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Relationship Between Sustainable Supply Chain Management Implementations and Environmental Performance: A Conceptual Review

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Abstract

Over the last two centuries there has been extraordinary industrial development. This situation brought along serious problems such as global warming, industrial accidents, working conditions threatening human health and ozone layer perforation. "Sustainable development" is an improved solution to overcome these adversities and has been recognized by many states. Current sustainability goals push the manufacturing and services industries to focus on the triple bottom line approach which embraces environmental, social and economic areas at the same time, beyond traditional economic goals. Increasing expectation of consumers and stakeholders to be fully responsible for their business activities and to clearly demonstrate their environmental and ethical behavior has led to several changes. Therefore, the expected line of responsibility needs to extend to a firm's products, processes and relationships to cover the entire supply chain. Aim of this study is to explain the practices that companies need to implement in order to have an environmentally friendly sustainable supply chain. These practices have been compiled under three groups as sustainable procurement, sustainable distribution and sustainable design. In this way, companies will be able to apply their supply chain practices correctly by understanding the factors that need to be considered in supply chain management.

Keywords: *Sustainability, SSCM Implementation, Environmental Performance*

1. Introduction

In the hundred years we have left behind, industrial processes have caused some of the deepest impacts on the ecosystem. Some of these effects are considered to be serious problems such as global warming, industrial accidents, working conditions that threaten human health, ozone layer depletion (Amjad, Jamil, & Ehsan, 2017). These effects are based on a variety of factors, including significantly use of natural resources, environmental degradation associated with industrial processes, and the

ecological effects of products and serves (El-Halwagi, 2012). "Sustainable development" is an improved solution to overcome these adversities and has been recognized by many states.

According to World Commission on Environment and Development (1987) sustainable development has been described as "meets the needs of present without compromising the ability of the future generations to meet their own needs." Sustainable development programme consists of 17 goals such as responsible production and consumption, clean water and sanitation, affordable and clean energy, decent work and economic growth, climate action (UNDP, 2019).

Current sustainability goals push the manufacturing and services industries to focus on the triple bottom line approach (Elkington, 1994), which embraces environmental, social and economic areas at the same time, beyond traditional economic goals (Esfahbodi, Zhang, & Watson, 2016). Because products and services affect all three aspects of economic, environmental, and societal sustainability throughout their entire life cycle; material extraction, production, transportation, use, and disposal (Ahmad, Wong, Tseng, & Wong, 2018).

Increasing expectation of consumers and stakeholders to be fully responsible for their business activities and to clearly demonstrate their environmental and ethical behavior has led to several changes. Therefore, the expected line of responsibility needs to extend to a firm's products, processes and relationships to cover the entire supply chain (Ashby, Leat, & Hudson-Smith, 2011). Prior to sustainability, the main goal of the companies was to reduce the costs and offer products and services in a better way. According to increase the importance of SSCM in the industrial practice, several companies have recently announced the adoption of sustainability as part of their corporate culture; for example, British Aerospace, Coca Cola, Toyota, Apple, Subaru, Herman Miller, Timberland, Xerox, Hewlett Packard (Wu, Santoso, & Roan, 2016). By incorporating environmental and social issues into traditional supply chain management, sustainable supply chain management (SSCM) expands the traditional field, considering the sustainability of economy, environment and community in designing and optimizing the supply chain.

Integrating the concept of sustainability with core business functions in the field of supply chain management, such as supply, logistics and information management, has emerged as a critical and interdisciplinary aspects (Morali & Searcy, 2012) of: sustainable supply chain management. SSCM is defined as: "the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e. economic, environmental and social, which are derived from customer and stakeholder requirements" (Seuring & Müller, 2008).

Aim of this study is to explain the practices that companies need to implement in order to have an environmentally friendly sustainable supply chain. These practices have been compiled under three groups as sustainable procurement, sustainable distribution and sustainable design. In this way, companies will be able to apply their supply chain practices correctly by understanding the factors that need to be taken into account in supply chain management.

