

Potential of Knowledge Management as Antecedence of Sustainable Supply Chain Management Practices

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Abstract— The importance of environmental protection has become topical in general economic development strategies of emerging economies. If sustainable development is desired, business practices along the supply need to consider the environmental protection, social contribution, and economics development. This paper discusses the concept of sustainable supply chain management (SSCM) in business. First, it provides definition of sustainable supply chain from a comprehensive review of the literature. Second, it discusses the factors that have been found to motivate firms to implement SSCM. Finally, it highlights the gaps of knowledge in factors affecting the implementation of SSCM and introduces the role of knowledge management as antecedence of SSCM. This paper offers some insights that are relevant in theory and practice.

Keywords— Environmental protection, Social progress, Economics Development, Sustainability, Knowledge Management

1 Introduction

Environmental protection turns to be a high topicality issues due to the increasing awareness of global climate change and natural disasters. In the 21st century, climate change and natural disasters has been known as the most pressing environmental problems face by the world. Today, climate change is one of the undoubtedly most important global environmental challenges, in

resources, territorial changes and disruption in trade patterns.

To curb the global warming, action must be taken by developing countries to avoid future increases in emission levels as their economies develop and populations grows, as clearly captured by the Kyoto Protocol [1]. As more consumers shift toward greener products and organizations, investing in environmental efforts may provide the firm a new market opportunity through environmental products and services differentiation [2]. The protection and development of environmental resources and social responsibility is an area of growing importance for consumers, businesses, governments, and the society at large [3]-[5].

Business supply chain, which covers the entire physical process from obtaining the raw materials to the final product that reach the end users have long been seen by the practitioners and researchers as the platform for improvement when excellence business performance is desired. This paper discusses the concept of sustainable supply chain management (SSCM) in business. First, it provides definition of sustainable supply chain from a comprehensive review of the literature. Second, it discusses the factors that have been found to motivate firms to implement SSCM. Finally, it highlights the gaps of knowledge in factors affecting the implementation of SSCM and introduces the role of knowledge management as antecedence of SSCM.

2. Sustainable Supply Chain Management

The essence of sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It was recognized that there is an essential need to make balance between environmental, social, and economic development [6]. Policies and practice that support sustainable development have become more widespread following concerns over the extent of environmental deterioration. Attention has been demanded from governments, communities and business all over the world to respond to the sustainability challenge to a certain degree. If organizations decide to pursue sustainability within its supply chain, the flows, operations, and activities within the chain should be improved and resulted in simultaneous economic, environmental, and social gains. Sustainable Supply Chain Management has its roots in supply chain management which based on the adoption and extension of its concepts.

An effective supply chain strategy must also explicitly address sustainability. Sustainability has become a global concern and hence motivated organizations to revisiting their supply chain operations which taking into consideration the environmental and social impacts of their supply chains [7]-[9]. Integrating the concept of sustainability with core business functions that fall within the domain of SCM, such as procurement, logistics, and knowledge management, which has led to a critical and interdisciplinary field: sustainable supply chain management (SSCM) [10]. Thus, SSCM has arises and becoming important role in business.

The topic of sustainability in the context of SCM has been discussed using a number of terms in the literature. The term sustainability has been interpreted in various ways. Early sustainability initiatives tended to focus on environmental issues. However, economic and social aspects should also be taken into account when defining sustainability. There have been various definitions of SSCM presented by various authors as presented in Table 1 below.

Table 1. Definitions of SSCM

Author	Definition
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Year	
[11]	The management of financial, information, and product flows with goals of inter, intra, extra integration with social and environmental concerns as the focus.
[12]	The designing, organizing, coordinating and controlling of supply chains to become truly sustainable with the minimum expectation of a truly sustainable supply chain being to maintain economic viability, while doing no harm to social or environmental systems.
[13]	The creation of coordinated supply chains through the voluntary integration of economic, environmental, and social considerations with key inter-organizational business systems designed to efficiently and effectively manage the material, information, and capital flows associated with the procurement, production, and distribution of products or services in order to meet stakeholder requirements and improve the profitability, competitiveness, and resilience of the organization over the short- and long-term.
[14]	The management of supply chain operations, resources, information, and funds in order to maximize the supply chain profitability while at the same time minimizing the environmental impacts and maximizing the social well-being.
[15]	The degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes for sustainability.
[16]	Reflection of the firm's ability to plan for, mitigate, detect, respond to, and recover from potential global risks. Risks involving substantial marketing and supply chain considerations include product development, channel selection, market decisions, sourcing, manufacturing complexity, transportation, government and industry regulation, resource availability, talent management, alternative energy platforms, and security.
[17]	An extension to the traditional concept of Supply Chain Management by adding environmental and social/ethical aspects.
[18]	The planning and management of sourcing, procurement, conversion and logistics activities involved during pre-manufacturing, manufacturing, use and post-use stages in the life cycle in closed-loop through multiple life-cycles with

