PERFORMANCE OF GREEN SUPPLY CHAIN MANAGEMENT IN THE SMALL AND MEDIUM ENTERPRISES IN CUDDALORE DISTRICT

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Abstract

Environmental or green or sustainable supply chain management is the emerging concept throughout the world. The green supply chain management activities include reuse, remanufacturing, and recycling which are embedded in green design, green procurement practices, total quality environmental management, environmentally friendly packaging, transportation, and various product end-of-life practices. The small and medium enterprises are not fully capable of harnessing the advantage of green supply chain management and face difficulties when implementing green supply chain management initiatives. Small and medium enterprises are diverse and heterogeneous in nature, which may be the hindrance to practice green supply chain management in a structured way. Small and medium enterprises do not have adequate proactive environmental strategies, green awareness and environmental controlling systems. In this context, the researchers have studied the green supply chain management practices of the small and medium manufacturing enterprises in Cuddalore district. As an essential part of the study, the researchers collected the primary data from 79 small scale and 5 medium scale manufacturing enterprises through a schedule. The results revealed that significant relationship is found among the enterprises belonging to varied years of existence, ownership patterns and nature of operations with performance of green supply chain management practices. The researchers suggested various measures for the effective GSCM practices of the select manufacturing enterprises.

Key words: Environmental sustainability, green supply chain management, green business, logistic management, etc.

1. Introduction

Sustainable development and saving of environment are now recognized globally as overriding imperative to protect the earth from the activity inflicted on it by the human. Environmental degradation, rising global temperature, melting of glaciers and ice-berg in the polar region, and rising sea level affect the globe. Irrational resource consumption resulting from raw material acquisition, manufacturing, use and disposal are the main reasons for the global environmental carrying capacity being exceeded. Balancing between economic and environmental performance has become increasingly important for organizations facing competitive, regulatory, and community pressures. Business activities can pose a significant threat to the environment. An

immediate action by business organizations, governments, and society is required to achieve a balanced growth to achieve socio-economic objectives without scarifying the environment. Increasing environmental concern has gradually become part of the overall organization culture and, in turn, has helped to reengineer the strategies of organizations. Regulations of the governments and other regulatory authorities regarding environmental aspects have compelled companies to design environmental plan on implementing green supply chain management practices. The number of organizations integrating the environmental practices into their strategic plans and operations is continuously increasing. Today, environmental issues pertaining to supply chain management are growing owing to wider debate on how industry meets the challenges of sustainability. Pressures from stakeholders posed a great challenge for supply chain managers in integrating sustainable practices in managing their supply chains.

2. Green supply chain management

Environmental or green or sustainable supply chain management is the emerging concept throughout the world. It is a new organizational philosophy to gain corporate profit and market share by environmental sustainability. Kovacs defines the green supply chain management as a strategy to minimize the negative impact on the environment through activities within the organization and supply chain. The green supply chain management redesigns the supply chain, incorporating practices such as materials recycling, remanufacturing, reuse of leftovers and projects oriented to the environment, minimizing the total impact of industrial activity throughout the life cycle of the product. Green supply chain management includes entire delivery of products and services from suppliers, manufacturers to end customers. The green supply chain management activities include reuse, remanufacturing, and recycling which are embedded in green design, green procurement practices, total quality environmental management, environmentally friendly packaging, transportation, and various product end-of-life practices. The green supply chain management can lessen harmful impact of the industrial processes and improve the competitive advantage of the firms.

3. Green and conventional supply chains

Conventional and green supply chains differ in several ways. The traditional supply chain aims to lower the cost and improve the efficiency of supply chain enterprise so as to take advantage of the economic benefits. Green supply chains seek to decrease the consumption of resources and energy and to reduce the emissions of pollutants i.e. all in an effort to create a socially responsible enterprise, and to balance the economic benefits, social effects and environmental effects. For green supply chain management, environmental performance is included in the enterprise's internal and external management, which is lacking in traditional supply chains. The traditional supply chain starts with suppliers and ends with users, and the

products flow is one-way and irreversible, known as "cradle-to-grave". In green supply chain, product flow is circular and reversible and all products must be managed throughout the entire life cycle, and beyond so that "waste" finds a second life or becomes raw material available for new production or other purposes. Besides, the consumption pattern of the traditional supply chains is a voluntary initiative governed by consumer interests and business activities.

