

Sustainable Supply Chain Management: Issues & Challenges Identification

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Abstract— The aim of this paper is shedding light on the issues and challenges of sustainable supply chain management (SSCM) adoption in supply chain operations. Sustainability practices adoption has received an increasing attention over time. However, tackling SSCM challenges is dominant to assure optimal supply chain operations. Therefore, to detect the obstacles and challenges on SSCM, reviewing the extant literature is required. Following the manual search method in 17 journals result in 61 relevant studies in SSCM literature. The relevant studies extensively reviewed to highlight the critical trends in the sustainable responsibility challenge. And an illustration of the current sustainability challenges has been identified. The findings showed twenty-one dominant challenges in SSCM. The challenges identification provides useful insights for SSCM adoption. It is not only beneficial for decision-makers, supply chain stakeholders and practitioners, but also highlighting unexplored areas and offering additional research opportunities for researchers.

Keywords— Sustainability; Supply Chain; Sustainable Supply Chain Management

1. INTRODUCTION

Climate change, advanced technologies, the increased pollution, and the dynamic nature of business and economic world are dominant drivers for adopting sustainability aspects in supply chain operations [1]. The emergence of such factors is confronting many new challenges to be addressed in SSCM. In accordance with these advances, more pressure has been drawn up on organizations to adopt sustainable initiatives [2]. External pressure may impose from environmental legislation, regulatory bodies, consumer groups [3]. Sustainable supply chain management (SSCM) concept has broadly expanded to include environmental, social and economic issues [4]. It is defined as:

“The strategic, transparent integration and achievement of an organization’s social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chains” [4].

However, such integration efforts lack the mechanism to translate sustainability practices into actual supply chain practices [5, 6, 7,8]. Hence, the question of how to implement sustainability practices have not been studied extensively in SSCM literature [8]. The concept of Triple Bottom Line (TBL) is grounded on the pillars of sustainability. TBL concept can be defined as inter-link between social equity (people), environmental protection (planet) and economic prosperity (profit) [9].

It is worthwhile to highlight the benefits of sustainability adoption for organizations such as: increased profitability [10], Marketing advantage [11]; Competitive advantage [12] ; Improve corporate Image/Reputation [11]; Competition [13]; Cost reduction in long term [14]; Customer satisfaction and value [15]. SSCM offers an increasing effectiveness, high quality products and services. It also offers reduced cost and waste, in addition to increasing the environmental responsibility for supply chains [16]. For successful implementation of SSCM, certain critical factors have been identified in the literature with influence to SSCM implementation [17]. Such SSCM practices implementation enablers are: commitment of top management, information sharing, regulations of the government [17]; internal environmental management(green)[18]; the integration of environmental and social parameters into procurement policies, optimize energy consumption, reverse logistics [19]; NGOs campaign, competitors strategies [20].

This paper offers useful insights for both industry practitioners and researchers. It builds on development of SSCM body of knowledge and fosters the understanding of obstacles and barriers to SSCM adoption.

This paper is structured as follows. The upcoming section provided a background on SSCM literature. Section 3 presented the set of SSCM challenges and finally, section 4 concluded with study implications and opportunities for future researches.

2. BACKGROUND

Gupta and Palsule-Desai [21] classified SSCM research domain to three main topics: (i) Inventory management; (ii) Reverse logistic (iii) Production planning, scheduling and control. There are several significant efforts have been made in the area, and excellent systematic reviews found in SSCM literature e.g. [22, 23, 24, 25, 26, 27]. In green supply chain management domain, Zhang et al.[28] present an empirical analysis of multi-item measurement scale of a hierarchical structure. The structure is operationalized as third-order factors and reflected based on these factors: “*external green supply chain management, internal green supply chain management and corporate social responsibility*”. The research empirically validates measurement scale based on 293 Chinese manufacturers and ensures the necessity of taking into account the environmental and social concerns. They contribute to the supply chain sustainable development by a supporting business decisions making “to do list”. De Brito [29] focused the sustainability approach of operations, they used abductive reasoning and behavioral theory as a methods of analysis, they concluded to the reasons of sustainability integration lacking with operations management in two main reasons that is the inconsistent nature of the inherent context. In the domain of Sustainable Supply Chain Planning (SPIng), Amjed & Harrison [30] studied the sustainability operationalization by content analysis methodology and developed a model of holistic dimensions and measures for SPIng. The author stated that the model is contextualized for Australian food industry and may generalize regardless of the context. It promotes the leading social and environmental aspects which lead to profitability in addition to supporting supply chain managers to pinpoint sustainability standards for their current functions. Whereas, every measure in the model acts as and operational guidance for identifying the planning functions, that incorporating sustainability practices.

