

# GSCM Practices and Sustainable Performance: A Preliminary Insight

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**Abstract**—Green supply chain management (GSCM) continues to be an important research agenda among the researchers. However, there are still limited studies to investigate GSCM practices and its implementation especially in Malaysia context. Since green issues are new and still developing in Malaysia, constant study is needed to fully understand and update information regarding this area. Firms in developing countries like Malaysia are still in the learning process on how to incorporate the green supply chain management practices in their daily operations. Therefore, this conceptual paper is intended to provide insights on the implementation and practices of GSCM, especially on its relation to the integration mechanisms. This paper is expected to provide a thorough review on the interdependent relationship of GSCM practices and supply chain integration towards sustainable performance. It is hoped that this conceptual paper would be useful in helping manufacturing firms to identify an effective approach towards successful green supply chain practices that contribute to sustainable performance.

**Index Terms**—green supply chain, green practices, supply chain integration, sustainable performance

## I. INTRODUCTION

In its transition to become an industrialized economy, Malaysia has shifted its focus from material production to manufacturing [1]. In 2007 alone, the manufacturing sector in the country contributed 32% to the gross domestic product while the same products' exports constituted 75% of the country's total export in the same year. In other words, the manufacturing industries have become the Malaysian economy's primary growth source in the past years. Nevertheless, this rapid industrialization has a negative impact on the environment owing to the heightened pollution, waste and the increasing consumption of natural resources. Specifically, environmental problems are basically brought about by industry or individual firms as human society is largely dependent on industrial products to maintain their living standard while these in turn, result in the negative impacts on the environment and society.

Generally, corporations utilize resources and expel environmental emissions from manufacturing products. These emissions are not significant in comparison to what the product produces throughout its life cycle. A common example includes durable goods like home appliances and automobiles. Environmental emissions from the utilization and disposal of such products are higher compared to those of its manufacturing stage. Although goods such as paper towels and aluminium foil emit high environmental loads in its manufacturing stage but the total load is still higher compared to such loads.

Hence, environmental loads arising throughout the life cycle of the product are the primary reasons behind the current environmental problem [2]. Regardless of the attempts to minimize environmental issues, these issues still exist and compounded. Recently, more effective methods have been employed for environmental management. These methods have led to the shift of environmental management (EM) from a simple end-of-pipe control and treatment of waste [3]. It is imperative for firms to acknowledge responsibility for its environmental effects which were considered in the past as incidental externalities. They need to shift from a paradigm of environmental management focus on clean up and control to a paradigm that encapsulates the steering clear of environmental harm throughout the product's life cycle [3]. Adopting this path calls for extensive methods to minimize pollution via tackling the source of pollution at every phase of the cycle including raw material extraction, transportation, manufacturing, product use, recycling and disposal [4].

With increasing awareness of environmental protection worldwide, Green supply chain management (GSCM) system is increasingly garnering interest among researchers and practitioners of operations and supply chain management. Moreover, GSCM's increasing importance is motivated by the compounding depletion of the environmental resources. GSCM has thus become an effective management tool that drives manufacturing organizations to improve the sustainability of the environment and performance.

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## II. HIGHLIGHTED ISSUES

Owing to the competitive and regulated environment characterized by community pressures that organizations thrive in, it is crucial for organizations to create a balance between their economic and environmental performance [5]. Moreover, with increasing stress for environmental sustainability, manufacturers will require the implementation of strategies to minimize the products and services impact on the environment. It is without a doubt that environmental sustainability is among the issues that stand out in the present and is expected to stand out in the future decades. In other words, environmental sustainability has become a necessity as opposed to being an option.

In addition, industrialized nations are in the midst of an environmental issue owing to the increased pollution in the environment, waste and the increasing utilization of natural resource. Added to this, individual corporations or whole industries are the reasons behind the environmental issues. Human society highly depends on industrial development for their sustenance and this in turn, would lead to adverse impacts on the environment and future societies. Moreover, the increasing industrialization has corporations consume resources and disseminate emissions to the environment in their manufacturing of products. The truth of the matter is, environmental waste stemming from the two stages (use and disposal) is higher in level in comparison to the wastes in the stage of manufacturing. For example, the environmental loads from the manufacturing stages of goods such as paper towels and aluminium foil are higher but the total load is definitely higher compared to it.

More importantly, the primary cause of the present day environmental issue has been attributed to the environmental loads happening throughout the life cycle of the product. Although efforts have been exerted to minimize environmental issues, they show no sign of slowing down but instead, it has a tendency to increase. Several effective methods have been proposed in the past few years to manage the environment. These methods directed EM from waste treatment and end-of-pipe control indicating responsibility for environmental footprints which were considered in the past as mere incidental occurrences. Therefore, a need exists to shift from an environmental management paradigm concentrating on clean up and control to a paradigm that avoids environmental damage via the product's entire life cycle. Following in this direction calls for an extensive method to minimize pollution by focusing on the source at each product life cycle stage (from raw material extraction to final disposal) [4].

