on patient safety culture, initiatives, and outcomes. J. Oper. Manage. 27 (5), 390–404.
McKinnon, A., 2012. Environmental sustainability: a new priority for logistics managers. In: McKinnon, A., Browne, M., Whiteing, A. (Eds.), Green Logistics: Improving the Environmental Sustainability of Logistics. Kogan Page, London, Philadelphia and New Delhi, pp. 377.
McWilliams, A., Siegel, D.S., 2011. Creaing and capturing value: strategic corporate social responsibility, resource-based theory, and sustainable competitive advantage. J. Manage. 37 (5), 1480–1495.
Meade, L., Sarkis, J., 2002. A conceptual model for selecting and evaluating third-party reverse logistics providers. Supply Chain Manage. Int. J. 7 (5), 283–295.
Meixell, M.J., Luoma, P., 2015. Stakeholder pressure in sustainable supply chain management A systematic review. Int. J. Phys. Distrib. Logist. Manage. 45 (1/2), 69–89.
Mentzer, J.T., Min, S., Zacharia, Z.G., 2000. The nature of interfirm partnering in supply chain management. J. Retail. 76 (4), 549–568.
Miemczyk, J., John, T.E., Macquet, M., 2012. Sustainable purchasing and supply management: a structured literature review of definitions and measures at the dyad, chain and network levels. Supply Chain Manage. Int. J. 17 (5), 478–496.
Mitra, S., 2014. A framework for research on green supply chain management. Supply Chain Forum Int. J. 15 (1), 34–51.
Mitra, S., Datta, P.P., 2014. Adoption of green supply chain management practices and their impact on performance: an exploratory study of Indian manufacturing firms. Int. J. Prod. Res. 52 (7), 2085–2107.
Monczka, R.M., Handfield, R.B., Giunipero, L.C., Patterson, J.L., 2009. Purchasing and Supply Chain Management, 4e ed. South-Western CENGAGE Learning, City of Mason.
Mook, D.G., 1983. In defense of external invalidity. Am. Psychol. 38 (4), 379–387.
OECD, 2015. Colombia: Policy Priorities for Inclusive Development. The Organisation for Economic Co-operation and Development (OECD), Paris.
Oelze, N., 2017. Sustainable supply chain management implementation—enablers and barriers in the textile industry. Sustainability 9 (8), 1435.
Pagell, M., Yang, C.-L., Krumwiede, D.W., Sheu, C., 2004. Does the competitive environment influence the efficacy of investments in environmental management? J. Supply Chain Manage. 40 (2), 30–39.
Paredes-Gazquez, J.D., Rodríguez-Fernàndez, J.M., de la Cuesta-González, M., 2016. Measuring corporate social responsibility using composite indices: mission impossible? The case of the electricity utility industry. Revista de Contabilidad – Spanish Account. Rev. 19 (1), 142–153.

Parmigiani, A., Klassen, R.D., Russo, M.V., 2011. Efficiency meets accountability: performance implications of supply chain configuration, control, and capabilities. J. Oper. Manage. 29 (3), 212–223.
Paruolo, P., Saisana, M., Saltelli, A., 2013. Ratings and rankings: Voodoo or science? J. R. Stat. Soc. Ser. A 176 (Part 3), 609–634.
Paulraj, A., 2011. Understanding the relationships between internal resources and capabilities, sustainable supply management and organizational sustainability. J. Supply Chain Manage. 47 (1), 19–37.
Peloza, J., Shang, J., 2011. How can corporate social responsibility activities create value for stakeholders? A systematic review. J. Acad. Mark.. Sci. 39 (1), 117–135.
Peng, D.X., Lai, F., 2012. Using partial least squares in operations management research: a practical guideline and summary of past research. J. Oper. Manage. 30 (6), 467–480.
Peterson, R.A., Merunka, D.R., 2014. Convenience samples of college students and research reproducibility. J. Bus. Res. 67 (5), 1035–1041.
Pfeffer, J., 2010. Building sustainable organizations: the human factor. Acad. Manage. Perspect. 24 (1), 34–45.
Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. J. Appl. Psychol. 88 (5), 879–903.
Podsakoff, P.M., MacKenzie, S.B., Podsakoff, N.P., 2012. Sources of method bias in social science research and recommendations on how to control it. Annu. Rev. Psychol. 63, 539–569.
