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World Class Sustainable Supply Chain Management: critical review and further research directions

Abstract

Purpose-Sustainable Supply Chain Management (SSCM) has attracted considerable interest among academics and practitioners. The aim of our article is to present a critical review of the literature, to identify missing links, to argue for the use of world-class SSCM through a framework, and suggest further research directions.

Design/methodology/approach-In our article we have undertaken an extensive review of literature and classified articles using a novel classification scheme.

Findings-Through the extensive review and identification of research gaps, the paper (i) identifies significant differences between definitions and methodologies in the SSCM literature; and (ii) argues for “world-class SSCM (WCSSCM)”. This term is elaborated on via a theoretical framework in which eighteen dimensions are classified under six constructs of SSCM. Furthermore, a list of potential research directions for WCSSCM is discussed.

Research limitations/implications- The research is an attempt to critically review literature, argue for WCSSCM, and develop a theoretical framework.

Originality/value- The article offers a new approach to sustainable supply chain management literature, arguing for WCSSCM through a framework, and providing further research directions.

Keywords: Sustainable Supply Chain Management (SSCM), World Class SSCM (WCSSCM), Triple-Bottom Line, Theoretical Framework, Literature Review.

1. Introduction

Sustainable supply chain management (SSCM) has attracted great attention from academics and practitioners in recent years (Tachizawa and Wong, 2014). The popularity of the field can be measured in terms of the exponential leap in the number of published articles around the issue of sustainability in supply chain networks in the last five years. Seuring *et al.* (2008) have argued that the sustainable supply chain literature has so far failed to investigate the impacts of sustainable practices on social dimensions. From an environmental and economic perspective, Ashby *et al.* (2012) and Halldorsson *et al.* (2009) have argued that the word ‘sustainability’ is over-stretched and it maybe that the level of attention is raised by unnecessary hyperbole surrounding sustainability in supply chains. Beske ~~&~~ and Seuring (2014) have argued that a sustainable supply chain differs from a conventional supply chain.

There is also strong evidence suggesting that sustainability in supply chain networks has helped organizations to achieve better performance (e.g. Tsoufias and Pappis, 2006; Yusuf *et al.* 2013; Plambeck *et al.* 2013).

Despite the popularity of the SSCM field, it is quite evident from the literature that the concept of a sustainable supply chain is poorly understood from both theoretical and managerial points of view. There is growing body of literature related to sustainable supply chain management, but, on the other hand, there are overlaps between green supply chain management or environmental supply chain management literature and sustainable supply chain literature, as well as other areas that have attracted significant contributions, such as environmental supply chains, ethical supply chains and responsible supply chains. Markman and Krause (2014), in a recent call for papers, have argued for more integrated theory-building articles. Despite the popularity of the SSCM topics amongst researchers, there is still a need for critical review and a framework that will shed light upon the different definitions and perspectives and links, and will provide further research directions. To bridge this knowledge gap and driven by the endorsement of Markman and Krause, this study aims at achieving the following research objectives:

- (i) To review the literature of SSCM and develop a classification of literature based on previous scholarly works;
- (ii) To argue for the use of world-class SSCM (WCSSCM) and propose a theoretical framework that articulates its different dimensions;
- (iii) To provide taxonomy of the literature based on our WCSSCM framework;
- (iv) To identify further research directions based on the limitations of our study.

The remainder of the article is organized as follows. In the second section we discuss our methodology and our classification of literature and present our theoretical framework. The third section is devoted to research discussions and finally we synthesize the findings of the extensive literature review, outline the limitations of this work, and offer extensive further research directions.

2. Research Methodology

In this section we discuss our research process. We firstly read the literature and identify different definitions of the SSCM literature, which provided the motivation for the use of world-class SSCM (WCSSCM). We then identify enablers of SSCM, which have provided the basis for the classification of the literature and our proposed framework.

2.1 Identification of literature

We have undertaken a critical review of the literature published in reputable journals indexed in the 'Web of Science' (using both the Science Citation Index and the Social Science Citation Index) and 'Scopus'. We used the keywords: 'sustainability', 'social sustainability' 'supply chain', 'definition', 'enabler', 'measure', and 'technique'. We reviewed each of the papers for relevance to the topic area. Following Gunasekaran *et al.* (2015), if there were disagreements regarding the inclusion of particular articles, the co-authors discussed until agreement was reached. Since many of the papers take different viewpoints and look at different aspects, there is an immense scope for advancement by unifying the field.

2.2 In-depth analysis of definitions of SSCM based on literature

In the past there were several attempts to outline lists of SSCM definitions. We decided to revisit SSCM definitions published in reputable journals. Our attempt took shape after we reviewed Mentzer *et al.*'s (2001) seminal article on defining 'supply chain management' which motivated us to make an attempt to provide a comprehensive definition for SSCM. In our article we present definitions of SSCM based on our critical and extensive literature review. This list is outlined in Table 1.

Table 1: Definitions of Sustainability in supply chain literature

| Reference | Definition |
|---------------------------------|--|
| Pagell and Shevchenko (2014) | Sustainable supply chain is the design, coordination, control and organization of a supply chain to make it truly sustainable with minimum expectation being to achieve economic viability, while ensuring no harm to environment and social systems over an extended period of time. |
| Ahi and Searcy (2013) | Sustainable supply chain management is the voluntary integration of social, economic, and environmental considerations with the key inter-organizational business systems to create a coordinated supply chain to effectively manage the material, information and capital flows associated with the procurement, production and distribution of products or services to fulfill short term and long term profitability, stakeholder requirements, competitiveness and resilience of the organization. |
| Wittstruck and Teuteberg (2012) | Sustainable supply chain management is the extension of the traditional supply chain concept, by adding the social, economic and environmental aspects of sustainability. |
| Closs <i>et al.</i> (2011) | Sustainability of supply chain is defined as the ability of an organization to mitigate, detect, respond, and to recover from growing global threats related to supply chain and to enhance the long-term value. |
| Wolf (2011) | Supply chain sustainability is defined as the strategic collaboration of a manufacturer with suppliers to deliver maximum value to multiple stake holders by collaboratively managing inter- and intra-organization process, flows of products and services, information and capital decisions to achieve the goal of economic, social and environmental sustainability. |
| Pagell and Wu (2009) | A truly sustainable supply chain is one which at the worst does zero net harm to the natural and social systems, while still producing consistent profit over an extended period of time by retaining its existing customers and business forever. |
| Badurdeen <i>et al.</i> (2009) | Sustainable supply chain management is the planning and management of sourcing, procurement, pre-manufacturing, manufacturing, use and post-use stages in the life cycle in closed loop, through multiple life-cycles to achieve a shared vision, with the sharing information on product life cycle stages between companies by considering social and environmental implications. |
| Haake and Seuring (2009) | Sustainable supply chain management is the set of well-defined supply chain management policies, actions taken, and the relationships formed to solve the social and environmental issues related to design, acquisition, production, distribution, use, reuse and disposal of the goods and services of a firm. |
| Seuring (2008) | Sustainable supply chain can be defined as the integration of sustainable development and supply chain, by considering environmental and social aspects along with supply chain to get more sustainable products and processes by avoiding related problems. |
| Font <i>et al.</i> (2008) | Sustainable supply chain is defined as the addition of sustainability to the supply chain to manage the environmental, social and economic impacts of business activities. |
| Seuring and Muller (2008) | Sustainable supply chain management is defined as meeting the goals of economic, social and environmental dimensions of sustainable development, derived from the requirements of customers and stake holders through the management of material, information, capital flows and cooperation among companies. |
| Ciliberti <i>et al.</i> (2008) | Sustainable supply chain management is the management of a supply chain by considering all the three dimensions of sustainability such as social, economic end environment. |

