



ADOPTION OF GREEN SUPPLY CHAIN MANAGEMENT FOR GAINING COMPETITIVE ADVANTAGE : A THEORETICAL PERSPECTIVE

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ABSTRACT

There is a growing concern for the environment in present times amongst consumers. Additionally, pressure from regulatory bodies which verbalize guidelines to meet societal and ecological apprehensions to enable growth of business and economy are compelling organizations to adopt environmentally friendly practices to sustain the growth in this competitive era. One of the approaches to exhibiting the concern for the environment is through implementing the Green Supply Chain Management (GSCM) practices in the organization. The literature is available but it is yet to illustrate a broad frame for the GSCM. This article is an attempt to classify the concept of GSCM in detail which will help researchers, academicians and industry in understanding GSCM from a broader perspective.

KEYWORDS: Green Supply Chain Management (GSCM), academicians and industry.

INTRODUCTION :

In the last few decades, we have exploited natural resources to such extent that it has resulted in various irreversible issues like global warming, depletion of the ozone layer, depletion of natural resources, soil erosions, biological imbalances, etc. This scenario demanded everyone, be it government officials, environmental scientists, business organizations and the public at large to come out with an optimum solution to turn away environmental collapse. According to the latest IPCC, (2018) climate change is the result of human activities, and this cannot be questioned. We all need to work together to deal with global environmental problems more effectively and efficiently.

India is being one of the fastest developing economies in the world is experiencing exponential economic and industrial growth. This growth is coupled with urbanization, for which we are paying a very high cost of increasing threat from Green House Gas (GHG) emissions and growing demand for scarce resources, ie. water (JRC Science for Policy Report, 2017). According to World Bank report 2018, India is the fifth-largest GHG emitter in the world. Moreover, carbon emission has increased to more than 150 per cent since 1990 (World Bank, 2018). This could be due to rapid urbanization and industrialization which is producing around 4 million tonnes of hazardous waste from industrial and biomedical sources. According to this report, another threat to India is the e-waste which is expected to reach 800 KT per annum by 2020 (JRC Science for Policy Report, 2017).

To avert this environmental destruction, various companies have implemented green management practices to their companies, ie. using raw material which leaves a less environmental footprint, plummeting the usage of fuel power, consuming the recycled papers for packaging, implementing cleaner production, adoption ISO 14001 certification, etc to meet environmental objectives (Saxena, Sharma, Rachuri & Joshi, 2015). The greater importance of inter-organizational relationships has also caused organizations to consider building competitive advantage by the management of their supplier and customer partnerships and networks. Green business practices that maintain and sustain good environmental quality are increasingly becoming a vital component of

economic competitiveness also. Consumers are also one of the major driving forces for the organizations to adopt green practices. Consumer awareness of the detrimental effects of products on the environment, both direct and indirect, have also prompted many companies to incorporate environmental measures in the manufacturing, administration, purchase, sale and other stages.

GREEN SUPPLY CHAIN MANAGEMENT (GSCM)

The Green Supply Chain Management (GSCM) is a concept that is evolving due to the consistent degradation of the environment due to the activities carried out by organizations in pursuit of the goals. These activities give rise to phenomena like pollution, global warming and uneven precipitation. There is a drive to make business practices sustainable to the environment and that brings in the concept of Green SCM (Sharma, 2013).

Green SCM becoming an important area of research and discussion for both academia and business when it comes to supply chain management. The main cause for this interest is the increasing degradation of the environment. The implementation of GSCM is advantageous to both the organization's environment and also to its bottom line. GSCM pervades various functions of the organization beginning from procurement to integrated supply chain. It could be as basic as reducing risk to use raw material more efficiently and impacting the environment and the bottom line positively. These kinds of practices can be termed as the Circular Economy. Here organizations try to save on raw material and energy inputs so as to have the least amount of waste exhausted to the environment. Thereby creating a more efficient cost structure for the organization and reducing the damage to the surrounding eco-systems. This has economic benefits for the organization and in the process, it becomes more sustainable in its developmental efforts. Some of the methods that organizations employ and can be employed by other organizations to make their business more economical and impact sustainability for their environment, under the concept of GSCM, are, **Re-duce**, **Re-use**, **Re-work**, **Re-furbish**, **Re-claim**, **Re-cycle**, **Re-manufacturer**, **Re-verse** logistics, etc.

