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

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24th^hJanuary 2016

Dear Editor,

We would like to express our sincere thanks to you and four reviewers who have contributed extensively to the development of our manuscript. In response to minor revisions we have undertaken revision and checked twice. We can hope that you and reviewers will like the final revised draft.

Sincerely yours,

The Authors

For Peer Review

1
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3 Response: Manuscript ID IJLM-07-2015-0112.R2 entitled "World Class Sustainable Supply
4 Chain Management: critical review and further research directions".
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9 Reviewer 1

10
11 Recommendation: Accept

12
13 Response: Thanks for accepting our work.

14
15 Comments:

16 I have no further objections to publishing the paper. Line 30 on page 5 speaks to "Twelve
17 definitions of SSCM,' while Table 1 appears to contains 16. I'm not sure if these are supposed to
18 be the same.

19
20 **Response:** *Thanks for pointing out discrepancy. We have corrected in our revised paper.*

21
22 Although I think the presentation of Appendix II could still use some improvement, it makes
23 sense to me when I compare it with Figure 2. This is not the case when I try to compare Figure I
24 to Appendix I. Anyone looking at what you are doing would sympathize with the challenges you
25 face organizing the appendixes by presenting the vertical hierarchies in the figures laid out
26 horizontally as tables in the appendixes.

27
28 **Response:** *Thanks for your observations. We have tried our best to present. However we believed that this is
29 one of the best way to classify the literature.*

30
31 Note that Figure 2 really only has two levels, the dimensions (Environmental, Social Values &
32 Ethics, etc.) with the subcategories (Green Design . . . , Conservation, and Life cycle concept,
33 under Environmental). Perhaps an explanation for why it is easier to express in its corresponding
34 table.

35
36 **Response:** *Thanks for your sincere comments. We have offered our explanation. For your convenience we have
37 shaded the revised portion.*

38
39 Figure 1 has (or at least appears to me to have) three levels. Theory building and Application
40 based research are the top with TB having subcategories Rationalist approach and Alt methods.
41 Then, each RA and AM have subcategories. Application based research has one (possibly
42 superfluous) subcategory "Cases" and below that "Industry focused . . ." In the appendix, you
43 have Application based research and then, apparently, below that "Theory in practice," a title
44 nowhere on Figure I. I would suggest finding someone who has never looked at the figure and
45 table combination before to see if it makes sense to them. It is possible you have been too close
46 to it for too long.

47
48 **Response:** *Thanks for your suggestions. We have double-checked.*

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50 We would like express our sincere thanks for your effort to improve our manuscript.
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For Peer Review

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

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3 also strong evidence suggesting that sustainability in supply chain networks has helped
4 organizations to achieve better performance (e.g. Tsoufas and Pappis, 2006; Yusuf *et al.* 2013;
5 Plambeck *et al.* 2013).
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8 Despite the popularity of the SSCM field, it is quite evident from the literature that the concept
9 of a sustainable supply chain is poorly understood from both theoretical and managerial points
10 of view. There is growing body of literature related to sustainable supply chain management,
11 but, on the other hand, there are overlaps between green supply chain management or
12 environmental supply chain management literature and sustainable supply chain literature, as
13 well as other areas that have attracted significant contributions, such as environmental supply
14 chains, ethical supply chains and responsible supply chains. Markman and Krause (2014), in a
15 recent call for papers, have argued for more integrated theory-building articles. Despite the
16 popularity of the SSCM topics amongst researchers, there is still a need for critical review and
17 a framework that will shed light upon the different definitions and perspectives and links, and
18 will provide further research directions. To bridge this knowledge gap and driven by the
19 endorsement of Markman and Krause, this study aims at achieving the following research
20 objectives:
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27 (i) To review the literature of SSCM and develop a classification of literature based on previous
28 scholarly works;
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30 (ii) To argue for the use of world-class SSCM (WCSSCM) and propose a theoretical framework
31 that articulates its different dimensions;
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33 (iii) To provide taxonomy of the literature based on our WCSSCM framework;
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35 (iv) To identify further research directions based on the limitations of our study.
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38 The remainder of the article is organized as follows. In the second section we discuss our
39 methodology and our classification of literature and present our theoretical framework. The
40 third section is devoted to research discussions and finally we synthesize the findings of the
41 extensive literature review, outline the limitations of this work, and offer extensive further
42 research directions.
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46 47 48 **2. Research Methodology** 49