| | |
|-------------------------------|---|
| Carter and Rogers (2008) | Sustainable supply chain can be defined as the strategic and transparent integration of organizations social, environmental and economic goals through systematic coordination of inter organizational business processes for improving the long term economic performance of the organization and its supply chain stake holders. |
| Linton <i>et al.</i> (2007) | Sustainability in supply chain can be defined as the integration of flows by taking care of things such as product design, manufacturing by-products, by-products produced during product use, product life extension, product end-of-life, and recovery processes at end-of-life to solve the core supply chain management issues. |
| Jorgensen & Knudsen (2006) | Sustainable supply chain management is defined as the means by which organizations manage their social responsibilities across dislocated production processes distributed over organizational and geographical boundaries. |
| Teuscher <i>et al.</i> (2006) | Sustainable supply chain management, which includes total quality management philosophy, and handles all internal and external risks associated with financial, social and ecological threats along the supply chain. |

From Table 1 it is noted that most of the definitions focus on the reduction of the impact of supply chain practices on ecology as a part of sustainability. Ahi and Searcy (2013) have argued that SSCM is an extension of green supply chain management (GSCM) with the integration of social and economic factors along with environmental factors. They add that none of the SSCM definitions focuses on performance characteristics and that most of the definitions of SSCM are yet to be critically reviewed to understand whether the mentioned characteristics are relevant to the SSCM concept. Sixteen definitions of SSCM from different articles are presented in comparison to GSCM, which is also considered in this paper. Based on the comparison of the definitions analyzed so far, we have tried to build a simple comprehensive and meaningful definition of SSCM. We argue that SSCM should enable organizations to achieve economic improvements. Then its acceptability rate could be increased among the supply chain managers and hence it would be easily operationalized. We can classify these definitions into two broad categories:

(i) SSCM as a management philosophy

In recent years, organizations have started embracing SSCM as their guiding philosophy. SSCM is now embedded within organizational culture. Ahi and Searcy (2013) have investigated SSCM from an integration perspective, paying attention to the balance between the dimensions of the triple-bottom line (i.e. environmental perspective, social benefits, and economic benefits).

(ii) SSCM as a set of management processes

Pagell and Schevchenko (2014) have argued that SSCM could be understood from a process point of view and in particular from a cycle and push/pull view. The cycle view focuses on embracing sustainability in procurement processes, manufacturing processes, replenishment processes and executing customer order processes (fulfilment). We can argue that the push/pull interface focuses on collaboration between suppliers and manufacturers. Wolf

(2011) has argued that sustainability in supply chain networks can be achieved through appropriate collaboration.

2.3 Classification of literature

The extensive review of literature provided numerous classification schemes. Sarkis *et al.* (2011) have used organizational theories to classify GSCM literature published in refereed journals. Gunasekaran and Spalanzani (2012) have proposed a scheme based on ~~building blocks~~ building blocks. Melnyk *et al.* (2014) attempted to offer an explanation based on building blocks. In the current study, we have attempted to classify the literature based on contributions to theory and practice. Similarly Brandenburg *et al.* (2014) classified the literature on the basis of various quantitative models used by literature focusing on GSCM or SSCM. Based on our reading of the literature and inspired by Whetten (1989) and Sutton & Staw (1995) who distinguish theory building from practice-based studies, we offer a twofold classification based on the methodologies used by past SSCM studies. First, the literature based on theory-building using a rationalist approach or alternative methods which include case study, action research, grounded theory, appreciative inquiry, or ethnographic study, and second, application based articles, which focus on benchmarking and the implementation of best practices. The classification scheme is presented in Figure 1.

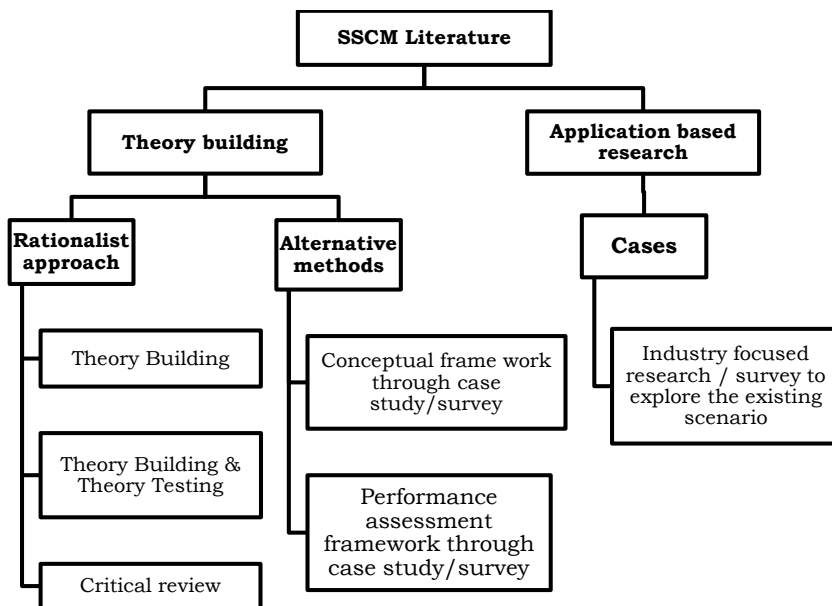


Figure 1: Classification scheme of literature (inspired by Whetten (1989) and Sutton & Staw (1995)).

We have attempted to classify some of the articles into two broad categories as shown in Appendix 1. We can see that first, the majority of SSCM literature has used a rationalist approach which includes either operations research or survey based articles. However survey-based articles cannot explain fully the mediating and moderating nature of the variables. Second, in alternative methods we have seen the use of the case study approach. Other methods, such as grounded theory, appreciative inquiry, and action research, have been given less attention in comparison to case studies by the operations management community. Hence we argue that there is lack of diversity in terms of methodology in SSCM literature that we have reviewed.

2.4 Identification and classification of the enablers of SSCM and their measures

The sustainable supply chain literature is firmly grounded on the triple bottom line concept with a focus on social, economic and environment performance measures as three main pillars, with four major aspects of risk management, transparency, strategy and culture (e.g. Elkington, 1997; Norman and MacDonald, 2004; Carter and Rogers, 2008; Mollenkopf *et al.* 2010; Morali and Searcy, 2010). Hervani *et al.* (2005) have argued that organizations have enablers and constraints from inside and outside the organization, the so-called internal and external factors. Matos and Hall (2007) have suggested that the identification of enablers is the most difficult part in framing policy and design. Zhu *et al.* (2013) have classified drivers of supply chain management as internal drivers and external drivers, in which internal drivers are identified as eco-design (ECO) and internal environmental management (IEM), whereas external drivers are explained as green purchasing, inventory optimization, and cooperation with external customers for environmental requirements. Svensson (2007) and Gupta & Palsule-Desai (2011) have further argued in favour of remanufacturing as a competitive advantage weapon and suggested the need to design the supply chain to include reused and recycled products within existing supply chain networks. Closs *et al.* (2011), have argued to change the conventional 3E's (Economic, Environment and Equity) and 3 P's (people, profit, planet) concept to make a more actionable framework for sustainable supply chain by adding ethical and educational dimensions along with environmental and economic ones. Tachizawa & Yew Wong (2014) developed their framework for sustainable multi-tier supply chains by considering contingency variables such as power, dependency, distance, industry and knowledge resources. Beske and Seuring (2014) have argued that SSCM is an extension of

SCM with the focus on triple bottom line, stakeholder management life cycle assessment, technological integration and supply chain partner collaboration. Vachon and Mao (2008) have argued that environmental performance and social sustainability in a country increases as the supply chain strength increases.