	seamless information sharing about all product life-cycle stages between companies by explicitly considering the social and environmental implications to achieve a shared vision
[19]	The set of supply chain management policies held, actions taken, and relationships formed in response to concerns related to the natural environment and social issues with regard to the design, acquisition, production, distribution, use, reuse, and disposal of the firm's goods and services.
[20]	The specific managerial actions that are taken to make the supply chain more sustainable with an end goal of creating a truly sustainable chain.
[21]	Adding sustainability to existing supply chain management processes to consider environmental, social and economic impacts of business activities.
[22]	The strategic, transparent integration and achievement of an organization's social, environmental and economic goals in the systemic coordination of key inter-organizational business process for improving the long-term economic performance of the individual company and its supply chain
[23]	The integration of sustainable development and supply chain management [in which] by merging these two concepts, environmental and social aspects along the supply chain have to be taken into account, thereby avoiding related problems, but also looking at more sustainable products and processes.

Starting from year 2012, there have been a growing number of research findings reporting that motivations to practice sustainable supply chain management are beyond compliance and further than the pressures of customers and competitors. Researches have started looking the other organizational factors that motivate or influence firms to practice sustainable supply chain management. For instance, [24] identified that Knowledge and environmental impact as drivers of Sustainable supply chain management practices. Meanwhile, [25] found that organizational values as the major drivers of GSCM practices. Ref. [26] proposed that Socio-culture responsibility relates to the implementation of the firm's green supply chain initiatives. Ref. [27] on the other hand found the important role of eco-oriented culture in the relationship between stakeholder pressure and the adoption of environmental practices. Based on

these observations, this paper try to articulate the role of firm's knowledge management as antecedence of their SSCM practices.

3. Knowledge Management and the Supply Chain Management

At the heart of effective supply chain management is the powerful flow of information from the downstream to the upstream members of the chain. Mastering the usage of information is the key for knowledge management proses in organization. Knowledge management is particularly important in the organization as an effective tool to manage the knowledge within and between the organizations. Knowledge management can be defined as a strategic, systematic management process of an organization knowledge asset that assists the creating values, storage, distribution and application of knowledge. Knowledge is not acquired from one source. Ref. [28] discuss knowledge in a multi-faceted context.

There are four dimensions in the knowledge management process which are knowledge acquisition, knowledge conversion, knowledge application and knowledge protection [29],[30]. All four dimensions are from the organizational capabilities perspectives. It is regarded as a strong enabler for organizations to transform knowledge into business competitive advantage [31]. The organizational changes occur to improve their performance highpoint the need for better knowledge management [32]. For this reason, efforts of organization to improve knowledge management have become the commonplace.

3.1 The Relationships Between Knowledge Management and Sustainable Supply Chain Practices

At the very core, [28] discuss knowledge in a multi-faceted context which are stated as what, why, how, and who. This fundamental understanding can be used to describe its applicability within the context of SSCM. To successfully manage and implement SSCM, firms need to know the fact (what) since through this, firms will have the ability to make decision such as to assess alternative fuel options for commercial vehicles or to assess criteria of suppliers with sustainable practices. The know why refers to

knowledge about principles and laws in nature, human kind and society. This enables firms to reason by linking it with the core principle such as the source of ground water and its source of recharge. The know how refers to skill, such as the ability to design products with less waste and usage of materials. Finally, know who involves the social ability to cooperate and communicate. For instance, having the ability to influence customers to participate in green initiatives or in socially responsible activities. It is argued that firms with these abilities are more likely to implement SSCM.

Knowledge has to be transferred across internal structures, external structures and individual competences [33]. New types of machines, renewable energy systems or the corresponding infrastructures often need a number of years to complete the full development process of invention, adaptation and diffusion [34]. It takes even longer to realize the major changes in important economic and social systems. The development of new knowledge and the need to introduce new skills in order to give more specific substance to the concept of sustainable development will remain a constant need, as many areas of expertise are constantly developing [35].

Meanwhile, professional skills and knowledge of sustainable development should be improved continuously and, consequently, be part of the lifelong learning of individuals in the different industry. Ref. [36] recommend that the firms which base their strategies on capabilities should adopt knowledge management approaches to provide the knowledge-creation capabilities needed to support value innovation, environmental scanning or strategic experimentation. As such, effective knowledge accusation, conversion and application process within firms can act as catalyst toward the implementation of SSCM.