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

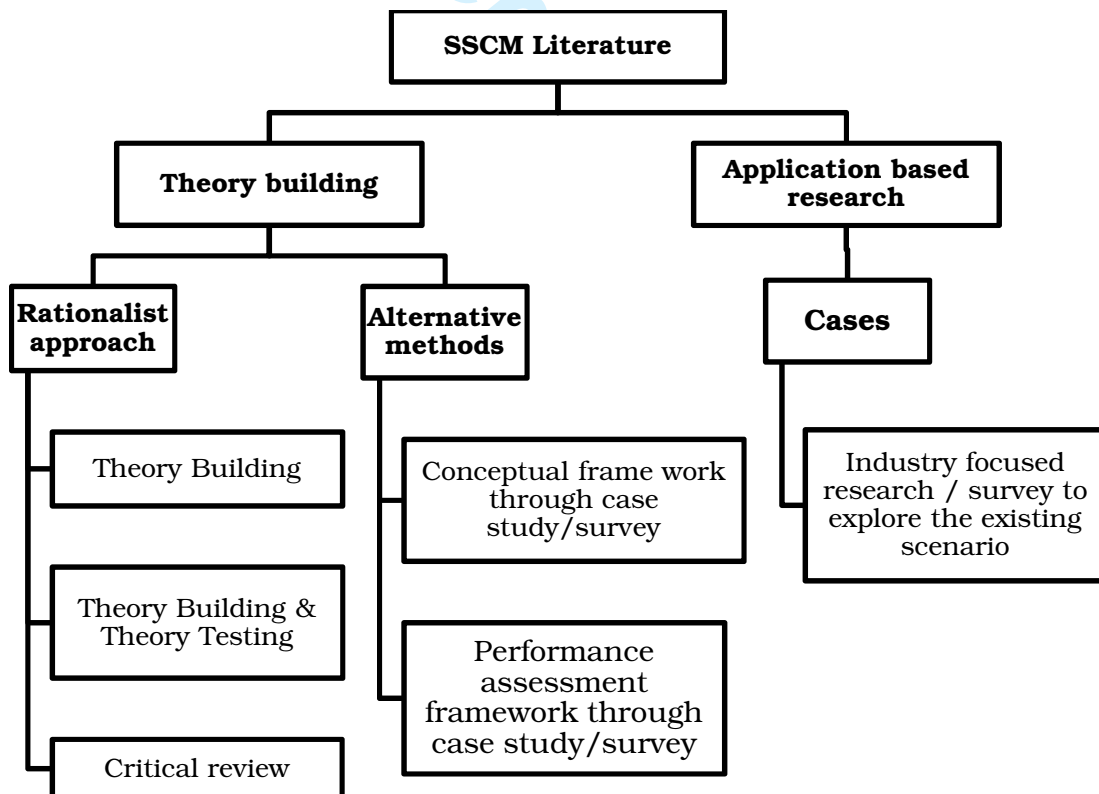


Figure 1: Classification scheme of literature (inspired by Whetten (1989) and Sutton & Staw (1995)).

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); Tsoulfas 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 andGhobadian (2009); Ofori (2000)	Purchasing that involves activities for material: <ul style="list-style-type: none"> • Reuse • Reduction • Recycling
Green Packaging	Rokka andUusitalo (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);	<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

		<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);Hoejmose <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