We have outlined various SSCM enablers and their measures on the basis of our literature review as shown in Table 2.

Table 2: Enablers of SSCM

| Sustainable supply chain enablers | Reference | Measures |
|--|--|---|
| Supply chain collaboration | Hsueh (2015); Gimenez <i>et al.</i> (2012); Kang <i>et al.</i> (2012); Lee (2010) | <ul style="list-style-type: none"> Trustful supplier partnership Mutual sharing of resources for better utilization |
| Green Product Design | Zhu <i>et al.</i> (2013); Linton <i>et al.</i> (2007); Sharma <i>et al.</i> (2010) | Design emphasis upon <ul style="list-style-type: none"> Green material selection Good recyclability Easy re-manufacturing Minimum environmental impact during product usage |
| Environmental Management | Lam and Dai (2015) ; Marshall <i>et al.</i> (2015) ; Zhu <i>et al.</i> (2013); Tsoufas and Pappis (2008); Lamming and Hampson (1996) | <ul style="list-style-type: none"> Ecological conservation Natural resource conservation |
| Green Procurement | Appolloni <i>et al.</i> (2014); Dubey <i>et al.</i> (2013); Amemba <i>et al.</i> (2013); Holt and Ghobadian (2009); Ofori (2000) | Purchasing that involves activities for material: <ul style="list-style-type: none"> Reuse Reduction Recycling |
| Green Packaging | Rokka and Uusitalo (2008); Coyle <i>et al.</i> (2014) | Use of packaging materials which are: <ul style="list-style-type: none"> Re-usable Recyclable Environmental friendly |
| Green Warehousing | Coyle <i>et al.</i> (2014); Amemba <i>et al.</i> (2013) | Warehousing by: <ul style="list-style-type: none"> Minimum Energy usage Maximize space utilization |
| Reverse Logistics | Vijayan <i>et al.</i> (2014); Nikolaou <i>et al.</i> (2013); Sarkis <i>et al.</i> (2010) | <ul style="list-style-type: none"> Energy and fuel conservation Pollution reduction Waste management |
| Minimization of greenhouse gas emission | Awudu and Zhang (2012) ; Chaabane <i>et al.</i> (2011) ; Halldorsson and Kovacs (2010); Edwards <i>et al.</i> (2010); Awudu and Zhang (2012) | <ul style="list-style-type: none"> Logistics route optimization Transport load and speed optimization Optimum logistics scheduling Renewable fuel usage Encouraging online trade |
| Institutional pressure | Dubey <i>et al.</i> (2015) ; Coyle <i>et al.</i> (2014); Kang <i>et al.</i> (2012); Zhu <i>et al.</i> (2005); Jayaraman <i>et al.</i> (2007) | <ul style="list-style-type: none"> Government bodies Stakeholders Customers Government policies |

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|---|---|---|
| | | <ul style="list-style-type: none"> • Government rules and norms |
| Manufacturing strategies | Dubey <i>et al.</i> (2015); Garbie (2013, 2014); Garetti and Taisch (2012); Gunasekaran and Spalanzani (2012) | <ul style="list-style-type: none"> • Agile manufacturing • Reconfigurable manufacturing • Lean production |
| Information Management | Paik & Bagchi (2007); Gunasekaran & Ngai (2004) | <ul style="list-style-type: none"> • Minimization of bullwhip effect • Supply chain Integration • Knowledge Management |
| Social Dimensions | Gopal and Thakkar (2016) ; Marshall <i>et al.</i> (2015) ; Luzzini <i>et al.</i> (2015); Mani <i>et al.</i> (2015); Mota <i>et al.</i> (2015); Hojmosse <i>et al.</i> (2013); Sarkis <i>et al.</i> (2010); Carter and Jennings (2002a, b) | <ul style="list-style-type: none"> • Ethics • Working conditions • Human rights • Safety • Community involvement |
| Public awareness | Gold <i>et al.</i> (2010a); Rokka & Uusitalo (2008) | <ul style="list-style-type: none"> • Customer awareness |
| Organizational culture & Corporate strategy | McAfee <i>et al.</i> (2002); Mello and Stank (2005); Hofmann (2010); Dey <i>et al.</i> (2011) | <ul style="list-style-type: none"> • Employee engagement & awareness • Supply chain strategy in line with corporate strategy • Top management commitment |

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2.5 Research Gaps

Drawing on the aforementioned review, we can infer that the majority of the SSCM literature focuses mostly on the environmental and economic dimensions. Studies have not yet explicitly studied and measured the social dimension (Miemczyk *et al.* 2012; Seuring, 2013). Therefore, we argue that the issue of sustainability in supply chains has a long way to go before it reaches maturity. Beske (2012) defines a framework for achieving dynamic capabilities for SSCM through knowledge management, supply chain continuity, and risk management, but does not consider the social and environmental aspects of sustainability in achieving SSCM dynamic capabilities. Coyle *et al.* (2014) focused only on the environmental factors of sustainability and proposed a framework for environmentally sustainable supply chains. Tseng & Hung (2014) have further developed a mathematical model by considering operating and social costs of SSCM, but nevertheless the social cost considered is related to the cost associated with the carbon dioxide emissions without considering any real social factors. Hence, there are limitations regarding its use as a reliable strategic decision making tool for SSCM. Fearne *et al.* (2012) further concluded that value chain analysis studies in SSCM mainly focused only on the economic aspects of SSCM and had given inadequate attention to environment and social dimensions. Markley and Davis (2007) argued that sustainability based on the triple bottom line concept must be used as a competitive advantage tool. Hazen *et al.* (2011) have argued

that GSCM practices *per se* may not be the source of competitive advantage. Hence we argue that SSCM may provide competitive advantage through mediating linkages.

Morali and Searcy (2010) suggest that integrating all the three dimensions of sustainability is the aim of today's organizations and supply chains. However, even though the triple bottom line concept of SSCM is widely acknowledged, most studies fail to consider all three pillars. Scholars have acknowledged the importance of institutionalizing SSCM practices and the benefits accruing from its adoption. However, there is yet research to be conducted that will identify and test the impact of factors such as culture, geographical region, and company size on SSCM practices. Furthermore, literature so far has not utilized alternative methods such as grounded theory, appreciative inquiry, action research or content analysis to explain SSCM related phenomena. Even though much work has been conducted on SSCM theoretical framework development, limited or no effort has been made to consolidate all the relevant enablers together to list the comprehensive common constructs of SSCM.