Earth Summit - 1992, saw major steps towards the protection of the environment and to promote the concept of 'Sustainable Development'. Representatives from various countries and global institutions discussed and planned procedures to save the environment as part of long-run economic development (Bhateja, *et al.*, 2012). Researchers (Zhu *et al.*, 2005, 2008; Ninlawan *et al.*, 2010;) have examined GSCM from the perspectives of challenges, supporting institutions, procedures and performance taking the case of the Chinese automobile industry and Thai electronics industry. They have concluded that political and legal requirements can be a major force that impacts both economic and environmental performance of GSCM measures. Zhu *et al.*, (2005, 2008) also assessed various systems and procedures employed for organizations under the GSCM umbrella for activities pertaining to green purchasing, managing the internal environment of the organization, designing for the eco-system, customer cooperation, and ROI.

Hsu and Hu(2008) examined the GSCM practices of the electronics industry and were able to identify various steps taken by the industry to advance the environmental agenda. Shang *et al.* (2010) and Walton *et al.* (1998) conducted research on GSCM activities related to eco-design, green engineering and packing, environmental contribution, green promotion, stock and suppliers. Organizations that follow eco-friendly production processes seem to enjoy greater success in the market than their rivals. Other researchers have been able to identify the factors that contribute to the greening of the supply chain the Indian industrial sector (Mudgal *et al.*, 2009, 2010). The factors that they were able to identify are:

1. Top management commitment
2. Societal concern for the protection of the natural environment
3. Regulations
4. Supplier involvement
5. Customer satisfaction
6. Employee involvement/empowerment
7. Green product development
8. Green procurement practices
9. Availability of clean technology
10. Green disposal
11. Green transportation

12. 3R-reduce/remanufacture/recycle
13. Lean manufacturing practices
14. Economic interests
15. Eco-labelling of products
16. Reverse logistics practices
17. Competitiveness
18. Corporate image

It has to be noted that diverse assessments have argued that there are diverse approaches to the implementation of GSCM (Lamming and Hampson, 1996; Bowen *et al.*, 2001; Rao, 2002; Zhu *et al.*, 2005). However, the amount of investigation done to categorize GSCM implementation based on similarity and approach has been inadequate. The reason for this could be that the GSCM practices are too complex to be observed; coupled with customer demands and pressures of cost and further compounded by the ever-changing regulatory requirements. For most organizations, they view the implementation of GSCM as a non-productive exercise that increases production cost.

OPERATIONALIZING GREEN SUPPLY CHAIN MANAGEMENT

A detailed investigation of the operations and environment (Corbett and Kleindorfer, 2003) and of the operations and sustainability (Kleindorfer *et al.*, 2005) reveal that linking supply chain and sustainability is the most crucial step that businesses need to take in order to become environmentally friendly. There have been various research works done on environmental policy related to operations, functions of business related to environment, strategy related to the environment and these have also revealed promising outcomes. However, the time has come to systematically address issues related to sustainability, environmental management and supply chains.

This research focuses on sustainability and supply chains. We start by examining the linkages between sustainability and supply chain with reference to environmental management. Next, we consider a set of enquiry and guidelines based on previous research related to the supply chain. An important point to consider here is that though the major research work seems to be on operations of organizations, the problems that we are trying to solve will have interdisciplinary solutions. This interdisciplinary orientation can be observed from the diversity in fields and areas that both industry and researchers are investigating to identify issues and consequences of sustainability.

Sustainability as a concept started finding footing in popular culture as well. This can be seen with books such as *The Lorax* (Geisel, 1971) – and films – *Soylent Green* (Fleischer, 1973). In the 1990s the issue of sustainability also moved into the management research and has swiftly grown after that. This transformation of ‘Sustainable development’ from theory into political discourse and conventional business can be attributed to the book *Our Common Future*, which is also called the Brundtland Report (WCED, 1987). Sustainability is usually defined as:

“Using resources to meet the needs of the present without compromising the ability of future generations to meet their own needs.”