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

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

5
6 Morali and Searcy (2010) suggest that integrating all the three dimensions of sustainability is
7 the aim of today's organizations and supply chains. However, even though the triple bottom
8 line concept of SSCM is widely acknowledged, most studies fail to consider all three pillars.
9 Scholars have acknowledged the importance of institutionalizing SSCM practices and the
10 benefits accruing from its adoption. However, there is yet research to be conducted that will
11 identify and test the impact of factors such as culture, geographical region, and company size
12 on SSCM practices. Furthermore, literature so far has not utilized alternative methods such as
13 grounded theory, appreciative inquiry, action research or content analysis to explain SSCM
14 related phenomena. Even though much work has been conducted on SSCM theoretical
15 framework development, limited or no effort has been made to consolidate all the relevant
16 enablers together to list the comprehensive common constructs of SSCM.
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24 **2.6 Theoretical Framework**

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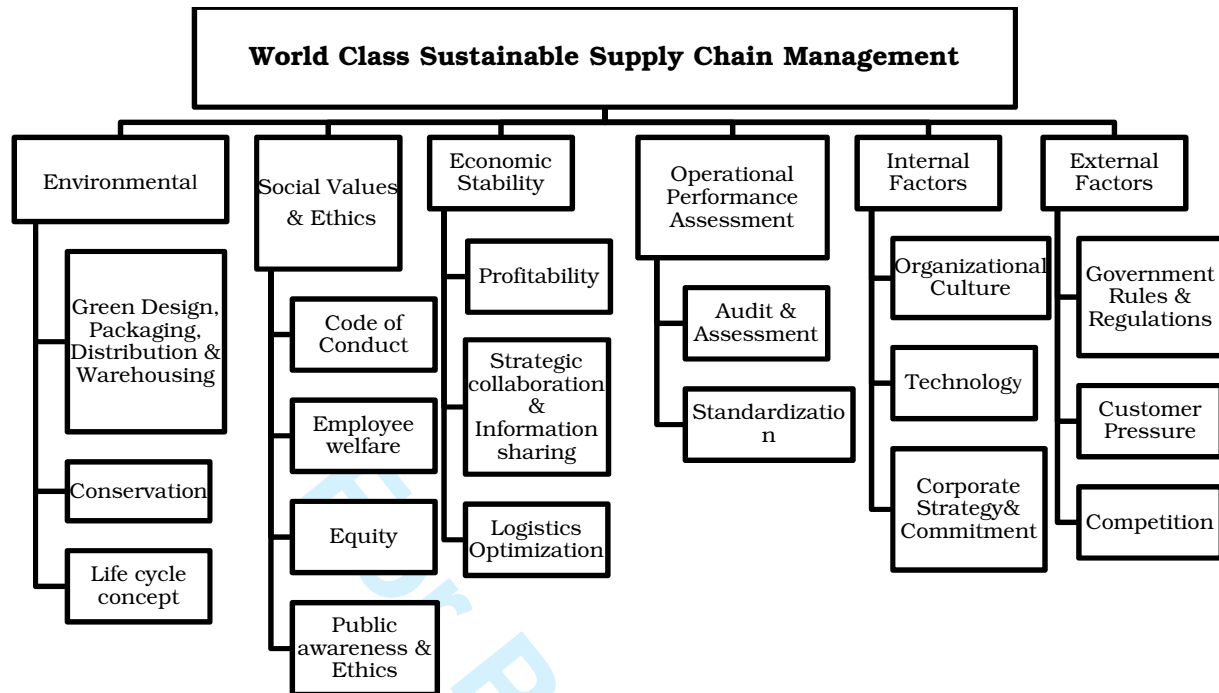


Figure 2: World Class Sustainable Supply Chain Framework

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 fit into the appropriate 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

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3 SSCM by dividing the well-known 3R's into first 3Rs of process improvement (reuse, recycle
4 and remanufacturing) and 3R's of product design(reduce, recover and redesign). By conducting
5 case study research, Wu and Pagell (2011) have concluded that organizations make
6 environmental decisions under information uncertainty, which forces managers to adopt
7 simple common assumptions and rules for decision-making.
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11 Abbasi and Nilsson (2012) have further outlined the challenges of environmentally sustainable
12 supply chain such as cost, uncertainties, mindset & cultural changes, complexity, and
13 operationalization. They have argued that sustainability should not be treated as an add-on to
14 supply chain management, but should have the same importance as revenue increase and cost
15 reduction. Wiese *et al.* (2012) have explained the importance of retailers in deciding the carbon
16 footprint in a sustainable supply chain network. Ji *et al.* (2014) have suggested that the double
17 environmental medium (DEM) regulations and reduction in carbon footprint can be achieved
18 by: improving demand forecast accuracy, investment in carbon reduction technology, using
19 smaller packaging, joint distribution, allying with third party logistics providers, adopting
20 cross-docking networks, improving energy efficiency, shortening using time, combining design
21 for ecology and comprehensive take-back networks.
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29 **3.2 Social values and ethics dimension**