2.6 Theoretical Framework

On the basis of our literature review and the research gaps identified, we introduce a new term, that is, world class SSCM (WCSSCM), as *the continuous development of the appropriate organizational culture, use of innovative technologies, and awareness and involvement of top management, employees, and society to consider and translate external pressures into strategic and operational performance as well as economic stability while considering the impact of these practices on social equity, ethical values and welfare, and the environment*. We conceptualise WCSSCM via six constructs and eighteen items, which have emerged as common themes from our literature review (Figure 2). We discuss briefly each of the dimensions of our proposed framework in the next subsections. We have also classified the relevant literature according to these dimensions and subcategories (Appendix 2).

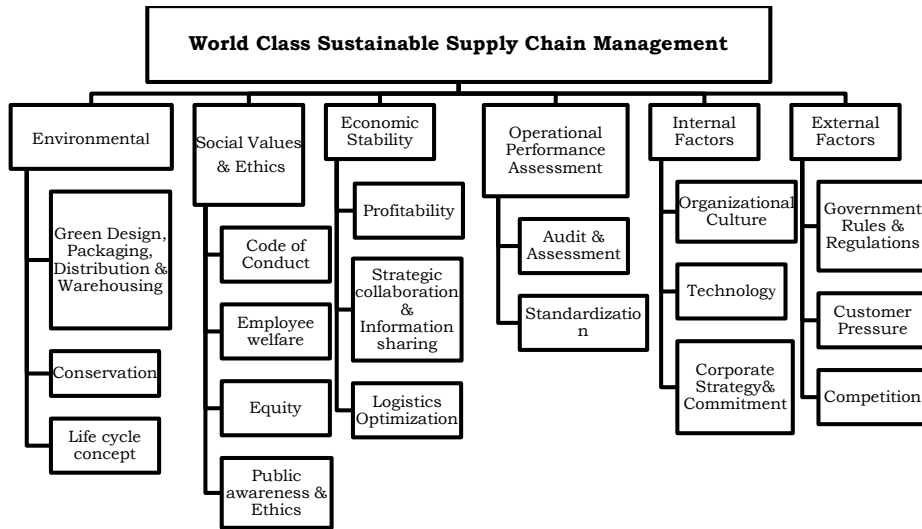


Figure 2: World Class Sustainable Supply Chain Framework

As shown in Appendix 2 we have allocated relevant literature to each subcategory under each category. For instance under environmental category we have three subcategories. Hence we have allocated relevant literature on the basis of its right fitment into the appropriate each subcategory. We next offer detailed arguments.

3. Discussion

3.1 Environmental dimension

Life cycle concept implementation, green product design, green packaging, green distribution and warehousing and conservation of natural resources are the factors considered under the environment dimension. Literature has explained the need for eco-friendly processes, technologies, products, energy efficient systems and conservation techniques. Handfield *et al.* (2002) have argued that product recalls due to environmental concerns may have an impact upon the financial health of organizations. [Aronsson and Huge Brodin \(2006\) have argued that structural changes in logistics systems can impact environmental sustainability.](#)

The importance of appropriate packaging has been raised by Rokka and Uusitalo (2008), who have argued that in recent time's customers have shown a preference for green packaged products due to increased environmental awareness and ethics. Halldorsson and Kovacs (2010) have shifted the focus from packaging to the need for energy-efficient logistics and for

reduction of the global carbon footprint. Kuik *et al.* (2011) have developed a clear framework for SSCM by dividing the well-known 3R's into first 3Rs of process improvement (reuse, recycle and remanufacturing) and 3R's of product design (reduce, recover and redesign). By conducting case study research, Wu and Pagell (2011) have concluded that organizations make environmental decisions under information uncertainty, which forces managers to adopt simple common assumptions and rules for decision-making.

Abbasi & Nilsson (2012) have further outlined the challenges of environmentally sustainable supply chain such as cost, uncertainties, mindset & cultural changes, complexity, and operationalization. They have argued that sustainability should not be treated as an add-on to supply chain management, but should have the same importance as revenue increase and cost reduction. Wiese *et al.* (2012) have explained the importance of retailers in deciding the carbon footprint in a sustainable supply chain network. Ji *et al.* (2014) have suggested that the double environmental medium (DEM) regulations and reduction in carbon footprint can be achieved by: improving demand forecast accuracy, investment in carbon reduction technology, using smaller packaging, joint distribution, allying with third party logistics providers, adopting cross-docking networks, improving energy efficiency, shortening using time, combining design for ecology and comprehensive take-back networks.

3.2 Social values and ethics dimension

Mello and Stank (2005) have argued the need for cultural change in organizations for the successful implementation of supply chain initiatives, and hence in our case, WCSSCM. Simoes *et al.* (2014) have further argued that stakeholder dimensions should be incorporated in the decision-making design process. This will further allow the identification of the critical aspects and associated measures that need to be considered when designing, planning and operating social sustainable supply chains. Harms *et al.* (2013) have argued that supplier management strategies are culture- and region- dependent, and most of the companies prefer to evaluate and select their suppliers to avoid risk rather than to develop suppliers to gain opportunity-oriented advantage. Hall & Matos (2010), through a case study, have illustrated the need and challenges in providing entrepreneurial opportunities within SSCM for the social and economic improvement of weak segments of the society.

Tencati *et al.* (2010) and Keating *et al.* (2008) have considered the social dimension of SSCM in their case studies, but have treated the social dimension as a part of corporate social responsibility. Beamon (2005) has argued that engineering ethics plays a major role in designing and developing an environmentally conscious supply chain management and the external legislation should protect the employees' job security. Fabbe-Costes *et al.* (2011) have explained a six-level scanning criteria framework starting from the people level to the societal level through functional, firm, chain and network levels for achieving sustainability. Cervellon

and Wernerfelt (2012), in an ethnographic study, have concluded that knowledge diffusion and public awareness increase sustainable fashion and clothing trends. According to Lobel (2006), the violations of human rights are another major concern in social sustainability. Sigala (2008) has explained the importance of public awareness in promoting sustainable tourism supply chain. Drake and Schlachter (2008) and Roberts (2003) have emphasized the importance of values and ethics for the successful collaboration of supply chain, ethical sourcing and purchasing.

Our review of the literature, however, suggests that only a limited amount of literature considers the social values and ethics dimension in SSCM, and that both the environmental and economic dimensions are overshadowing the social dimension. The social issues which include child labour, health issues, compensation, discrimination on the basis of ethnicity, caste or creed, and exploitation of workers are inadequately addressed in the current literature.

3.3 Economic stability dimension

Profitability, strategic collaboration, and information sharing and logistics optimization are regarded as three important factors that are to be taken care of to achieve economic stability. In the early stage, according to Walley and Whitehead (1994), sustainability thinking focused on being economically rational to all stakeholders in the supply chain by adding value to the entire system. But scholars such as Min and Galle (1997; 2001) clarified that merely focusing on cost reduction in supply chains will not help organizations become sustainable.

In later studies, scholars (Zailani *et al.* 2012; Wang and Sarkis, 2013; Ortas *et al.* 2014) stated that social and environmental sustainability initiatives in SSCM offer long-term corporate financial benefits to the organization. Spekman *et al.* (1998); Verghese and Lewis (2007); Vachon and Klassen (2008); Sharfman *et al.* (2009); Tencati *et al.* (2010); Peters *et al.* (2011); Gimenez *et al.* (2012) and Blome *et al.* (2014) have all suggested that supply chain collaboration and internal environmental programs have a positive impact on the three dimensions of sustainable development (social, economic and environmental).