4. Statement of the problem

Balancing economic and environmental performance has become increasingly significant for organizations facing competitive, regulatory, and community pressures. The supply chains become more lengthy and complex due to globalization. Today's enterprises have global networks of suppliers. This poses a major challenge to the supply chain managers to balance at low costs and innovate to substantiate both environmental and economic sustainability. Due to multiple stakeholders, uncertain implications and international presence, GSCM pose inherent complexity and has been a challenging field. The large transportation system in India is based on gasoline and diesel fuels, which would dramatically increase India's dependence on oil imports. Though, manufacturing companies implementing environmental strategies, the investment recovery and development of recycled material markets in India is not upto mark. Increasing pressures from various directions have forced the supply chain managers to implement green supply chain management practices to improve both their economic and environmental performance.

With the ever-growing concern on environmental sustainability, the challenges confronting small and medium enterprises in the manufacturing sector are becoming more amplified. Operational skills lacking in small and medium enterprises appear to be embedded in the concept of green supply chain management. Given the background of the increased failure of small and medium enterprises, it is to assert that green supply chain management is central to business performance enhancement in small and medium enterprises. Increasing environmental concerns and awareness are the driving force which pushes manufacturers all over the world to adopt green manufacturing practices that results manufacturing small and medium enterprises to implement green practices in their business. Green supply chain management practices can provide good innovative opportunities for small and medium enterprises to enhance production reduce costs and minimize environmental damage. Some small and medium enterprises that follow ISO 14001 have started to develop initiatives such as green design, green production, green distribution, and reverse logistics as the green supply chain management practices.

Although large multinational enterprises are quickly moving towards greening the supply chains and have positive social, environmental and economic impacts, small and medium enterprises, due to short of knowledge, technologies, expertise, financial and human resources, lack of interest, or understanding of long-term rewards, are lagging behind significantly.

Consequently, small and medium enterprises are losing competitive advantage for not practicing green supply chain management. Small and medium enterprises are diverse and heterogeneous in nature, which may be the hindrance to practice green supply chain management in a structured way. Small and medium enterprises do not have adequate proactive environmental strategies, green awareness and environmental controlling systems. For small and medium enterprises due to the scarcity of resources and dependence on the partners supply chains become critical. Therefore, there are still a large number of small and medium enterprises unwilling to adopt green supply chain management owing to many challenges that hinder its implementation. In this context, the researchers have studied the performance of green supply chain management practices of the small and medium manufacturing enterprises in Cuddalore district.

5. Objectives of the study

The following are the objectives of the present study.

1. To assess the performance dimensions of green supply chain management in the small and medium enterprises in Cuddalore district.
2. To suggest suitable model for the effective green supply chain management in the small and medium enterprises based on findings of the study.

6. Testing of hypothesis

There is no significant relationship among the small and medium scale manufacturing enterprises belonging to different institutional profiles towards performance of green supply chain management.

7. Methodology

The present study is empirical in character based on survey method, and is an attempt for discovering unrevealed truths in green supply chain management of the small and medium scale manufacturing enterprise in Cuddalore district. The secondary data were collected from books, reports, journals and magazines, websites, etc. congregated from published and unpublished works on the related topics. As an essential part of the study, the researchers collected the primary data from the chosen 79 small scale and 5 medium scale manufacturing enterprises through a schedule. The data collected were entered into a master table and tabulated to arrive at useful conclusions. Analysis of variance, student t, multiple regression analysis, discriminant function analysis, and descriptive analysis are used to assess the performance of green supply chain management.

8. Findings of the study

1. No significant relationship is found among the enterprises belonging to varied years of existence, ownership patterns and nature of operations with performance of green supply chain management practices. A significant relationship is found among the enterprises belonging to ISO certification, scale of operations and annual sales groups towards performance of green supply chain management practices.