30 Mello and Stank (2005) have argued the need for cultural change in organizations for the
31 successful implementation of supply chain initiatives, and hence in our case, WCSSCM.
32 Simoes *et al.* (2014) have further argued that stakeholder dimensions should be incorporated
33 in the decision-making design process. This will further allow the identification of the critical
34 aspects and associated measures that need to be considered when designing, planning and
35 operating social sustainable supply chains. Harms *et al.* (2013) have argued that supplier
36 management strategies are culture- and region- dependent, and most of the companies prefer
37 to evaluate and select their suppliers to avoid risk rather than to develop suppliers to gain
38 opportunity-oriented advantage. [Hall & Matos \(2010\)](#), through a case study, have illustrated
39 the need and challenges in providing entrepreneurial opportunities within SSCM for the social
40 and economic improvement of weak segments of the society.
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47 Tencati *et al.* (2010) and Keating *et al.* (2008) have considered the social dimension of SSCM in
48 their case studies, but have treated the social dimension as a part of corporate social
49 responsibility. Beamon (2005) has argued that engineering ethics plays a major role in
50 designing and developing an environmentally conscious supply chain management and the
51 external legislation should protect the employees' job security. Fabbe-Costes *et al.* (2011) have
52 explained a six-level scanning criteria framework starting from the people level to the societal
53 level through functional, firm, chain and network levels for achieving sustainability. Cervellon
54 and Wernerfelt (2012), in an ethnographic study, have concluded that knowledge diffusion and
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3 public awareness increase sustainable fashion and clothing trends. According to Lobel (2006),
4 the violations of human rights are another major concern in social sustainability. Sigala (2008)
5 has explained the importance of public awareness in promoting sustainable tourism supply
6 chain. Drake and Schlachter (2008) and Roberts (2003) have emphasized the importance of
7 values and ethics for the successful collaboration of supply chain, ethical sourcing and
8 purchasing.

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11 Our review of the literature, however, suggests that only a limited amount of literature
12 considers the social values and ethics dimension in SSCM, and that both the environmental
13 and economic dimensions are over shadowing the social dimension. The social issues which
14 include child labour, health issues, compensation, discrimination on the basis of ethnicity,
15 caste or creed, and exploitation of workers are inadequately addressed in the current literature.
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20 21 **3.3 Economic stability dimension**