According to Wittstruck et al. [22] review and illustration of the efforts in the research area, current trends and unsolved problems in SSCM, an open research questions has been raised such as: “*How and with which key performance indicators can SSCM be measured? ; which cause and effect relationships exist between sustainable management and long-term financial success?*”. The authors stated the current trends and the shifted focus on economic and the legal/compliance perspectives. A research agenda for future research that emphasized on using reference models in particular supply chains has been proposed, as reference models are useful, helpful and supportive for organizational structuring and software implementation in addition to minimization of risks.

The environmental impacts, wastes and recycled products and CO2 emissions have been investigated by Rahimi et al. [31]. This work focuses on recycling construction and demolition (C&D waste) under uncertainty and proposes a risk-averse mathematical model and designs a sustainable reverse logistics network. Hence, considers the amount of CO2 emissions and energy consumption on the recycling centers as measures of the environmental impact.

Hussain [32] developed first order measurement model to measure supply chains sustainability in service industries. A comprehensive sustainability framework for supply chains service has been proposed. The outcomes of measures items classification is four elements, namely: environment management, health/safety and risk management, social responsibility and customer management. The measurement scale tested and verified the factor structure using the statistical technique Confirmatory Factor Analysis (CFA).

A recent call for considering the new term world class SSCM (WCSSCM) has been produced by Dubey et al. [19] through the propose of theoretical framework that equally classifies 18 different dimensions under six constructs of SSCM such as: Environmental, social values and ethics and Economic Stability dimension.

3. SUSTAINABLE SUPPLY CHAIN CHALLENGES

The goal of this review is to identify the issues and challenges of sustainable supply chain management. The review follows the manual search method using sources namely: Web of science, GoogleScholar and Scienedirect. Including the keywords:

“sustainability”, “supply chain”, “sustainable supply chain management” in the topic area of basic search , a number of 17 journals result in 61 relevant studies in SSCM literature. The selection and inclusion criterion are based on the papers title, keyword and abstract relevancy. Figure 1 shows the methodology design of the paper.