(WCED, 1987; Cobb & Daly, 1994)

Expectedly, with the amount of room for multiple interpretations of this definition, there are many and diverse views that can and are been drawn from the concept. This makes the design and implementation of sustainability action plan vague and difficult to control. This definition has given room for various questions that need answers before embarking on the road to sustainability. Some of those questions could be (Linton *et al.*, 2007):

- i. What are the resources that our successors will need?
- ii. What are the different levels at which various toxins can be emitted without compromising our future generations?
- iii. How many new non-renewable energy resources can and will be discovered in the near future?

- iv. To what extent renewable sources of energy can be utilized with the assumption that sources will remain renewable?
- v. What is the level to which technology can be helpful in solving the issue of sustainability of resources and also facilitate amassing material wealth?
- vi. What is the degree of impact that market forces will have on the acceptance and success of the concept of sustainability?
- vii. Will the approaches to sustainability lead to change in lifestyle and if yes, then to what degree?
- viii. What will the policy framework for sustainability look like?

Though the deliberations keep happening regarding the kind of lifestyle changes and consequences of sustainability or what would be required to accomplish sustainability (Hart, 1997; Kemp, 1994), these thoughts and ideas are still at a nascent stage. It can be postulated as an argument that we are too early into the planning and implementation of sustainability and that we may still not be prepared for it. We have had similar events earlier where a concern related to the environment or public health was exaggerated and with further investigation, it proved to be not as harmful as it was deemed earlier (Wildavsky, 1995).

This time the warning signals seem to be more real and the response that they are receiving from the international community is also adequate. The major environmental concern seems to be an outcome of the production process - and end-product-derived pollution. Take the case of the legislation that was approved internationally and that too swiftly to remove the products that emit chemicals responsible for diminishing the Ozone layer (Cook, 1996). Also, it is evident from the growing concern among both private and public institutions regarding Global warming that the issue is being recognized as a real threat (Ball, 2004; Corey, 2005). Similarly, sustainability, as an idea that can mitigate the threat is also being accepted and appreciated by a growing number of institutions both private and public around the Globe.

One of the most significant advocates of sustainability is the European Union (EU). EU recognizes the criticality of the issue to such a great extent that they have mandated to the European Parliament that all current and future bills passed in the parliament must ensure adherence to the sustainability policy (American Chamber of Commerce of Europe, 2004).

Evidently, the proliferation of the concept and the activities around sustainability, make it a preferred choice of researchers from the area of operations management research and businesses alike to bring this area into their focus.

Under operations management research, some of the areas where work has already begun are greener product design (Dambach and Allenby, 1995), non-polluting production processes (Clelland et al., 2000; Porter and van der Linde, 1995), extending product life (Linton and Jayaraman, 2005), and environmental management systems (Sroufe, 2004). However, these areas are still not being viewed from the angle of sustainability and the ability of sustainability to unify them. Further, there is a group of researchers working in the area of industrial ecology, a field that looks at the impact of industrial production processes on the biological ecosystem (Allenby, 2000). From this field of research new and useful methods of re-use of industrial by-products have been generated (Frosch, 1994; Frosch and Gallopoulos, 1989). To summarize this discussion we can say that we have discussed sustainability, appreciated its importance and taken into consideration the limitations of current research to answer numerous questions related to sustainability. Some of these questions can be answered by the integration of the concept of sustainability with the supply chain. We will look into this linkage in the following discussion.

The interface between Sustainability and Supply Chains

From the discussion in the previous section, we can infer that the focus has shifted from economizing operations through a particular department or an organization to the complete supply chain. Implementation of management tools across the supply chain ensures that value is created and the lowest costs are achieved (Handfield and Nichols, 1999). It has to be noted here, that in order to accomplish this, organizations have to work on higher costs in the short-run so the entire value-chain can be made value driven at a lower cost in the long-run (Leenders and Blenkhorn, 1988).

By concentrating on the supply chain we are moving closer to the design and implementation of sustainable development agenda. This is because the supply chain extends from the most basic raw material to the delivery of the final product to the end-user.