2. SSCM Implementation

SSCM implementations include internal and external implementations performed by a company to make the supply chain economically, environmentally and socially more sustainable (Morali & Searcy, 2012). Sustainable companies perform their implementations by taking measures to support sustainable development while managing supply chains (Hong, Zhang, & Ding, 2017). Companies adopting the sustainable supply chain, base their strategies on sustainable orientation to increase their sustainable performance. Three main SSCM implementations (will be explained in this study),

including sustainable procurement, sustainable distribution and sustainable design are designed as environmental and human-friendly initiatives. According to Esfahbodi, Zhang and Watson (2016); these initiatives are designed to minimize the environmental impact of a product without creating a negative balance with other performance aspects such as costs and functionality. Therefore, sustainable procurement, sustainable distribution and sustainable design implementations are assumed to improve economic, environmental and social performance due to their ability to reduce material consumption, waste, emissions, energy use and excess inventory and provide competitive advantage (Zaidi, Mirza, Hou, & Ashraf, 2018; Esfahbodi, Zhang, & Watson, 2016).

3. Sustainable Procurement

Sustainable procurement is the choice of products with criteria such as reuse of materials, recyclability and non-toxic materials when purchasing (Zsidisin & Siferd, 2001). Sustainable procurement, which ensures that these substances comply with the desired ecological characteristics, is seen as an environmental purchase approach (Esfahbodi, Zhang, & Watson, 2016). Sustainable procurement aims to minimize waste and reduce the number of hazardous substances through the supply of raw materials in accordance with sustainability (Filho, et al., 2019). According to Carter and Carter (1998); suppliers play a key role in developing environmentally and socially sustainable products or services. For this reason, most large production companies prefer to cooperate with the appropriate suppliers to provide environmentally and socially sustainable products and services (Esfahbodi, Zhang, & Watson, 2016). Sustainable procurement also improves economic performance by reducing energy, health and environmental costs.

4. Sustainable Distribution

Economic growth and the expansion of global trade networks lead to a significant increase in distribution activities. Distribution produces numerous adverse effects, such as noise, air pollution, or accidents; it is also one of the major causes of human-caused climate change (Faulin, Grasman, Juan, & Hirsch, 2019). Sustainable distribution is the conduct of sustainable transport, storage, stock control, packaging and plant location allocation decisions in a manner that has the lowest possible negative environmental and social impact (Shi, Arthanari, Liu, & Yang, 2019). According to Esfahbodi, Zhang and Watson (2016) Chinese and Iranian firms often use third-party logistics providers with green expertise, capabilities and resources to effectively execute sustainable distribution implementations. Firms also exhibit better economic performance with rearranged loading models, as they can reduce the use of materials, increase space usage in the warehouse and reduce the amount of transport required (Bian, 2002).

5. Sustainable Design

Sustainability in product design can be defined as the ability to work continuously while providing economic-social benefits to stakeholders while reducing the harm the designed product does to the environment (Ahmad, Wong, Tseng, & Wong, 2018). Sustainable design is essentially the activity of designing products or services with environmental awareness and social concerns (Steenis, van der Lans, van Herpen, & van Trijp, 2015). In traditional product design, issues such as product functions, quality, and costs are at the forefront to meet customer requirements, while sustainable product design focuses on projecting functional, environmental, and economic performances into the entire product life cycle (Lu, Zhang, Gu, & Xue, 2011). Sustainable design aims to reduce the negative economic, environmental and social impacts of products over their lifetime (Seuring & Müller, 2008). Sustainable design practice also focuses on removing waste that contravenes environmental sustainability throughout the supply chain. Additionally, sustainable design requires manufacturers to minimize their consumption of materials and energy. This leads to lower costs potentially

associated with material and energy consumption. In line with all this information, it has been found that there is a significant direct link between sustainable design and economic performance, and it has been reported that sustainable design has the capacity to improve environmental performance, economic performance and lead to competitiveness (Esfahbodi, Zhang, & Watson, 2016).

6. Environmental Performance

With increasing importance given to environmental and social performance, not only the traditional economic performance criteria-i.e. cost, quality, delivery and flexibility - but also environmental and social performance began to be vital for firms. (Yang, 2013). Due to this increasing importance, environmental performance has become an important indicator that firms have a sustainable supply chain. Companies with an effective environmental performance can exploit market opportunities created by the growing demand for environmentally friendly products and services (Gölgeci, Gligor, Tatoglu, & Arda, 2019).