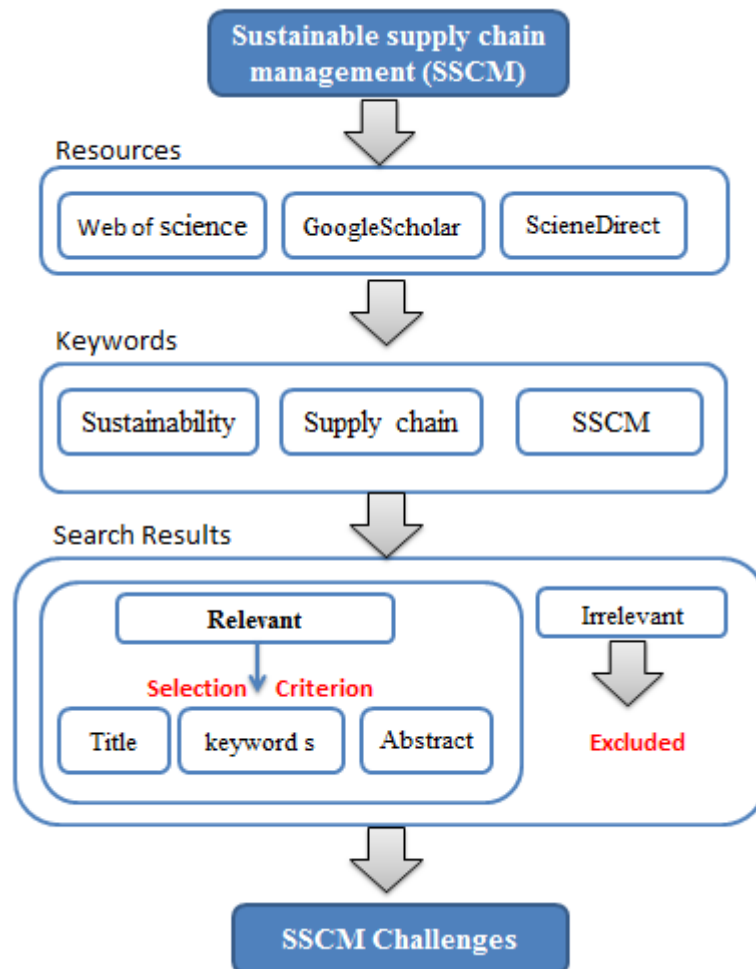


Figure 1: Methodology Design

To enhance the understanding of SSCM and to demonstrate the most critical issues in SSCM, this extensive review in SSCM literature reveals more challenges to SSCM which will be discussed in the following sections. Several studies have addressed those challenges, however it is worthwhile to note the significant gap in available SSCM research that addresses the challenging question of how to practically implement the social and environmental aspects integration in supply chain operations [6,7,33, 8]. Social issues as well, are not sufficiently studied as noted by [33,34], such as “*child labor, health issues, compensation, discrimination on the basis of ethnicity, caste or creed, and exploitation of workers*” [19,35]. Lacking of decision support scheme and raw material assessment that is sustainability-oriented is regarded as a major challenge for manufacturers [36]. Table1 overviews and summarizes twenty-one challenging issues that SSCM faces. The relationship between (environmental, economic and social) performance has been matter of investigation to many studies investigations e.g. [35, 24]. The major challenge of missing implementing mechanisms for social and environmental integration in supply chain operations [6, 7]; [8]. Another main challenge, is the need for more industry-specific research on SSCM [16], manufacturing environmental performance [37] .

Table 1: Overview of SSCM Challenges

	SSCM Challenge	Year	Source
	<i>Corporate sustainability performance assessment</i>	2018	[9]
	<i>Improving environmental performance in manufacturing.</i>	2018	[37]
	<i>Empirical evidence supporting sustainability integration.</i>	2017	[44]
	<i>Stakeholder influences and risks.</i>	2017	[39]
	<i>Business partner development. Stakeholder involvement. Innovation technological integration. Enhanced communication. long-term relationship development with other Supply chain actors.</i>	2015	[38]
	<i>How to implement sustainability Practices.</i>	2014	[8]
	<i>Social dimension integration into respective models.</i>	2017	[44]
	<i>Lack of required capabilities for sustainability management. Lack of consensus on how to develop a sustainable supply chain</i>	2012	[7]
	<i>The importance of a governance mechanism in developing a sustainable supply chain.</i>	2012	[5]
	<i>Industry-specific research on SSCM. Inventory management performance. Pricing. Assessments of sustainable supply chain, e.g. metrics, composite indicators. Implementing SSCM theory into actual supply chain practice.</i>	2012	[16]
	<i>The relationship between company environmental and social performance versus economic performance.</i>	2013	[45, 24]
	<i>The relationship between regulatory compliance and economic performance across members of a supply chain.</i>	2011	[24]

Performance, communication and stakeholder involvement are regarded as recent challenges ([9, 38, 39]). In addition, the lack of required capabilities and consensus on the implementation of sustainable practices [7]. Finally, the missing metrics and indicators to assess the sustainable supply chain [16].