According to Dam and Petkova (2014) and Glover *et al.* (2014), for the institutionalization of SSCM energy efficient technologies should be commercialized and made easily available by lowering the financial barriers through incentives, low interest loans and faster pay back periods and with the financial collaboration between stakeholders in the supply chain. Attaran and Attaran (2007) proposed a collaborative planning, forecasting and replenishment system to facilitate collaboration in the supply chain, and explained how supply chain collaboration can be achieved. Lee *et al.* (2010) showed the success story of inter-organizational supply chain collaboration, which helped Hewlett-Packard, Electrolux, Sony and Braun reduce their recycling and disposal costs by 35% by developing a common European Recycling Platform.

Supplier selection is another critical SSCM decision, which has an impact on, for instance, supply chain collaboration, profitability, and technology integration for which various multi-criteria decision making tools are used. Vurro *et al.* (2009) have proposed a theoretical framework explaining different sustainable supply chain governance models for better collaboration. However, Ashby *et al.* (2012) argue that there is little literature underlining the importance of supplier collaboration for improved sustainability performance. Bai and Sarkis (2014), Bai *et al.* (2012) and Bai *et al.* (2010) have used the neighborhood rough set methodology for the supplier selection problem with environmental and economic factors as decision attributes. Azadi *et al.* (2014) have proposed a linear programming model for sustainable supplier selection by using data envelopment analysis methodology.

Pagell and Wu (2009), in their case study research, have concluded that those organizations that follow a sustainable supply chain strategy are successful in aligning their financial goals with environmental and social goals, and are successful in ensuring transparency in all of their business processes. According to Jorgensen & Knudsen (2006), large buyers should help second and third tier small and medium scale (SMEs) companies to meet the environmental and social requirements, which will help them to become change agents, for the rule keeping process, and in risk management to achieve sustainable production in global value chains. According to Giunipero *et al.* (2006), future supply chains need strong strategic collaboration and strategic cost reductions for which supply chain managers need to acquire good strategic capabilities with a combination of technical, communication, and financial skills.

According to Krause *et al.* (2009), if cost is measured over the whole product life cycle, sustainability efforts are cost effective in both the short-and long-term, and organizations can gain sustainable competitive advantage by determining, documenting, and communicating their supply chain initiatives and goals in collaboration with their suppliers. Goldbach *et al.* (2003), following case study research, have outlined the challenges related to the coordination of complex networks of the different partners for SSCM. Walker and Preuss (2008) have argued that government must encourage sourcing from small local suppliers through partnership and other aids to improve the local economic and social aspects of sustainability. Finally, Brindley and Oxborrow (2014) have asserted the need to align marketing with SSCM to make SSCM lean and resource efficient, considering seasonal demand fluctuations and local resource availability.

3.4 Operational performance assessment dimension

Audit, assessment and standardization are considered to be the key building blocks of performance assessment, which help organizations to quantify their performance and to continuously strive for better sustainability. According to Spence and Bourlakis (2009) and

Foerstl *et al.* (2010), assessment has a positive impact on sustainability performance. Other scholars (e.g. Chen, 2005; Kleindorfer *et al.* 2005; [Oglethorpe and Heron, 2010](#); Curkovic and Sroufe, 2011) explain how environmental audit and standardization management systems such as ISO14000, Eco-Management and the European Union Audit scheme help organizations to achieve quality processes and products. According to Ching & Moreira (2014), standardization and traceability are identified as required management practices in addition to the often-mentioned practices such as lean, reverse logistics, green purchasing, eco-design and collaboration with suppliers for achieving better sustainability performance.

Grosvold *et al.* (2014) have developed a framework that explains the methods for achieving sustainability performance through SSCM with third party certifications and supplier training. They have also suggested methods for supplier auditing and assessing and monitoring risk. According to Grimm *et al.* (2011), lower-tier suppliers are often linked with serious social and environmental issues. Hence, introducing standards is the best indirect method to address such issues and have better coordination within the supply chain. Using sustainability reports from nine companies, Turker and Altuntas (2014) have identified compliance, monitoring, and auditing as the main components of SSCM for supply chain performance improvement, risk avoidance and for choosing suppliers. Hutchins and Sutherland (2008) have quantified the relationship between corporate social decisions and social indicators of sustainability by using the concept of life cycle assessment, and showed that even a single individual corporate decision can affect national level measures of social sustainability of SSCM. Schaltegger and Burritt (2010) have argued towards the use of sustainability accounting and assessment to measure the financial implications and benefits of sustainability initiatives. According to Roehrich *et al.* (2014), standardization and audit can provide invaluable help to minimize reputational risks and maximize sustainability performance.

3.5 Internal factors dimension

Organizational culture, technology, corporate strategy and commitment are considered to be internal factors, which are directly or indirectly relevant to the sustainability initiatives of organizations. The use of state-of-the art technologies and innovative processes can provide competitive advantage to both firms and their suppliers. According to Geffen and Rothenberg (2000), good supplier relationships help firms promote innovative technologies and joint R&D across the supply chain. Wittstruck and Teuteberg (2012) have concluded that supply networks that adopt a common sustainability strategy, information sharing, and technology infrastructure will benefit and can achieve better sustainability performance.

Lambert (2008) has studied the intangible constructs of SSCM, such as organizational culture, corporate strategy and commitment. According to Carter and Dresner (2001) and Griffiths and

Petrick (2001), a lack of corporate strategy and a lack of management involvement will hamper the organization's sustainability achievement efforts. Narasimhan and Das (2001) and Day & Lichtenstein (2006) have stated that alignment of SSCM strategy with corporate strategy is necessary for the success of SSCM.

Clelland *et al.* (2000) and Klassen (2001) have asserted the need to develop cleaner process technologies that minimize waste in manufacturing. Beamon (2008) emphasized the need for better technological and logistics integration to achieve better SSCM performance. Finally, scholars including Hanna *et al.* (2000), New *et al.* (2000), and Hughes (Hughes (2005) have) have argued that employee involvement, middle management involvement, and organizational culture need to be considered when developing sustainable supply chains. However, there are still few papers that analyze the effect of organizational culture and corporate commitment on the sustainability performance of supply chains.

3.6 External factors dimension

Government rules and regulations, customer pressures, and competition are amongst the most important external factors driving the SSCM strategy of organizations. According to Gold *et al.* (2010b) and Georgiadis and Besiou (2008) legislation from governing bodies, and customer and stakeholder requirements are highly-relevant enablers of SSCM. However, they underline that further research is required to explore the interrelationships among the enablers of SSCM. Kumar & Yamaoka (2007) have shown that tax exemption or relaxation for reverse logistics and for recycled product exports will boost the sustainability performance of supply chains. According to scholars including Porter and Van der Linde (1995), Carter and Ellram (1998) and Amann *et al.* (2014) government policy regulations have a major influence on sustainability efforts and are a main driving force of SSCM. Literature including Ilbery and Maye (2005), Smith (2008), Jones *et al.* (2008), Banterle *et al.* (2013), and Shokri *et al.* (2014) emphasizes the role and importance of cooperation among stakeholders, environmental certification and government rules and policies in sustainable consumption, production, and recycling in retail food supply chains. Ross *et al.* (2012) have argued that government has an important role in the infrastructure development of a country, which is an important enabler of SSCM.