With this, we need to recognize that sustainability must also be at the centre of various other functions in an organization related to:

- a. Product design
- b. Manufacturing by-products
- c. By-products produced during product use
- d. Product life extension
- e. Product end-of-life
- f. Recovery processes at end-of-life.

Product design

Tools such as examining the life cycle (Rebitzer et al., 2004; Pennington et al., 2004) can be utilized to ascertain the procedure for designing a product keeping in mind the damage that the production process, the product itself, over its usable life and its disposal may cause to the environment (Karna and Heiskanen, 1998). We are at an intersection of design, engineering and the environmental science looks at resource depletion and the impact an organization may cause to its environment.

Manufacturing by-products

The extension of the supply chain will also encompass reducing and finally removing any by-products that may be an outcome of the production process. This can be achieved through process R&D focused on cleaner production processes (Kemp, 1994) and by focusing on quality and lean production methods (Zink, 2005; Zhu and Sarkis, 2004; King and Lennox, 2001). Another way of looking at the issue is to find ways to utilize the by-product to form the part of another product or to be utilized in the facility to reduce fuel or other costs without causing any other side-effects (Frosch and Gallopoulos, 1989). For this, the organization will have to employ product R&D.

By-products produced during product use

Product management can also contribute to the field of sustainability by innovations in the product that may lead to great opportunities to increase revenues and profits for the organization. This would require a greater engagement and onus on part of the manufacturer.

Organizations may reap the benefits of this by creating a product or a service (Sharma et al., 2013; Sharma et al, 2018; Michaelis and Coates, 1994) or a series of product or services that have to be utilized over the lifetime of the product (Wise and Baumgartner, 1999).

Product life extension

Organizations may use various methods and tools to lengthen the workinglife of a product (Linton and Jayaraman, 2005). By extending the life of a given product we are able to save the resources that we would have exhausted from the environment in order to make a new unit of the same product. However, the point to be noted here is that this approach is contrary to the principles of a consumption society that delve on hyper-competition and product cannibalism. None-the-less, the value created by a unit of product surely expands with this technique. The issue faced by such producers is to design and produce a product that is durable enough and has technology and utility that will not be surpassed by other products in the near future. This means that the producer will have to focus on value-creating activities other than what the industry trends are valuing.

Product end-of-life

Planning for the right disposal of the product has to be devised at the design stage of the product. For most organizations this has not been a matter of concern, however, with the growing waste disposal issues, now it is the onus of the organizations to ensure that the product is disposed of by the end-user in ways that are safe and do not harm the environment. The product may also be engineered in a way that it could be reprocessed and/or recycled for a second use. In the case of cathode ray tubes used in the older generations of television sets

contained high amounts of lead. This led to issues of disposal of such products because of the toxic nature of lead. As an innovation, such products are processed before final disposal to remove the lead to be used in other new products thereby creating a dual advantage for the business as well as for the environment (Linton and Yeomans, 2004).

Recovery processes at end-of-life

A growing interest in the recovery of used products can be observed as a number of researchers are working on the engineering as well as the economic side of used product recovery (Thierry *et al.*, 1995; Flapper *et al.*, 2005). These research projects focus on various product categories, for example, flooring accessories, copiers, metal by-products, recycled packaging and sand (Barros *et al.*, 1998).

Based on the above discussion and with reference to various studies, we can argue that implementing sustainability in the supply chain has a positive or in the worst case scenario a neutral impact on the value derived from the supply chain (Rao and Holt, 2005). However, there are research works that have cited examples of organizations making trade-offs between what is most valued to the supply chain and what is most economical for the supply chain members (Walley and Whitehead, 1994).

CONCLUSION

It should be noted here that activities like recycling, reprocessing and refurbishing will make the management of the supply chain even more difficult. This is because the supply chain is already being compounded with strategic concerns of members, operational concerns and the new complexities may add to costs at least in the short-run. There are two basic issues that become the root of this concern:

1. There is a looming uncertainty of the returns expected from these recycled products.
2. The obvious other concern is the logistics of the products on their way back.

In the short-run the supply chain members may have to bear the burden of the costs that are related to the society and the environment, however, in the long-run sustainability does give rise to many market potentials and developments.

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