

## Conference Paper

# A Survey on Green Supply Chain Management (GSCM) Challenges in the Malaysian Construction Industry

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## Abstract

In recent years, mounting environmental and sustainability concerns are driving the construction industry players to adopt green supply chain management (GSCM) in their organizations. GSCM is a converging sustainability approach that integrates environmental thinking and initiatives into the traditional supply chain management (SCM) practices. However, despite having various benefits, this approach has not been widely implemented. Therefore, this paper aims to reveal the challenges faced by Malaysian construction companies in implementing GSCM. A total of 160 questionnaires were distributed among contractors and consultants in Malaysian Construction Companies. Only 50 questionnaires completed by the respondents resulting in a response rate of 32%. The research found that leadership and commitment from top management as the main challenges among construction players in implementing GSCM, in addition to changing mindset and culture and government support and regulation. This finding will allow practitioners to acknowledge and prioritize the challenges embedded with GSCM implementation, thus come out with strategies to overcome the challenges. This research can be further enriched by including an in-depth study on the GSCM challenges through qualitative research.

**Keywords:** green supply chain (GSCM), sustainability, challenges, construction industry.

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## 1. Introduction

The construction sector accounts for about 39% of the world's total carbon emission, which may lead to severe environmental pollution (United Nations Environmental Program, 2017). Reasonably, the industry needs to take actions to reduce environmental impacts in their activities, especially when the customers are becoming environmental conscious and stringent environmental regulations are being imposed by the government (Mathiyazhagan, Govindan, NoorulHaq, & Geng, 2013). This situation leads to the emerging sustainable construction concept. The green supply chain was introduced to balance marketing performance with environmental issues. Several companies had

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implemented green supply chain by creating networks of suppliers to purchase environmentally superior products or building conventional approaches to waste reduction and operational efficiencies to tackle various environmental challenges such as energy conservation and pollution abatement, (Kumar & Chandrakar, 2012). As a developing country, Malaysia is currently experiencing rapid economic growth through urbanization, and it is expected to rise more and more from year to year. In order to ensure sustainability in future development, many researchers had come out with the idea of green technology or system in its supply chain management. However, in the Malaysian construction industry, the concept is still relatively new where there is only a few organization's had implemented this concept, and there are reasons hindering the implementation (Wooi & Zailani, 2010). Therefore, the challenges in green supply chain management (GSCM) implementation by the Malaysian Construction Industry will be investigated in this research.

## 2. Literature Review

### 2.1. GSCM Concept and Initiative

Green supply chain management (GSCM) can be explained as an approach that integrates environmental thinking into supply chain management (SCM) (Srivastava, 2007). The main focus of GSCM includes identifying benefits, costs, and risks associated with environmental performance (Handfield, Sroufe, & Walton, 2005; Trigos, 2016). The implementation of GSCM in the construction organization depends on to what extent the initiative being used. Ghobakhloo, Tang, Zulkifli, and Ariffin, (2013) and Dheeraj and Vishal, (2012) have introduced a guideline to ensure the systematic and effective GSCM implementation. This guideline embedded the 'green' concept in several activities, which include product design, material management, manufacturing management, distribution and marketing, and reverse logistics.

The objectives of green product design are to minimize the product's environmental impact during its whole life cycle and reinforce the product expansion by providing an environmental-conscious design or called as eco-design (Ghobakhloo et al., 2013; Johansson & Glenn, 2002). Meanwhile, Nur, Handayani, and Wibowo (2018) stated that green material management (purchasing) commonly associated with managing the environmental performance of suppliers by eliminating hazardous materials or harmful activities in their operations. This initiative required the supplier to meet certain

specifications such as product content requirements, product content restrictions and product content labeling (eco-labeling) (Hamner, 2006).

According to Wibowo, Handayani, & Mustikasari, (2018), there are three main phases in green manufacturing processes: resource utilization decrement, waste decrement, and emission decrement. Cox (2008) defined green marketing as an advertisement in promoting the reputation of a company towards environmental responsibility, supporting a green lifecycle of a product or service, and addressing the relationship between a product or service and the biophysical environment. Reverse logistics focuses primarily on the return of the products or materials from the point of consumption to the forward supply chain for recycling, reuse, remanufacture, repair, refurbishment or safe disposal (Carter & Easton, 2011; ElTayeb, Zailani, & Jayaraman, 2010).