Furthermore, consumers' impacts on product features (Bask *et al.* 2012), customer pressures for low-price products (Orsato, 2006), as well as pressures from investors (Trowbridge, 2001) are important drivers for sustainable supply chains. Darnall *et al.* (2008) have stated that GSCM complements the environmental management system of an organization, which in turn is stimulated by external factors such as market demand and environmental regulations. Furthermore, Koplin *et al.* (2007) have argued that that the policy implications of government and trade agreements must be integrated with the sustainable supply chain strategy. Griffin *et al.* (2014) have further tested the impact of government acts on the financial performance of

sustainable supply chains. Soosay *et al.* (2012) have argued that government bodies must develop regulations for sustainable supply chains while keeping in mind value chain and product life cycle concepts.

The literature highlights the importance of customers as the focal point of supply chains, e.g. Handfield *et al.* (1997); Walton *et al.* (1998); Hall (2001); Korpela *et al.* (2001); Childerhouse *et al.* (2002). Therefore, we argue that sustainable supply chain network design should include an examination of the impact of external factors on SSCM performance and subsequently on the achievement of sustainable competitive advantage within supply chain networks.

4. Conclusions and further research directions

In this article we have presented an extensive literature review, and developed a classification scheme of contributions to the SSCM literature through which we classified the articles into those aiming at theory building vs. those looking at application based research. Our review of literature suggests that social issues are not sufficiently studied. These include child labour, health issues, compensation, discrimination on the basis of ethnicity, caste or creed, and exploitation of workers. Empirical research fails to capture some of the most important ethical dimensions and the majority of SSCM literature reviewed has attempted to use OR-based mathematical models or multi-criteria decision making tools. Furthermore, the majority of the literature has adopted a rationalist approach and few contributions use methods based on qualitative case studies, ethnography, or action research. To address these gaps, we have argued for the need to introduce the term *world-class sustainable supply chain management (WCSSCM)*. We have developed a theoretical framework for WCSSCM (Figure 4), which considers equally the triple bottom line dimensions, while attending to the role of translating external pressures into strategic and operational performance by taking notice of the role of top managers, society, employees, and technology.

Our contribution lies in (i) categorizing and consolidating the different definitions of SSCM and the relevant enablers of SSCM, through a novel systematic classification and analysis of literature; (ii) recognising the need for a holistic study of SSCM paying attention to the different pillars and constructs; (iii) arguing for WCSSCM to address the aforementioned issues; and (iv) presenting the literature on the basis of our WCSSCM framework. Based on extensive review we have made some observations along the lines of Ketchen and Hult (2007), in which they have argued that supply chain management research will benefit from analysing the supply chain phenomena using the lens of organizational theories. Sarkis *et al.* (2011) attempted to classify green supply chain management (GSCM) literature on the basis of nine organizational

theories. (We have taken the liberty to exclude the discussion of nine organizational theories to avoid any repetition of literature.) The discussions are aimed at understanding the missing link between SSCM literature and organizational theories. Though there is research that has embraced organizational theories, with few exceptions most of the articles have attempted to explain supply chain phenomena using a single point of view. In order to explain complex phenomena, it is felt that integration of some of the organizational theories will offer better insights. Hence we feel that there is a huge opportunity to examine current SSCM phenomena using integrated organizational theories.

Inspired by Markman and Krause (2014) we would like to encourage researchers to further study WCSSCM. Our presentation of the relevant literature (Appendix 2) also illustrates the need to focus on particular subcategories of the dimensions of our proposed framework, to advance our knowledge on WCSSCM. For instance, in the technology subcategory, there is interest in how big data science could help both developed and developing countries to learn how to prevent environmental and human health challenges through sustainable production and sustainable consumption, by focusing upon prevention rather than primarily upon pollution control or pollutant treatment or pollutant dilution. This may help to build more comprehensive frameworks which may not be possible through traditional methodologies and techniques. These comprehensive frameworks generated using big data may have significant positive impact on programs surrounding sustainable production and consumption. Furthermore, we believe that future WCSSCM research can benefit from the use of alternative methods such as case studies, grounded theory, appreciative enquiry, action research, ethnographic studies and other methods currently used in other fields (Taylor and Taylor, 2009; Ketokivi and Choi, 2014). In this vein, we will address one of the gaps identified in the literature, that is, to conduct more studies (theory-building and application-based) in order to study WCSSCM-related phenomena (e.g. related to social equity, ethical values and welfare, and the environment).

Finally, we feel that current SSCM literature has failed to adopt the triangulation method to validate qualitative work, except for few studies (see Seuring, 2008; Pagell and Wu, 2009). Hence, it is recommended the use of the triangulation method to validate qualitative research. We believe that rigorous application of research methods in WCSSCM can provide new insights. To further reveal finer grain boundaries of microstructure, the use of mixed research lenses blended with rich organizational theories can take current WCSSCM research forward. Based on our extensive review we suggest the following research avenues:

- (i) The WCSSCM framework needs empirical validation in order to be established as a comprehensive and reflective framework;
- (ii) There is pressing need for a suitable costing system for WCSSCM taking into account appropriate cost drivers and the basis for allocation of overhead costs;
- (iii) New quality standards have to be established for WCSSCM including a new model for Total Quality Management for WCSSCM;
- (iv) Performance measures and metrics for WCSSCM should be developed as basic managerial tools;
- (v) Outsourcing models need to be refined based on the characteristics of WCSSCM;
- (vi) Human resource management issues in WCSSCM need to be further investigated.

One limitation of our study is that the findings are influenced by the selection keywords and databases used. Therefore it may be that articles not included in these databases were excluded from our research. However, we followed other researchers (e.g. Gunasekaran *et al.* 2015) in our selection of appropriate keywords, and we find that the majority of highly-ranked academic journals are included in our selection.

Notwithstanding the limitation of the study, we believe that this study will offer a new perspective to those who would like to further study and incorporate WCSSCM in their research and practice.