22 Profitability, strategic collaboration, and information sharing and logistics optimization are
23 regarded as three important factors that are to be taken care of to achieve economic stability.
24 In the early stage, according to Walley and Whitehead (1994), sustainability thinking focused
25 on being economically rational to all stakeholders in the supply chain by adding value to the
26 entire system. But scholars such as Min and Galle (1997; 2001) clarified that merely focusing
27 on cost reduction in supply chains will not help organizations become sustainable.
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31 In later studies, scholars (Zailani *et al.* 2012; Wang and Sarkis, 2013; Ortas *et al.* 2014) stated
32 that social and environmental sustainability initiatives in SSCM offer long-term corporate
33 financial benefits to the organization. Spekman *et al.* (1998); Vergheze and Lewis (2007);
34 Vachon and Klassen (2008); Sharfman *et al.* (2009); Tencati *et al.* (2010); Peters *et al.* (2011);
35 Gimenez *et al.* (2012) and Blome *et al.* (2014) have all suggested that supply chain collaboration
36 and internal environmental programs have a positive impact on the three dimensions of
37 sustainable development (social, economic and environmental).
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41 According to Dam and Petkova (2014) and Glover *et al.* (2014), for the institutionalization of
42 SSCM energy efficient technologies should be commercialized and made easily available by
43 lowering the financial barriers through incentives, low interest loans and faster pay back
44 periods and with the financial collaboration between stakeholders in the supply chain. Attaran
45 and Attaran (2007) proposed a collaborative planning, forecasting and replenishment system to
46 facilitate collaboration in the supply chain, and explained how supply chain collaboration can
47 be achieved. Lee *et al.* (2010) showed the success story of inter-organizational supply chain
48 collaboration, which helped Hewlett-Packard, Electrolux, Sony and Braun reduce their
49 recycling and disposal costs by 35% by developing a common European Recycling Platform.
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53 Supplier selection is another critical SSCM decision, which has an impact on, for instance,
54 supply chain collaboration, profitability, and technology integration for which various multi-
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3 criteria decision making tools are used. Vurro *et al.* (2009) have proposed a theoretical
4 framework explaining different sustainable supply chain governance models for better
5 collaboration. However, Ashby *et al.* (2012) argue that there is little literature underlining the
6 importance of supplier collaboration for improved sustainability performance. Bai and Sarkis
7 (2014), Bai *et al.* (2012) and Bai *et al.* (2010) have used the neighborhood rough set
8 methodology for the supplier selection problem with environmental and economic factors as
9 decision attributes. Azadi *et al.* (2014) have proposed a linear programming model for sustainable
10 supplier selection by using data envelopment analysis methodology.

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

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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

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Stroufe, 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 and 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 &

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3 Lichtenstein (2006) have stated that alignment of SSCM strategy with corporate strategy is
4 necessary for the success of SSCM.

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6 Clelland *et al.* (2000) and Klassen (2001) have asserted the need to develop cleaner process
7 technologies that minimize waste in manufacturing. Beamon (2008) emphasized the need for
8 better technological and logistics integration to achieve better SSCM performance. Finally,
9 scholars including Hanna *et al.*(2000), New *et al.* (2000), and Hughes (2005) have argued that
10 employee involvement, middle management involvement, and organizational culture need to be
11 considered when developing sustainable supply chains. However, there are still few papers that
12 analyze the effect of organizational culture and corporate commitment on the sustainability
13 performance of supply chains.
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19 **3.6 External factors dimension**

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21 Government rules and regulations, customer pressures, and competition are amongst the most
22 important external factors driving the SSCM strategy of organizations. According to Gold *et al.*
23 (2010b) and Georgiadis and Besiou (2008) legislation from governing bodies, and customer and
24 stakeholder requirements are highly-relevant enablers of SSCM. However, they underline that
25 further research is required to explore the interrelationships among the enablers of SSCM.
26 Kumar & Yamaoka (2007) have shown that tax exemption or relaxation for reverse logistics and
27 for recycled product exports will boost the sustainability performance of supply chains.
28 According to scholars including Porter and Van der Linde(1995), Carter and Ellram(1998) and
29 Amann *et al.*(2014)government policy regulations have a major influence on sustainability
30 efforts and are a main driving force of SSCM. Literature including Ilbery and Maye (2005),
31 Smith(2008), Jones *et al.*(2008), Banterle *et al.*(2013), and Shokri *et al.*(2014) emphasizes the
32 role and importance of cooperation among stakeholders, environmental certification and
33 government rules and policies in sustainable consumption, production, and recycling in retail
34 food supply chains. Ross *et al.* (2012) have argued that government has an important role in
35 the infrastructure development of a country, which is an important enabler of SSCM.
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44 Furthermore, consumers' impacts on product features (Bask *et al.* 2012),customer pressures
45 for low-price products (Orsato, 2006), as well as pressures from investors (Trowbridge, 2001)
46 are important drivers for sustainable supply chains. Darnall *et al.* (2008) have stated that
47 GSCM complements the environmental management system of an organization, which in turn
48 is stimulated by external factors such as market demand and environmental regulations.
49 Furthermore, Koplin *et al.* (2007) have argued that that the policy implications of government
50 and trade agreements must be integrated with the sustainable supply chain strategy. Griffin *et*
51 *al.* (2014) have further tested the impact of government acts on the financial performance of
52 sustainable supply chains. Soosay *et al.* (2012) have argued that government bodies must
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3 develop regulations for sustainable supply chains while keeping in mind value chain and
4 product life cycle concepts.