The complexity of regulation uncertainty, green practices, customer, supplier and cost pressures in gas and oil industries have brought up the challenge of critical success factors CSFs [40]. In order to achieve successful implementation of SSCM practices, a set of 32 critical success factors has been identified by the author. “*Global Climatic Pressure and Ecological Scarcity of Resources*” have been drawn up as the most significant factors that might encourage industries to implement sustainable practices. Reefke et al. [6] categorizes areas of SSCM research in accordance with SSCM success factors, putting forward the emergence of the following topics open for research: 1. Performance management. 2. Management aspects (Governance, Compliance, and Risk). 3. Sustainability aspects (Environmental, Economic and Societal). In response to environmental medium regulations, some suggestions have been made by Gunasekaran et al.[41] to achieve the reduction in carbon footprint: “*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*”.

As the recent expansion and globalization of supply chain exposes business operations to risks, and likely to be more vulnerable and has great impact on profitability and performance[42], the identification of sustainability-related supply chain risks and managing these emerging risks is considered as an increasingly important issue in SSCM [43].

To address risk management issues in SSCM, classifications for sustainable supply chains risk factors associated with the three main pillars of sustainability have been found in the literature e.g.([46]; United Nations Global Compact and BSR, 2010, [43, 47, 48]. And effective SSCM risk mitigating plans have been proposed in the literature such as big data analytics approach to mitigate supply chain social risk [49], supplier risk assessment [50], raw materials assessment and sustainability indicators identification [36], purchasing [51], social risks [52]. Dimensions to develop sustainability aspects are based on the TBL [1]. However, opting for individual dimensions [53] or the combination of two pillars is vastly exists in the extant literature e.g. [54, 55, 29, 27]. Decision makers in supply chain may expose to pressure in order to take into consideration sustainability initiatives [3]. Pressure may be in response to legislation and regulating bodies or to gain a competitive advantage or customer interests [6]. As leading-edge firms adopting sustainability initiatives aiming to maximize profit whereas reduce the environmental impacts and increasing the social responsibility[17]. In order to integrate sustainability practices with business practices, the sustainability integration degree in decision- making is a main challenge for firms [3]. However, literature

categorized drivers to sustainability to two main groups, namely: exogenous and endogenous related to strategy, resource base and culture[3]. To support the decision of sustainability integration, and to examine the current research status, Seuring [35] calls for the need to use various methodologies such as more quantitative research to identify the issues and challenges in SSCM. Recently, Lean and Agile supply chain issues have been addressed [44] and future research efforts have been guided towards filling the gap of lacking empirical studies to foster the understanding of the integration between established and sustainable supply chain paradigms. Considering the link between supplier development activities and social issues in supply chains, supplier selection and logistical integration have received only scarce research attention [38].

4. CONCLUSION

Adopting sustainable responsibility offers an increased profitability, effectiveness, competitive advantage of products/services within the supply chain operations. To achieve these strategic goals, the perceived importance of social, environmental responsibility is widely acknowledged. This paper attempts to understand the issues and challenges of sustainable supply chain management. A set of 61 published studies have been analyzed in the sustainable supply chain domain to highlight trends in the sustainable responsibility challenge. Twenty-one dominant challenges have been addressed. Arguably, practical integration of social and environmental aspects, sustainability performance assessment, Risk Management, raw material assessment, Inventory management performance, critical success factors, empirical evidence supporting sustainability integration, business partner development, corporate sustainability performance assessment, innovation technological integration, supplier and materials risk assessment, stakeholder involvement, long-term relationship development with other supply chain actors, enhanced communication, the required capabilities for sustainability management. All of those factors have profound impact on sustainability implementation. The body of knowledge on SSCM has been enriched by highlighting these 21 fundamental challenges. Aiming at shedding lights on issues that confronting many new challenges to sustainability adoption and providing an extensive overview of existing challenges. Therefore, additional opportunities and more focus for future studies in this research area have been determined precisely. Prominent effort has to be undertaken to further investigate unexplored research avenues.

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