2. Enterprises having existence for 6-10 years, sole proprietorship enterprises, enterprises engaged in miscellaneous manufacturing operations, ISO certified enterprises, medium scale enterprises and enterprises having annual sales of above Rs.15 crore are more satisfied with the performance of green supply chain management practices.

3. There exists consistency among the enterprises having existence for above 15 years, partnership form of enterprises, chemical and pharma enterprises, ISO non-certified enterprises, small scale enterprises and enterprises having annual sales of below Rs.5 crore towards performance of GSCM practices.

4. There has been a high degree of correlation (0.738) between the performance of GSCM practices and the selected institutional variables. The R square indicates that 54.50 per cent of variation is explained by all institutional variables taken together. The F value indicates that the multiple correlation coefficients are significant at 1 per cent level. Years of existence, ISO certification and annual sales have no significant effect the performance of GSCM practices. On the other hand, size of enterprise has significant effect on the performance of GSCM practices.

5. The operational performance is the maximum discriminating factor (R^2%=43.6%) between small scale and medium scale enterprises followed by investment recovery (19.4%) and intangible performance (17.8%) in that order. Vendor selection is (less than 5%) the least discriminating factor between small scale and medium scale enterprises.

6. Majority of the enterprises are highly satisfied and satisfied (28.57%) with the eco procurement, followed by dissatisfied (27.38%). 13.10% and 2.38% of the enterprises are neither satisfied nor dissatisfied and highly dissatisfied respectively with the eco procurement.

7. Out of 84 manufacturing enterprises, majority of the enterprises are satisfied (33.33%) with the eco product design, followed by highly satisfied (29.76%) and dissatisfied (23.81%). 13.10% of the enterprises are neither satisfied nor dissatisfied with the eco product design.

8. In regards to the eco manufacturing, majority of the enterprises are satisfied (34.52%), followed by highly satisfied (29.76%) and dissatisfied (17.86%). 16.67% and 1.19% of the enterprises

are neither satisfied nor dissatisfied and highly dissatisfied in that order with eco manufacturing.

9. Out of 84 enterprises, the majority of enterprises is satisfied (35.71%) with eco accounting, followed closely by highly satisfied (27.38%) and dissatisfied (21.43%). 15.48% of the enterprises are neither satisfied nor dissatisfied with eco accounting.

10. Majority of the enterprises are satisfied (35.71%) with the financial performance, followed closely by highly satisfied (25%) and dissatisfied (22.62%). In regards to the eco logistics design, the majority of enterprises are satisfied (33.33%), followed by dissatisfied (26.19%) and neither satisfied nor dissatisfied (20.24%). 19.05% and 1.19% of the enterprises are highly satisfied and highly dissatisfied with the eco logistics design.

11. Out of 84 enterprises, the majority of enterprises are dissatisfied (40.48%) with marketing and communication, followed closely by satisfied (32.14%) and neither satisfied nor dissatisfied (17.85%). 7.14% and 2.38% of the enterprises are highly satisfied and highly dissatisfied correspondingly with marketing and communication.

12. Out of 84 enterprises, majority of the enterprises are dissatisfied (36.90%) with the environmental performance, followed by satisfied (33.33%) and neither satisfied nor dissatisfied (17.86%). 9.52% and 2.38% of the enterprises are highly satisfied and highly dissatisfied in that order with environmental performance.

13. Majority of the enterprises are satisfied (34.52%) with customer co-operation, followed closely by highly satisfied (28.57%) and dissatisfied (22.62%). 13.10% and 1.19% of the enterprises are neither satisfied nor dissatisfied and highly dissatisfied respectively with customer co-operation.

14. In regards to human and technological resources, majority of enterprises are satisfied (36.90%), followed closely by highly satisfied (29.76%) and dissatisfied (20.24%). 13.10% of the select enterprises are neither satisfied nor dissatisfied with human and technological resources.

15. The majority of enterprises are satisfied (35.71%) with the internal environmental management, followed closely by dissatisfied (33.33%) and neither satisfied nor dissatisfied (15.48%). 14.29% and 1.19% of the enterprises are highly satisfied and highly dissatisfied respectively with the internal environmental management.