## 2.2. GSCM Challenges

The green supply chain initiatives have shown positive outcomes for many companies, but it is not without facing some challenges in its implementation. The literature has thrown light on the various challenges or barriers that would impede the industry in adopting GSCM. Some literature (Government & Perron, 2014; Khidir & Zailani, 2009; Mathiyazhagan et al., 2013) categorized the challenges in four broad categories: (1) institutional challenges, (2) organizational challenges, (3) informational challenges, and (4) economic challenges. Meanwhile, some other literature (Balasubramanian, 2012; Walker, Di Sisto, & McBain, 2008) divided the challenges into two parts: internal challenges and external challenges.

### 2.2.1. Internal challenges

Internal challenges are defined as the challenges that occur internally within the players or organizations itself. The most significant internal challenge identified in the literature was financial constraints (Ojo, Mbowa, & Akinlabi, 2014). Khidir and Zailani (2009) stated two types of cost involved in the environmental management of supply chains: direct cost and transaction cost. Precedent literature has mentioned that the implementation of the green supply chain might result in increased economic performance and profitability (Mollenkopf, Closs, Twede, Lee, & Burgess, 2005; Zhu & Sarkis, 2004). However, green supply chain management involve higher operation costs thus hinder the adoption of the approach amongst organizations (Balasubramanian, 2012; Benachio, Freitas, & Tavares, 2019; Khidir & Zailani, 2009; Mathiyazhagan et al., 2013; Min & Galle, 2001;

Varnäs, Balfors, & Faith-Ell, 2009). This is especially true for organizations that have limited availability of resources.

Apart from the financial challenges, changing the mindset and culture of an organization and the players itself proved to be a significant challenge in implementing GSCM. Changing the fundamentals and core features of organizations (organizational goals, forms of authority, core technology, and operational and marketing strategy) are one of the challenging tasks to the organizations. Leadership and commitment from the top management in aligning the organizations into a new direction are crucial. It is important for the management to support and create environmental awareness among their subordinates. Other challenges faced by the industry in implementing GSCM include lack of resources (technical expertise, technology, material and process), lack of knowledge and experience, and lack in managing standard environmental control policies within the organization (Balasubramanian, 2012; Government & Perron, 2014; Jabbour, Mauricio, & Jabbour, 2017; Khidir & Zailani, 2009; Trigos, 2016).

### 2.2.2. External Challenges

In addition to the internal factors, external factors also posed some challenges to the industry in implementing GSCM. According to the literature, the most significant external challenge faced by the construction industry is lack of support from the government (Rao and Holt, 2005; Walker et al., 2008; Khidir and Zailani, 2009; Balasubramaniam, 2012; Mathiyazhagan, 2013, Ojo, 2014). The government basically catalyzes since their support can be both drivers and challenges in the implementation of the green supply chain. Development of appropriate policies, standards, and regulations encourage the industry players to adopt green initiatives. The fact that GSCM involved much interaction with suppliers, the management of suppliers also proves to be a challenge for many organizations (Mathiyazhagan et al., 2013). For example, green purchasing requires a supplier to comply with environmental requirements; thus, it is crucial for the supplier to be responsible and to provide a strong commitment to achieving GSCM.

Trigos (2007) highlighted that the availability of green products in the market nowadays also serves as a factor that hinders the implementation of GSCM. In the construction industry, there is a limited product that meets the green requirements. Only a few products can be considered as 'green' and made for 'recycle' (Varnas et al., 2009). Two most popular green products are concrete and timber. However, the usage of a green product is still at an infant stage due to the cost preference. Other external challenges include lack of adequate environmental measures such as training and

development, sustainable auditing, and certifications like ISO 14001 (Balasubramaniam, 2012). Additionally, some organization found it is challenging to adopt the green supply initiatives mainly because of the competitive and uncertain nature of the construction industry. Generally, the construction players are highly competitive among themselves in pitching for projects and in providing reputable performance for their projects. Given the fact that construction projects involve a lot of unknowns and uncertainties, the chance of project delays, put on hold or terminated, or affected by economic situations are significantly high for construction projects.