Prahinski, C., Benton, W.C., 2004. Supplier evaluations: communication strategies to improve supplier perfromance. J. Oper. Manage. 22, 39–62.
Rao, P., Holt, D., 2005. Do green supply chain lead to competitiveness and economic performance? Int. J. Oper. Prod. Manage. 25 (9), 898–916.
Reio Jr., T.G., 2010. The threat of common method variance bias to theory building. Hum. Resour. Dev. Rev. 9 (4), 405–411.
Rentizelas, A., Jabbour, A.B.L.D.S., Al Balushi, A.D., A, Tuni, 2018. Social sustainability in the oil and gas industry:institutional pressure and the management of sustainable supply chains. Ann. Oper. Res. https://doi.org/10.1007/s10479-018-2821-3.
Rogers, D.S., Tibben-Lembke, R., 2001. An examination of reverse logistics practices. J. Bus. Logist. 22 (2), 129–148.
Rossiter, J.R., 2011. Measuremente for the Social Sciences: The C-OAR-SE Method and Why it Must Replace Psychometrics. Springer, New York, Dordrecht, Heidelberg, London.
Sajjad, A., Eweje, G., Tappin, D., 2015. Sustainable supply chain management: motivators and barriers. Bus. Strategy Environ. 24, 643–655.
Salvati, L., Zitti, M., 2009. Substitutability and weighting of ecological and economic indicators: exploring the importance of various components of a synthetic index. Ecol. Econ. 68 (4), 1093–1099.
Sancha, C., Longoni, A., Giménez, C., 2015. Sustainable supplier development practices: drivers and enablers in a global context. J. Purch. Supply Manage. 21 (2), 95–102.
Sánchez-Rodríguez, C., 2009. Effect of strategic purchasing on supplier development and performance: a structural model. J. Bus. Ind. Mark. 24 (3/4), 161–172.
Sarkis, J., 2012. A boundaries and flows perspective of green supply chain management. Supply Chain Manage. Int. J. 17 (2), 202–216.
Schreiber, J.B., Stage, F.K., King, J., Nora, A., Barlow, E.A., 2006. Reporting structural equation modeling and confirmatory factor analysis results: a review. J. Educ. Res. 99 (6), 323–337.
Seuring, S., Muller, M., 2008. From a literature review to a conceptual framework for sustainable supply chain management. J. Clean. Prod. 16 (15), 1699–1710.
Shang, K.-C., Lu, C.-S., Li, S., 2010. A taxonomy of green supply chain management capability among electronics-related manufacturing firms in Taiwan. J. Environ. Manage. 91 (5), 1218–1226.
Shen, L., Zhang, Z., Long, Z., 2017. Significant barriers to green procurement in real estate development. Resour. Conserv. Recycl. 116, 160–168.
Shi, V.G., Baldwin, J., Cucchiella, F., 2012. Natural resource based green supply chain management. Supply Chain Manage. Int. J. 17 (1), 54–67.
Silvestre, B., 2015a. Sustainable supply chain management in emerging economies: environmental turbulence, institutional voids and sustainable trajectories. Int. J. Prod. Econ. 167, 156–169.
Silvestre, B., 2015b. A hard nut to crack! implementing supply chain sustainability in an emerging economy. J. Clean. Prod. 96, 171–181.
Silvestre, B., 2016. Sustainable supply chain management: current debate and future directions. Gestão Produção 23 (2), 235–249.
Smith, A.D., 2007. Making the case for the competitive advantage of corporate social responsibility. Bus. Strategy Ser. 8 (3), 186–195.
Song, Y., Cai, J., Feng, T., 2017. The influence of green supply chain integration on firm performance: a contingency and configuration perspective. Sustainability 9 (5), 1–18.
Srivastava, S.K., 2007. Green supply-chain management: a state-of-the-art literature review. Int. J. Manage. Rev. 9 (1), 53–80.
Stiller, S., Gold, S., 2014. Socially sustainable supply chain management practices in the Indian seed sector: a case study. Supply Chain Forum Int. J. 15 (1), 52–67.
Stone, M., 1974. Cross-validatory choice and assessment of statistical predictions. J. R. Stat. Soc. Ser. B (Methodol.) 36 (2), 111–147.