While the acquisition, transmission, and use of knowledge has always been an important part for an organization operation, knowledge sharing. Knowledge sharing is another avenue where it can act as antecedence of SSCM. Knowledge sharing occurs when an individual is willing to assist as well as to learn from others in the development of new competencies [37]. The interaction between organizations in the supply chain relating to joint environmental planning and shared environmental know-how or knowledge are having a positive effect on delivery and flexible performance [38].

3.2 Previous Research on Knowledge Management

Knowledge management can be seen as a factor that affects the firm performance. Based on the literature review (See Table 2), most researchers investigate the antecedent and the outcome of knowledge management. Various performance measures have been used to see the impact of effective knowledge management process by firms. However, understanding on how the effective knowledge management process can act as antecedents towards SSCM remain vague.

Table2. Previous research on knowledge management

Author (year)	Objective	Results
[39]	To identify factors that facilitate individual knowledge sharing	Coworker support and learning orientation is positively but exchange ideology is negatively related to knowledge sharing
[40]	To examine knowledge-sharing phenomena from the perspective of recipients' characteristics	Recipients' characteristics play different roles in different situations (responsive and proactive knowledge sharing) in triggering the knowledge sharers' motivation to share. (Antecedent)
[41]	To illuminate the discrepancy between the need for knowledge and the requirements formulated by those taking part in destination development.	Contrast to the theoretical findings, specific knowledge was not a prioritized requirement, neither in tourism nor marketing (Outcome/Consequences)
[42]	To determine the factors (trust, formalization, knowledge technology, empowering leadership, effective reward systems and motivation) that	Knowledge technology, motivation, effective reward systems, trust and empowering leadership influence towards knowledge sharing. (Antecedent)

	influence knowledge sharing among the small and medium-sized enterprises (SMEs) in Malaysia,	
[43]	To examine the role of managing knowledge within organizations	<ul style="list-style-type: none"> i. Knowledge, likewise any other organization's resource, need to be managed. Firms need to support its allocation and development. Frameworks and tools are needed to identify, manage and assess the critical knowledge resources for growth ii. Translation of knowledge into business outcomes requires management mechanisms, and then considering the knowledge processes grounding the improvement of performance
[44]	To provide a conceptual overview of the relationship between knowledge management, supply chain technology investments, and overall firm performance	Improved supply chain efficiencies can result in more effective knowledge management; a vitally important capability that can lead to a strategic competitive advantage.
[45]	To help knowledge managers systematically grasp knowledge about management knowledge and get a deep and full understanding of the nature, scope and	Knowledge management in business organizations has the task of managing the activities of knowledge workers or the transformation and interaction of organizational static substance knowledge and dynamic process knowledge for products, services, and practical

	methodologies of knowledge management	process innovation and, at the same time, creating new or justifying existing organizational systematic Knowledge.
[37]	To empirically investigate the extent to which knowledge sharing and organizational learning affect organizational effectiveness	Knowledge sharing would facilitate the transformation of collective individual knowledge to organizational knowledge without the existence of orphaned knowledge and knowledge depreciation, thus result in the advancement of organizational learning and eventually, the enrichment of organizational effectiveness.

4. Discussion

Although knowledge management has long been recognized as the factor influencing supply chain effectiveness, there have been lack of research investigate whether knowledge management acts as antecedent towards the SSCM. Ref. [46] found that proper knowledge management process enables firm to have clearer picture on what is lacking in the organization and the training programs will have more relevance than the organizations without such process. This signals that it seems natural that firms with proper knowledge management process would be the first to realize the benefits of adopting sustainability practices for its supply chain. In contrast, if the effective knowledge management does not exist, then firms might fail to identify and let alone to execute sustainable supply chain practices. Thus, future studies that provide deeper understanding about knowledge management that adding value to organizations within the context of sustainable supply change should be conducted. Understanding these issues will contribute to the body of knowledge in supply chain, sustainable development, and the knowledge management.

Practitioners, especially manufacturers aiming to implement sustainable practices along the supply chain should aware on the need to have effective knowledge management system in place in order to

smooth the process. Beyond the pressures of SSCM implementation due to regulators, customers, and competitor, firms with a proper knowledge acquisition, conversion, sharing, and application are gaining an added advantage in their pursuit of sustainable supply chain journey.

5. Conclusion

This paper highlights how knowledge can be consistently and successfully managed towards the implementation of SSCM practices. Like any other assets of the firm, knowledge needs to be managed with proper tools and framework. Consistent with what has been suggested by [43], this papers stresses that proper knowledge management of the firms can support the sharing and creation of knowledge for sustainable business value creation. The lack of knowledge and awareness often drives behavior and practice to produce unsustainable outcomes. Within the supply chain management context, the goal of an effective knowledge management is to secure a match of information and material flows along the supply chain. Hence the importance of building the long-term benefits of collaborative efforts and defining what mutual benefits that can be established are key elements towards achieving the SSCM.

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