The increasing focus on environmental protection on a global scale has added values to the GSCM, encouraged by the heightening stress from the operations and SCM researchers and practitioners. Added to this, the development of GSCM is primarily driven by environmental deterioration. Hence, GSCM has been considered as a management tool for prominent manufacturing organizations particularly for the

enhancement of environmental sustainability and performance.

## III. PRACTISING GSCM

Some researchers refer to green supply as the purchasing intent of the organization to improve its environment performance of purchase input. As such, green supply encapsulates different purchasing activities like organizations cooperation to decrease the logistic impact of material flows or the gathering of information regarding the characteristics of the purchased products. Some other definitions stress on the purchasing function and this shows that activities of green supply includes the purchasing function in realizing internally-focused environmental activities such as recycling, reusing and reducing source.

The GSCM activity can be attributed to top management support, organizational environmental policy, investment recovery and green eco-design whereas the latter activity is more geared towards green purchasing, reverse logistics, and customer relationship in order to satisfy green requirements, R&D collaboration with stakeholders and evaluation and selection of suppliers. Basically, there are three main GSCM basic practices which must be implemented in order to achieve a better environmental sustainability and performance:

### A. *Eco-Design*

Environmental-Conscious Design or Eco design, for short, refers to the activities employed throughout the product development that are undergone to minimize the product's environmental impact on the environment. This covers the acquisition of material, manufacturing, use and final disposal. Eco design is carried out while keeping other crucial product criteria into consideration (like performance and cost). Eco design is deemed to be one of the top supply chain initiatives that integrate aspects of the environment with the design of the product in a way that is appropriate to the product supply chain.

The importance of this consideration lies in the fact that most of the environmental effect originates from the production of products, their consumption and disposal that influence the decision making in the design phase. This stage represents the definition of product, process or service function and the choice of raw materials, supplies and process chemicals to measure the used energy in the creation or product as well as the creation of waste.

### B. *Green Purchasing*

Green purchasing is considered as a practice of environmental purchasing aiming to guarantee that the bought items are aligned with the firm's environmental objectives including the minimization or eradication of dangerous compounds, the minimization of waste sources and the carrying out of recycling and retrieval of purchased items. Green purchasing also refers to the fact that purchasing managers take the issue of sustainability into consideration in their purchasing of inputs and in the cost, quality and delivery of items.

### C. Reverse Logistic

The focus of reverse logistics is basically on the return of products and materials from the viewpoint of supply chain consumption for recycling, reusing, remanufacturing, repairing, or disposing. The primary logistic activities of transportation as well as inventory management are also covered by reverse logistics although it is basically concerned with product retrieval from the customers as opposed to providing them to customers.

### IV. SUPPLY CHAIN INTEGRATION

Supply chain management aims to remove communication barriers and eradicate discrepancies with the help of coordination, monitoring and control processes. Stated differently, the integration of supply chains has been considered as an attempt to promote linkages among components in the chain and better facilitate decision making in order to get every component to effectively interact. The primary drivers of integration are information revolution, maximized level of global competition, demanding customers and markets that are demand driven along with the novel types of inter-organizational connections [6]. Therefore, information systems, inventory management and supply chain management make up the three primary elements of integrated supply chain model.

Integration is based on cooperation, collaboration, sharing of information, shared technology, partnerships, and the fundamental transition from managing individual functional activities to managing integrated process chains. The level of integration can involve product design initiatives, and other phases leading to eventual item sale. Some authors claimed that all the activities in the product life cycle including service, reverse logistics and recycling are included in the integration level. The reason behind integrating the supply chain lies in the enhancement of profit potential and competitive position that reflects 60%-80% of the normal company cost structure, with 10% reduction that generates 40-50% enhancements in pre-tax profits.

Integration is a concept that evolved over time to one where in the supply chain functions as a corporate entity, encapsulates a virtual enterprise without relating to boundaries of traditional company, and it can directly brought about by customer demand through electronic storefronts access. This trend develops significant changes in majority of companies and it consequently leads to the higher utilization of outsourced services. Successful implementation depends on how changes are introduced in the company and how the process is extended towards suppliers and customers. Thus, the main advantages could include reduced cycle time and cost. In a related study, [7] examined the significance of aligning goals throughout functions via cooperation and collaboration and claimed that the poor alignment of goals between manufacturing and sales functions open up an opportunity to bring about a superior alignment in order to improve the supply chain management practices.