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6 The literature highlights the importance of customers as the focal point of supply chains, e.g.
7 Handfield *et al.* (1997); Walton *et al.* (1998); Hall (2001); Korpela *et al.* (2001); Childerhouse *et*
8 *al.* (2002). Therefore, we argue that sustainable supply chain network design should include an
9 examination of the impact of external factors on SSCM performance and subsequently on the
10 achievement of sustainable competitive advantage within supply chain networks.
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14 15 16 **4. Conclusions and further research directions**

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18 In this article we have presented an extensive literature review, and developed a classification
19 scheme of contributions to the SSCM literature through which we classified the articles into
20 those aiming at theory building vs. those looking at application based research. Our review of
21 literature suggests that social issues are not sufficiently studied. These include child labour,
22 health issues, compensation, discrimination on the basis of ethnicity, caste or creed, and
23 exploitation of workers. Empirical research fails to capture some of the most important ethical
24 dimensions and the majority of SSCM literature reviewed has attempted to use OR-based
25 mathematical models or multi-criteria decision making tools. Furthermore, the majority of the
26 literature has adopted a rationalist approach and few contributions use methods based on
27 qualitative case studies, ethnography, or action research. To address these gaps, we have
28 argued for the need to introduce the term *world-class sustainable supply chain management*
29 (*WCSSCM*). We have developed a theoretical framework for WCSSCM (Figure 4), which considers
30 equally the triple bottom line dimensions, while attending to the role of translating external
31 pressures into strategic and operational performance by taking notice of the role of top
32 managers, society, employees, and technology.
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42 Our contribution lies in (i) categorizing and consolidating the different definitions of SSCM and
43 the relevant enablers of SSCM, through a novel systematic classification and analysis of
44 literature; (ii) recognising the need for a holistic study of SSCM paying attention to the different
45 pillars and constructs; (iii) arguing for WCSSCM to address the aforementioned issues; and (iv)
46 presenting the literature on the basis of our WCSSCM framework. Based on extensive review
47 we have made some observations along the lines of Ketchen and Hult (2007), in which they
48 have argued that supply chain management research will benefit from analysing the supply
49 chain phenomena using the lens of organizational theories. Sarkis *et al.* (2011) attempted to
50 classify green supply chain management (GSCM) literature on the basis of nine organizational
51 theories. (We have taken the liberty to exclude the discussion of nine organizational theories to
52 avoid any repetition of literature.) The discussions are aimed at understanding the missing link
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3 between SSCM literature and organizational theories. Though there is research that has
4 embraced organizational theories, with few exceptions most of the articles have attempted to
5 explain supply chain phenomena using a single point of view. In order to explain complex
6 phenomena, it is felt that integration of some of the organizational theories will offer better
7 insights. Hence we feel that there is a huge opportunity to examine current SSCM phenomena
8 using integrated organizational theories.
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13 Inspired by Markman and Krause (2014) we would like to encourage researchers to further
14 study WCSSCM. Our presentation of the relevant literature (Appendix 2) also illustrates the
15 need to focus on particular subcategories of the dimensions of our proposed framework, to
16 advance our knowledge on WCSSCM. For instance, in the technology subcategory, there is
17 interest in how big data science could help both developed and developing countries to learn
18 how to prevent environmental and human health challenges through sustainable production
19 and sustainable consumption, by focusing upon prevention rather than primarily upon
20 pollution control or pollutant treatment or pollutant dilution. This may help to build more
21 comprehensive frameworks which may not be possible through traditional methodologies and
22 techniques. These comprehensive frameworks generated using big data may have significant
23 positive impact on programs surrounding sustainable production and consumption.
24 Furthermore, we believe that future WCSSCM research can benefit from the use of alternative
25 methods such as case studies, grounded theory, appreciative enquiry, action research,
26 ethnographic studies and other methods currently used in other fields (Taylor and Taylor,
27 2009; Ketokivi and Choi, 2014). In this vein, we will address one of the gaps identified in the
28 literature, that is, to conduct more studies(theory-building and application-based) in order to
29 study WCSSCM- related phenomena (e.g. related to social equity, ethical values and welfare,
30 and the environment).
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42 Finally, we feel that current SSCM literature has failed to adopt the triangulation method to
43 validate qualitative work, except for few studies (see Seuring, 2008; Pagell and Wu, 2009).
44 Hence, it is recommended the use of the triangulation method to validate qualitative research.
45 We believe that rigorous application of research methods in WCSSCM can provide new
46 insights. To further reveal finer grain boundaries of microstructure, the use of mixed research
47 lenses blended with rich organizational theories can take current WCSSCM research forward.
48 Based on our extensive review we suggest the following research avenues:
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53 (i)The WCSSCM framework needs empirical validation in order to be established as a
54 comprehensive and reflective framework;
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3 (ii) There is pressing need for a suitable costing system for WCSSCM taking into account
4 appropriate cost drivers and the basis for allocation of overhead costs;
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6 (iii) New quality standards have to be established for WCSSCM including a new model for Total
7 Quality Management for WCSSCM;
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9 (iv) Performance measures and metrics for WCSSCM should be developed as basic managerial
10 tools;
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12 (v) Outsourcing models need to be refined based on the characteristics of WCSSCM;
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14 (vi) Human resource management issues in WCSSCM need to be further investigated.
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17 One limitation of our study is that the findings are influenced by the selection keywords and
18 databases used. Therefore it may be that articles not included in these databases were
19 excluded from our research. However, we followed other researchers (e.g. Gunasekaran *et al.*
20 2015) in our selection of appropriate keywords, and we find that the majority of highly-ranked
21 academic journals are included in our selection.
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25 Notwithstanding the limitation of the study, we believe that this study will offer a new
26 perspective to those who would like to further study and incorporate WCSSCM in their
27 research and practice.
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Appendix 1