This aspect of sustainability can be expressed in the way that human beings should not create more waste than the environment can absorb, and human consumption should recognize and emphasize sustainability (Yusuf, et al., 2013). According to Abdul-Rashid, Novita, Ghazilla, Ramayah (2017); environmental performance is highly dependent on the use and development of efficient and clean sustainable energy sources and pollution control. For this reason, it is very important that the energy sources used during production should emit minimum CO2 emissions and be renewable. It is also equally important that resources are used in such a way that they can replenish themselves and be protected from possible contaminants and overuse. In this study, performance outcomes related to pollution control and resource efficiency are evaluated as environmental performance indicators when conducting a firm's activities.

7. Discussion

Today, firms are under significant pressure to measure and report their social, environmental and economic performance. In our globalized world, procurement, distribution and design activities are constantly increasing. While these activities offer significant benefits and better quality of life to citizens and consumers, they are also responsible for negative impacts such as pollution, greenhouse gas emissions, over-resourcing. Given the effects of environmental problems and these pressures, firms must adopt environmentally holistic implementations in collaboration with their supply chain partners, rather than seeking individual solutions (Gölgeci, Gligor, Tatoglu, & Arda, 2019). In this way, companies will be able to provide benefits such as competitive advantage, increased consumer and supplier satisfaction, increased market share, increased return on investment, effective resource consumption, and customer loyalty through successful sustainable supply chain management.

In the light of all this information, model and assumptions we propose in the measurement of strategic sustainability orientation are as follows;

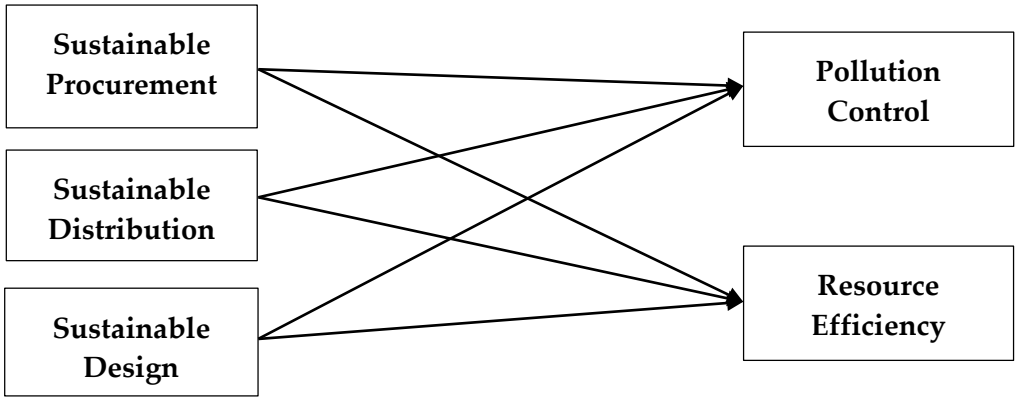

Figure 1. Proposal Model

A1: Sustainable procurement is positively associated with pollution control.

A2: Sustainable distribution is positively associated with pollution control.

A3: Sustainable design is positively associated with pollution control.

A4: Sustainable procurement is positively associated with resource efficiency.

A5: Sustainable distribution is positively associated with resource efficiency.

A6: Sustainable design is positively associated with resource efficiency.

8. Conclusion

Sustainability can mean a lot to organizations. While many organizations do not distinguish between environment and sustainability, other organizations associate sustainability with economic sustainability, i.e. consistent economic growth. With this study, we categorized (supply, distribution, design) and defined the supply chain activities that affect the environmental performance of the companies. We tried to explain conceptually what activities can be implemented in the management of the supply chain of companies. These implementations clearly demonstrate the importance of environmental performance in terms of sustainable development. By establishing the right relationships with supply chain partners, the quality of the supply chain and the sustainability performance of the firm can be improved.

As a result, with this study, we explained production activities based on previous studies by both researchers and firms to measure and enhance the effectiveness of environmental sustainability performance and proposed a new model.

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