### V. SUSTAINABLE PERFORMANCE

In business, sustainability refers to a dynamic state that arises when the company develops continuous shareholders and stakeholders' value. A crucial aspect of sustainable value lies in the premise that by serving society and the environment, the firm services its customers and shareholders better than it would without it. Sustainability as stated by reference [8] in his book 'Conceptualizing Sustainability: The Business Opportunity' consists of activities that contribute to the extension of the useful life of the firm, enhancement of the earth's maintenance, renewal of biosphere, protection of living beings, improvement of the ability of society to maintain itself and to tackle issues and to sustainability of welfare, and humanity's participation and personal freedom in the present as well as future. Based on this, sustainability refers to a superior manner of doing business and is a crucial contributor to transforming enterprises cultures into a constructive innovative one. This culture motivates high performance and maximizes the use of present assets in a manner that leads to good results in terms of society, environment and the economy [8].

The assessment of sustainability performance in an industry calls for developing suitable framework criteria and the defining relevant indicators. Several current integrated frameworks that are utilized for the assessment of sustainability at global, national or company level were reviewed to identify the related aspects that should be kept in mind when examining the sustainability of the industry. Such a framework can be categorized into three main sustainability dimensions as proposed by reference [9]. These dimensions are economic sustainability, environmental sustainability and social sustainability.

### VI. CONCLUDING REMARKS: PREPOSITION DEVELOPMENT

Environmental issues call for strategic decision making and in this regard, several issues have cropped up and caught the attention of management. Instead of evaluating fundamental material or component requirements, like cost, quality and delivery, it is crucial for supply chain management to tackle a range of factors that cover the product and process on upstream and downstream side of the supply chain. One such requirement set is related to sustainable development and performance and it has been garnering interest as managers left with no recourse but to address social and environmental issues for the firm and for the supply chain partners [10]. This viewpoint deems customer and supplier relationships as significant relations for firms in order that it may minimize environmental uncertainty. In several cases, inter-organizational relationship is important for oversight over internal and external coordination for GSCM to achieve performance outcomes.

Green supply chain refers to the buying of the firm's inclination to enhance the environmental performance of purchased input and/or of the suppliers providing them

[11]. Accordingly, green supply chain covers various activities such as cooperation and coordination among organizations to lessen the logistical effect of material flows or information collection concerning the characteristics of products and to guarantee the practices effectiveness. Hence, organizational relation or partnership collaboration is important to the creation of a supply chain strategy and performance advantage. In other words, it can be contended that successful strategies and practices depend on each party's integration of the supply chain.

Keeping this into consideration, it is then possible to determine several acknowledged characteristics of GSCM practices. Basically, environmental management in the supply chain must be considered as the management of the environmental activities or two or more coordinating firms. Many methods can be employed to manage, co-opt or drive these activities in other organizations in the supply chain. An organization can essentially opt for direct involvement and investment of its resources for the improvement of the practices of the supply chain members.

As an alternative, it may also make use of arms-length, market mechanisms to urge the practices of other organizations. The integration degree (upstream and downstream) may potentially affect the success of GSCM practices to achieve sustainable performance. For instance, these relationships interdependence can be defined as if in terms of suppliers, objectives of extensive environmental monitoring include guaranteeing their adherence with government regulations and laying down systems to minimize risky issues in the environment [12]. These risks may be legal, financial or operational. In case a supplier is forced to foreclose business owing to accidents involving hazardous material or owing to the fact that it faces a regulatory obligation to clean up damaged soil, the purchasing organization may have to deal with the issue of material shortage.

Another issue may arise due to the customer's option to boycott the firm's products and services owing to the environmental impacts of the supplier (urged by NGOs). Additionally, the dependence on a large supplier base maximizes the possibility that one or more suppliers are not operating according to the changing expectations in the society – for instance, the existence of sweat shops in developing nations. Hence, organizations can minimize risks or expediently react to developing issues with the help of collaboration with customers and suppliers.

Contrastingly, the transactions carried out inter-firm are largely concentrated on few suppliers or customers and as such, the parties have a high probability of shifting from pure transaction-based toward relational interactions [12]. In this background, greater trust enables management to focus their attention and resources towards critical aspects namely improvement in performance. To conclude, literature is full of studies that support the claim concerning how contingency on supply

chain integration improves performance via GSCM practices.

Based on the above assertions, a conceptual framework is derived (as shown in Fig. 1) and two prepositions are proposed:

**P1:** There is a positive and significant relationship between GSCM practices and sustainable performance.

**P2:** There is a positive and significant moderating effect of supply chain integration on the relationship between GSCM practices and sustainable performance.

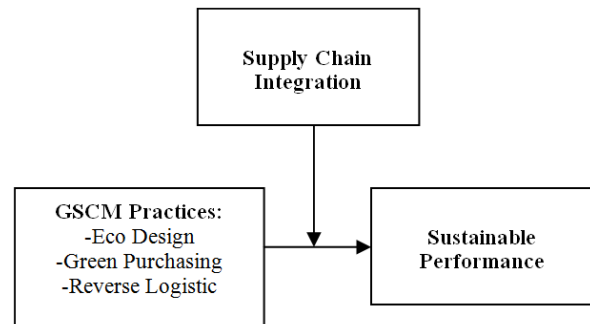


Figure 1. The proposed conceptual framework.

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