Appendix 1 Classification of literature based on methodology adopted Theory Building	Theory building	Theory building	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)
		Theory building & theory testing	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)
		Critical review	Cambero 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)
	Alternative Methods	Conceptual frame work through case study/survey	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)
Performance assessment framework through case study/survey		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)	
Application-based research	Theory in practice	Industry focused research / survey to explore the existing scenario	Turker & Altuntas (2014); Alvarez <i>et al.</i> (2010); Zhu & Cote (2004); Glover <i>et al.</i> (2014); Wang and Sarkis (2013); Jorgensen & Knudsen (2006); Harms <i>et al.</i> (2013); Ross <i>et al.</i> (2012); Wittstruck & Teuteberg (2012); Grimm <i>et al.</i> (2011); Rokka & Uusitalo (2008); Liu <i>et al.</i> (2012); Cervellon & Wernerfelt (2012); Darnall <i>et al.</i> (2008); Griffin <i>et al.</i> (2014); Koplín <i>et al.</i> (2007); Colicchia <i>et al.</i> (2011); Vachon and Mao (2008); Walker & Jones (2012); Amann <i>et al.</i> (2014)

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); Tsoufias & 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); Tsoufias & 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)
	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)

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Appendix 2
Classification of literature based on the WCSSCM framework

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); Giuniper <i>et al.</i> (2006); Jorgensen&Knudsen (2006); Vasileiou&Morris (2006); Vachon & Klassen (2006); Vergheese&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); Kuiket <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-Arcaet <i>et al.</i> (2014); Vijayanet <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); Roehrichet <i>et al.</i> (2014); Schaltegger&Burritt (2014); Schrettleet <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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				Rosenet <i>al.</i> (2002); Ching & Moreira (2014)
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Standardization

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Appendix 2 Classification of literature based on the WCSSCM framework	Internal factors	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); Darnallet <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); Hoejmose <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); Siaminweet <i>et al.</i> (2005); Zhu <i>et al.</i> (2005); Jayaraman <i>et al.</i> (2007); Kassolis (2007); Koplin <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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