Appendix 1

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|--|---|---|--|
| <p style="text-align: center;">Appendix 1 Classification of literature based on methodology adopted Theory Building</p> | <p style="text-align: center;">Theory building</p> | <p style="text-align: center;">Theory building</p> | <p>Closs <i>et al.</i> (2011); Coyle <i>et al.</i> (2014); Yu and Tseng (2014); Ching & Moreira (2014); Sharma <i>et al.</i> (2010); Beske (2012); Faisal (2010); Kumar & Yamaoka (2007); Fabbe-Costes <i>et al.</i> (2011); Ageron <i>et al.</i> (2012); Vurro <i>et al.</i>(2009); Tachizawa & Yew Wong (2014); Xia & Tang (2011); Kuik <i>et al.</i> (2011); Drake & Schlachter (2008)</p> |
| | | <p style="text-align: center;">Theory building & theory testing</p> | <p>Chardine-Baumann & Botta-Genoulaz (2014); Hassini <i>et al.</i> (2012); Schaltegger & Burritt (2014); Grosvold <i>et al.</i> (2014); Figge <i>et al.</i> (2002); Okongwu <i>et al.</i> (2013)</p> |
| | | <p style="text-align: center;">Critical review</p> | <p>Camero and Sowlati (2014);Martinez-Jurado and Movano-Fuentes (2014); Brandenburg <i>et al.</i> (2014); Beske <i>et al.</i> (2014); Seuring (2013); Schaltegger and Burritt (2010); Ji <i>et al.</i> (2014); Linton <i>et al.</i>(2007); Halldorsson and Kovacs (2010); Jones <i>et al.</i> (2008); Shokri <i>et al.</i>(2014); Giunipero <i>et al.</i> (2006); Ahi & Searcy (2013); Carter & Easton (2011); Dey <i>et al.</i> (2011); Beske & Seuring (2014); Alexander <i>et al.</i> (2014); Gold <i>et al.</i> (2010b); Gupta & Palsule-Desai (2011); Smith (2008); Taticchi <i>et al.</i> (2013); Abbasi & Nilsson (2012); Awudu & Zhang (2012); Bourlakis <i>et al.</i> (2014); Gimenez & Tachizawa (2012); Appolloni <i>et al.</i> (2014); Pagell & Shevchenko (2014); Wiese <i>et al.</i>(2012); Fearne <i>et al.</i> (2012); Attaran & Attaran (2007); Hofmann (2010); Miemczyk <i>et al.</i> (2012); Bai <i>et al.</i> (2010); Kleindorfer <i>et al.</i> (2005); Markley and Davis (2007) Geffen and Rothenberg (2000); Morali and Searcy (2010); Krause <i>et al.</i> (2009); Winter & Knemeyer (2013)</p> |
| | <p style="text-align: center;">Alternative Methods</p> | <p style="text-align: center;">Conceptual frame work through case study/survey</p> | <p>Brindley & Oxborrow (2014); Georgiadis & Besiou (2008); Ilbery & Maye (2005); Frostenson & Prenkert (2014); Soosay <i>et al.</i> (2012); Seuring (2008); Ho & Choi (2012); Ortas <i>et al.</i> (2014); Wolf (2011); Reuter <i>et al.</i> (2010); Banterle <i>et al.</i>(2013); Cheung & Rowlinson (2011); Goldbach <i>et al.</i> (2003); Spekman <i>et al.</i> (1998); Garcia-Arca <i>et al.</i> (2014); Dam & Petkova (2014)-; Hall & Matos (2010); Sigala (2008); Pagell & Wu (2009); Peters <i>et al.</i>(2011); Curkovic & Sroufe (2011); Wu & Pagell (2011); Tencati <i>et al.</i> (2010); Blome <i>et al.</i> (2014); Keating <i>et al.</i> (2008); Bask <i>et al.</i> (2012); Svensson (2007); Walker and Preuss (2008); Roehrich <i>et al.</i>(2014); Isaksson <i>et al.</i> (2010); Clelland <i>et al.</i> (2000)</p> |
| | | <p style="text-align: center;">Performance assessment framework through case study/survey</p> | <p>Silvestre (2015); Azadi <i>et al.</i> (2014); Tseng & Hung (2014); Hutchins and Sutherland (2008); Matos & Hall (2007); Reefke & Trocchi (2013); Varsei <i>et al.</i> (2014); Hubbard (2009); Brignall & Modell (2000); Vasileiou & Morris (2006); Bai and Sarkis (2014); Bai <i>et al.</i> (2012); Emmanuel-Ebikake <i>et al.</i> (2014); Zhou <i>et al.</i> (2000); Zailani <i>et al.</i> (2012)</p> |
| | <p style="text-align: center;">Application-based research</p> | <p style="text-align: center;">Theory in practice</p> | <p style="text-align: center;">Industry focused research / survey to explore the existing scenario</p> |

Appendix 2

| Appendix 2 Classification of literature based on the WCSSCM framework | | |
|--|---|--|
| Environmental | Green Design, packaging distribution & Warehousing | Ofori (2000); Griffiths & Petrick (2001); Carter & Jennings (2002a); Tsoufas & Pappis (2006); Linton <i>et al.</i> (2007); Paik & Bagchi (2007); Frota Neto <i>et al.</i> (2008); Rokka & Uusitalo (2008); Haake & Seuring (2009); Holt & Ghobadian (2009); Sharfman <i>et al.</i> (2009); Halldorsson & Kovacs (2010); Ramudhin <i>et al.</i> (2010); Sharma <i>et al.</i> (2010); Wu and Pagell (2011); Abbasi & Nilsson (2012); Chaabane <i>et al.</i> (2012); Wiese <i>et al.</i> (2012); Zailani <i>et al.</i> (2012); Amemba <i>et al.</i> (2013); Dubey <i>et al.</i> (2013); Garbie (2013); Zhu <i>et al.</i> (2013); Coyle <i>et al.</i> (2014); Appolloni <i>et al.</i> (2014); Dubey <i>et al.</i> (2013); Amemba <i>et al.</i> (2013); Ji <i>et al.</i> (2014); Melnyk <i>et al.</i> (2014); Mota <i>et al.</i> (2015) |
| | Conservation | Zhu <i>et al.</i> (2013); Tsoufas & Pappis (2008); Lamming & Hampson (1996); Despeisse <i>et al.</i> (2012) |
| | Life Cycle Concept | Badurdeen <i>et al.</i> (2009); Hall & Matos (2007); Kuik <i>et al.</i> (2010);Van Hoof & Lyon (2013) |
| Social Values & Ethics | Code of Conduct | Keating <i>et al.</i> (2008); Mello & Stank (2005); Hall & Matos (2007); Roberts (2003); |
| | Employee welfare | Simoes <i>et al.</i> (2014) |
| | Equity | Keating <i>et al.</i> (2008); Tencati <i>et al.</i> (2010); Mani <i>et al.</i> (2015) |
| | Public awareness & Ethics | Roberts (2003); Beamon (2005); Lobel (2006); Drake & Schlachter (2008); Sigala (2008); Smith (2008); Rokka & Uusitalo (2008); Gold <i>et al.</i> (2010a); Hall & Matos (2010); Fabbe-Costes <i>et al.</i> (2011); Cervellon and Wernerfelt (2012); Mani <i>et al.</i> (2015) |