16. Out of 84 enterprises, majority of the enterprises are dissatisfied (41.67%) with the operational performance, followed closely by satisfied (35.71%) and neither satisfied nor dissatisfied

(16.67%). 4.76% and 1.19% of the enterprises are highly satisfied and highly dissatisfied in that order with the operational performance.

17. In regards to stakeholders, majority of the enterprises are satisfied (42.86%), followed by dissatisfied (34.52%) and neither satisfied nor dissatisfied (15.48%). 5.95% and 1.19% of the enterprises are highly satisfied and highly dissatisfied respectively with the stakeholders.

18. Majority of the enterprises are dissatisfied (38.10%) with the vendor selection, followed closely by satisfied (32.14%) and neither satisfied nor dissatisfied (14.29%). 13.10% and 2.38% of the select enterprises are highly satisfied and highly dissatisfied respectively with vendor selection.

19. In regards to intangible performance, the majority of enterprises are dissatisfied (35.71%), followed by satisfied (34.52%) and neither satisfied nor dissatisfied (17.86%). 10.71% and 1.19% of the select enterprises are highly satisfied and highly dissatisfied correspondingly with intangible performance.

20. Out of 84 enterprises, majority of the enterprises are dissatisfied (48.41%) with the investment recovery, followed by satisfied (28.57%) and neither satisfied nor dissatisfied (10.72%). 8.33% and 3.57% of the select enterprises are highly satisfied and highly dissatisfied respectively with investment recovery.

9. Suggestions

1. The select enterprises can put into action global green supply chain management best practices through ensuring that they include environmental criteria when sourcing for goods to ensure that they procure from environmentally certified suppliers. Further, policies can be designed to ensure that environmentally friendly products are procured.

2. As assessing the environmental, occupational health and resource-related consequences of a product through all phases of its life pertaining to extracting and processing raw materials, production, transportation and distribution, use, remanufacturing, recycling and final disposal is crucial, the select manufacturing enterprises can use life cycle analysis concept which has to be looked at as one whose benefits are long-term.

3. The select enterprises need to adopt innovative green product development practices which consider environment friendly raw materials and processes to improve product design and find new market opportunities. The enterprises can put into effect these practices through the use of biodegradable raw materials and inputs in the product design and continuously upgrade their product offering to validate with environmental requirements.

4. The select manufacturing enterprises should strive for achieving sustainability through recycling, reuse and reverse logistics. Execution of these techniques should be based on pinch analysis, industrial energy and energy and life cycle analysis.

5. The non-governmental organizations ought to play an important role in greening the supply chain, particularly in partnership with key stakeholders as a part of their commitment to the community to solve environmental problems through strategic partnerships.

6. The select enterprises have to find suppliers who will minimize their environmental impact without reducing the quality of their product or rising costs considerably. Such relationship with suppliers results in lower inventory level, cost and higher accuracy.

7. The select enterprises should promote GSCM practices through employees' trainings, seminars and workshops. Hence, they shall organize training programs for employees to disseminate information and knowledge on regular basis. The training of employees and members of supply chain should advance their eco-literacy which is imperative for managing the GSCM profitable.

8. The select enterprises can extensively use reverse logistics which can lead to economic benefits by recovery of the returned products for reuse, remanufacturing, and recycling. The enterprises should properly maintain their machineries and adopt better technologies to reduce pollution.

10. Conclusion

The expanding global economy has brought affluence but also environmental degradation, such as climate change, ozone layer depletion, loss of biodiversity, pollution, degradation and the depletion of air, water, minerals and land. These issues have become necessary to firms because their stakeholders are increasingly demanding that firms address environmental and social sustainability in business operations. Organizations desiring to lessen their environmental impacts might discover their ability to manage increasingly complex supplier relationships. Green supply chain management has emerged as a way to combine elements of environmental management and supply chain management. Green supply chain management practices have been developed as a practical means to pursue an environmentally focused strategy. Hence, possible policy measures, regulatory framework and initiatives to promote GSCM have become the need of the hour. Hence, the present study was conducted in Cuddalore district with 84 small and medium scale manufacturing enterprises to asses the performance of the green supply chain management. The researchers suggested various measures for the effective GSCM of the select manufacturing enterprises.

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