Tate, W.L., Ellram, L.M., Kirchoff, J.F., 2010. Corporate social responsibility reports: a thematic analysis related to supply chain management. J. Supply Chain Manage. 46 (1), 19–44.
Tay, M.Y., Rahman, A.A., Aziz, Y.A., Sidek, S., 2015. A review on drivers and barriers towards sustainable supply chain practices. Int. J. Soc. Sci. Humanit. 5 (10), 892–897.
Theyel, G., 2001. Customer and supplier relations for environmental performance. GMI 35, 61–69.
Thompson, B., 2004. Exploratory and Confirmatory Factor Analysis: Understanding Concepts and Applications. American Psycholgical Association, Washington, D.C.
Tobescu, C., Seuring, S., 2015. Internal enablers for the implementation of sustainable supply Chain risk management systems. In: Uwe, C., Hompel, M., de Souza, R. (Eds.), Logistics Management: Products, Actors, Technology – Proceedings of the German Academic Association for Business Research, Bremen, 2013. Springer, Switzerland, pp. 17–26.
Vachon, S., Klassen, R.D., 2008. Environmental management and manufacturing performance: the role of collaboration in the supply chain. Int. J. Prod. Econ. 111 (2), 299–315.
Vallance, S., Perkins, H.C., Dixon, J.E., 2011. What is social sustainability? A clarification of concepts. Geoforum 42 (3), 342–348.
Wagner, M., 2011. Corporate performance implications of extended stakeholder management: new insights on mediation and moderation effects. Ecol. Econ. 70 (5), 942–950.
Wagner, M., Schaltegger, S., 2004. The effect of corporate environmental strategy choice and environmental performance on competitiveness and economic performance. Eur. Manage. J. 22 (5), 557–572.
Wagner, M., Van Phu, N., Azomahou, T., Wehrmeyer, W., 2002. The relationship between the environmental and economic performance of firms: an empirical analysis of the european paper industry. Corp. Soc. Responsib. Environ. Manage. 9 (3), 133–146.
Wang, Z., Sarkis, J., 2013. Investigating the relationship of sustainable supply chain management with corporate financial performance. Int. J. Prod. Perform. Manage. 62 (8), 871–888.
Wieland, A., Handfield, R.B., Durach, C., 2016. Mapping the landscape of future research themes in supply chain management. J. Bus. Logist. 37 (3), 1–8. https://doi.org/10.1111/jbl.12131.
Winston, A.S., 2014. The Big Pivot: Radically Practical Strategies for a Hotter, Scarcer, and a More Open World. Harvard Business School Publishing, Boston.
Wolf, J., 2014. The relationship between sustainable supply chain management, stakeholder pressure and corporate sustainability performance. J. Bus. Ethics 119 (3), 317–328.
Wong, C.Y., Wong, C.W.Y., Boon-itt, S., 2015. Integrating environmental management into supply chains: a systematic literature review and theoretical framework. Int. J. Phys. Distrib. Logist. Manage. 45 (1/2), 43–68.
Yawar, S.A., Seuring, S., 2017. Management of social issues in supply chains: a literature review exploring social issues, Actions and performance outcomes. J. Bus. Ethics 141, 621–643.
Zhang, M., Tse, Y.K., Doherty, B., Li, S., Akhtar, P., 2018. Sustainable supply chain management: confirmation of a higher-order model. Resour. Conserv. Recycl. 128, 206–221.
Zhu, Q., Geng, Y., 2001. Integrating environmental issues into supplier selection and management. GMI 35, 27–40.
Zhu, Q., Sarkis, J., 2004. Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. J. Oper. Manage. 22 (3), 265–289.
Zhu, Q., Sarkis, J., Lai, K.-H., 2013. Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. J. Purchasing Supply Manage. 19 (2), 106–117.
Zhu, Q., Sarkis, J., Ordeiro, J.J., Lai, K.-H., 2008. Firm-level correlates of emergent green supply chain management practices in the Chinese context. Omega 34 (4), 577–591.
Zhu, Q., Sarkis, J., Lai, K.-H., 2012. Green supply chain management innovation difussion and its relationship to oganizational improvement: an ecological modernization perspective. J. Eng. Technol. Manage. 29, 168–185.