Appendix 2
Classification of literature based on the WCSSCM framework

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|------------------------------------|--|---|
| Economic stability | Profitability | Guide Jr., & Van Wassenhove (2009); Krause <i>et al.</i> (2009); Wu & Pagell (2011); Zailani <i>et al.</i> (2012); Wang and Sarkis (2012); Glover <i>et al.</i> (2014); Dam & Petkova (2014); Orgas <i>et al.</i> (2014) |
| | Strategic collaboration & information sharing | Walley & Whitehead (1994); Min & Galle (1997); Spekman <i>et al.</i> (1998); Bierma & Wasterstraat (1999); Geffen & Rothenberg (2000); Carter & Dresner (2001); Min & Galle (2001); Carter & Jennings (2002b); Figge <i>et al.</i> (2002); Goldbach <i>et al.</i> (2003); Choi & Krause (2006); Giunipero <i>et al.</i> (2006); Jorgensen & Knudsen (2006); Vasileiou & Morris (2006); Vachon & Klassen (2006); Verghese & Lewis (2007); Attaran & Attaran (2007); Ciliberti <i>et al.</i> (2008); Seuring & Muller (2008); Vachon & Klassen (2008); Walker & Preuss (2008); Shafman <i>et al.</i> (2009); Vurro <i>et al.</i> (2009); Bai & Sarkis (2010); Bai <i>et al.</i> (2010); Foerstl <i>et al.</i> (2010); Kuik <i>et al.</i> (2010); Lee <i>et al.</i> (2010); Sharma <i>et al.</i> (2010); Tencati <i>et al.</i> (2010); Zhou <i>et al.</i> (2010); Cheung & Rowlinson (2011); Curkovic & Sroufe (2011); Peters <i>et al.</i> (2011); Wolf (2011); Zhou <i>et al.</i> (2011); Ashby <i>et al.</i> (2012); Bai <i>et al.</i> (2012); Cervellon & Wernerfelt (2012); Gimenez & Tachizawa (2012); Liu <i>et al.</i> (2012); Bai & Sarkis (2014); Blome <i>et al.</i> (2014); Brindley & Oxborrow (2014); Azadi <i>et al.</i> (2015); Hsueh (2015); |
| | Logistics optimization | McCullen & Towill (2002); Sheu <i>et al.</i> (2005); Edwards <i>et al.</i> (2010); Sarkis <i>et al.</i> (2010); Awudu & Zhang (2012); Nikolaou <i>et al.</i> (2013); Garcia-Arca <i>et al.</i> (2014); Vijayan <i>et al.</i> (2014) |
| Operational Performance Assessment | Audit & Assessment | Brignall & Modell (2000); Fransoo & Wouters (2000); Carter & Dresner (2001); Hatfield <i>et al.</i> (2002); Zhou <i>et al.</i> (2004); Chen (2005); Hervani <i>et al.</i> (2005); Kleindorfer <i>et al.</i> (2005); Rao & Holt (2005); Zhou <i>et al.</i> (2005); Day & Lichtenstein (2006); Zhou & Sarkis (2007); Hutchins <i>et al.</i> (2008); Zhou <i>et al.</i> (2008); Hubbard (2009); Spence & Bourlakis (2009); Foerstl <i>et al.</i> (2010); Isaksson <i>et al.</i> (2010); Schaltegger & Burritt (2010); Testa & Iraldo (2010); Azevedo <i>et al.</i> (2011); Colicchia <i>et al.</i> (2011); Curkovic & Sroufe (2011); Grimm <i>et al.</i> (2011); Chen <i>et al.</i> (2012); Hassini <i>et al.</i> (2012); Shi <i>et al.</i> (2012); Wittstruck & Teuteberg (2012); Zhou <i>et al.</i> (2012); Plambeck <i>et al.</i> (2013); Reefke & Trocchi (2013); Taticchi <i>et al.</i> (2013); Varsei <i>et al.</i> (2013); Wu & Sarkis (2013); Yusuf <i>et al.</i> (2013); Zhou <i>et al.</i> (2013); Beske & Seuring (2014); Bourlakis <i>et al.</i> (2014); Chardine-Baumann & Botta-Genoulaz (2014); Emmanuel-Ebikake <i>et al.</i> (2014); Grosvold <i>et al.</i> (2014); Garbie <i>et al.</i> (2014); Ortas <i>et al.</i> (2014); Roehrich <i>et al.</i> (2014); Schaltegger & Burritt (2014); Schrettle <i>et al.</i> (2014); Turker & Altuntas (2014); Yu & Cheng (2014); Dubey <i>et al.</i> (2015); Gunasekaran <i>et al.</i> (2015); Luzzini <i>et al.</i> (2015) |

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|--|--|--|------------------------|---|
| | | | Standardization | Rosen_ <i>et al.</i> (2002); Ching & Moreira (2014) |
|--|--|--|------------------------|---|

| Appendix 2 Classification of literature based on the WCSSCM framework | | Internal factors | | | |
|--|------------------------------|--|--|--|--|
| | | | Organizational Organizational Culture | Hanna <i>et al.</i> (2000); Geffen & Rothenberg (2000); New <i>et al.</i> (2000); McAfee <i>et al.</i> (2002); Hughes (2005); Mello & Stank (2005); Lambert (2008); Wittstruck & Teuteberg (2012); Harms <i>et al.</i> (2013) | |
| | | | Technology | Klassen (2001); Gunasekaran & Ngai (2004); Beamon (2008); Clelland <i>et al.</i> (2008); Darnall <i>et al.</i> (2008); Deif (2011); Wittstruck & Teuteberg (2012) | |
| | | | Corporate Strategy & Commitment | Handfield <i>et al.</i> (1997); Zhou <i>et al.</i> (2000); Carter & Dresner (2001); Griffiths & Patrick (2001); Narasimhan & Das (2001); Maignan & Mcalister (2003); Forman & Jorgensen (2004); Zhou & Cote (2004); Ilbery & Maye (2005); Day & Lichtenstein (2006); Giunipero <i>et al.</i> (2006); Markley & Davis (2007); Svensson (2007); Halldorsson <i>et al.</i> (2009); Alvarez <i>et al.</i> (2010); Hofmann (2010); Klassen (2010); Mollenkopf <i>et al.</i> (2010); Park <i>et al.</i> (2010); Reuter <i>et al.</i> (2010); Sarkis <i>et al.</i> (2010); Dey <i>et al.</i> (2011); Wolf (2011); Xia & Tang (2011); Keating <i>et al.</i> (2012); Ho & Choi (2012); Law & Gunasekaran (2012); Kang <i>et al.</i> (2009); Singh <i>et al.</i> (2012); Walker & Jones (2012); Wu <i>et al.</i> (2012); Hojmosse <i>et al.</i> (2013); Okongwu <i>et al.</i> (2013); Frostenson & Prenkert (2014); Tseng <i>et al.</i> (2014); Silvestre (2015) | |
| | | External factors | | | |
| | | | Government rules & Regulations | Porter & Van der Linde (1995); Carter and Ellram (1998); Ilbery & Maye (2005); Siaminwe <i>et al.</i> (2005); Zhu <i>et al.</i> (2005); Jayaraman <i>et al.</i> (2007); Kassolis (2007); Koplín <i>et al.</i> (2007); Kumar & Yamaoka (2007); Preuss (2007); Font <i>et al.</i> (2008); Georgiadis & Besiou (2008); Jones <i>et al.</i> (2008); Smith (2008); Vachon & Mao (2008); Holt & Ghobadian (2009); Spence & Bourlakis (2009); Gold <i>et al.</i> (2010b); Park <i>et al.</i> (2010); Kang <i>et al.</i> (2012); Ross <i>et al.</i> (2012); Soosay <i>et al.</i> (2012); Wu <i>et al.</i> (2012); Banterle <i>et al.</i> (2013); Amannet <i>et al.</i> (2014); Coyle <i>et al.</i> (2014); Griffin <i>et al.</i> (2014); Shokri <i>et al.</i> (2014); Silvestre (2015) | |
| | Customer Pressure | Lamming & Hampson (1996); Walton <i>et al.</i> (1998); Hall (2001); Handfield <i>et al.</i> (2001); Korpela <i>et al.</i> (2001); Childerhouse <i>et al.</i> (2002); Maignan & Mcalister (2003); Lobel (2006); Orsato <i>et al.</i> (2006); Seyfang (2006); Teuscher <i>et al.</i> (2006); Park <i>et al.</i> (2010); Hazen <i>et al.</i> (2011); Ageron <i>et al.</i> (2012); Bask <i>et al.</i> (2012) | | | |
| | Competition | Lamming & Hampson (1996); Hall (2001); Trowbridge (2001); Park <i>et al.</i> (2010); Ageron <i>et al.</i> (2012); Sheu <i>et al.</i> (2012); Wu <i>et al.</i> (2012); | | | |

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