### 3. Methodology

The quantitative research design was applied for this research. A hundred sixty self-administered survey questionnaires were distributed through the mail, facsimile, electronic mail (e-mail) and pass by hand to contractors and consultants (architect, engineer and quantity surveyor) whose practice were in the Selangor and Klang Valley area. Listing and contacting the respondents were done before the distribution of questionnaires. The questionnaires were developed to answer the research question on 'what are the challenges faced by the players in the Malaysian construction industry in adopting green supply chain practice?'. Respondents were asked to indicate their level of agreement to the statement as per indicator is shown in the questionnaire with 1.00 as strongly disagree and 5.00 as strongly agree. A total of 50 questionnaires were returned and completed by the respondents. The questionnaires were analyzed using SPSS version 20.

### 4. Results and Discussion

#### 4.1. The Respondents' Background

Table 1 presents the respondents' nature of work, years of employment, and types of project involved. Altogether, 50 of the questionnaires replied by the respondents from both fields and giving a response rate of about 32%. As mentioned by Saunders et al. (2007), an average response rate of 30% to 40% is considered reasonable for a delivered and collated method. All respondents were assumed to have a broad knowledge and sufficient experience for the firm's operational and practices, and 70% of them were used to involve with the green projects.

TABLE 1: General background of the respondents in their company.

Nature of work	N	%	Years of employment	N	%	Types of the project involved	N	%
Architect	13	26	< 5 years	14	28	Residential	18	36
C&S Engineer	10	20	5 - 10 years	23	46	Commercial/office	14	28
Quantity Surveyor	13	26	> 10 years	13	26	Industrial	5	10
Contractor	14	28				Institutional	5	10
						Others	8	16

From the survey conducted, there are 43% of the respondents' companies are implemented Environmental Management Systems, EMS. Figure 1 elucidates the respondents' feedback on the four main reasons why the construction companies adopt the GSCM concept and practice in their organization. They are to comply with regulation, pressure from the client, pressure from competitors, and voluntarily. It is found that more than half of the respondents (75%) adopt green supply chain management (GSCM) due to complying with the regulations. The findings are in lieu with the previous study conducted by Min & Galle, (2001), that many organizations get involved in the green supply chain management (GSCM) to avoid violations of regulatory law.

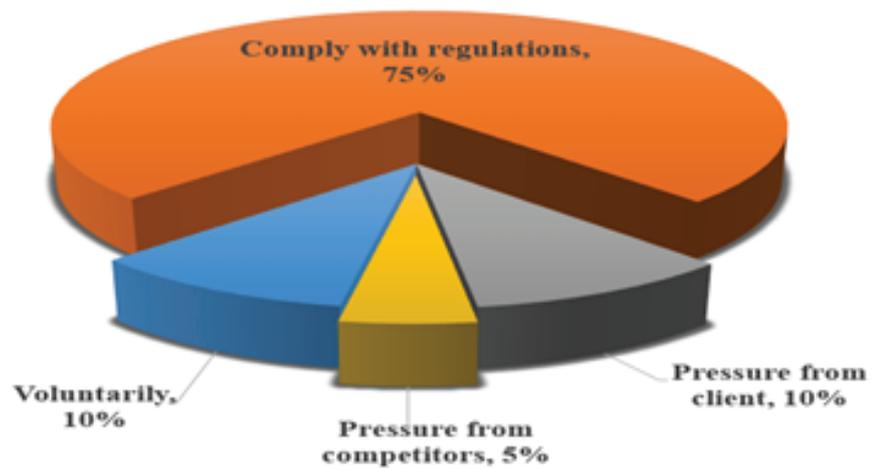


Figure 1: Reasons for the organization to implement GSCM.

#### 4.2. Identification of GSCM Challenges

Generally, challenges are any obstacle, pitfall, drawback, barrier, limitation, difficulty, or factors constraining the adoption of GSCM. The challenges were grouped into two groups; i.e. internal challenges and external challenges. The internal challenges were considered to be the pressures within a company that hindered the implementation of

GSCM. External barriers were reflected to be external forces that are obstructing the companies from implementing their GSCM. Overall, there twelve challenges (8 internal challenges and 4 external challenges) were identified and studied in this research.

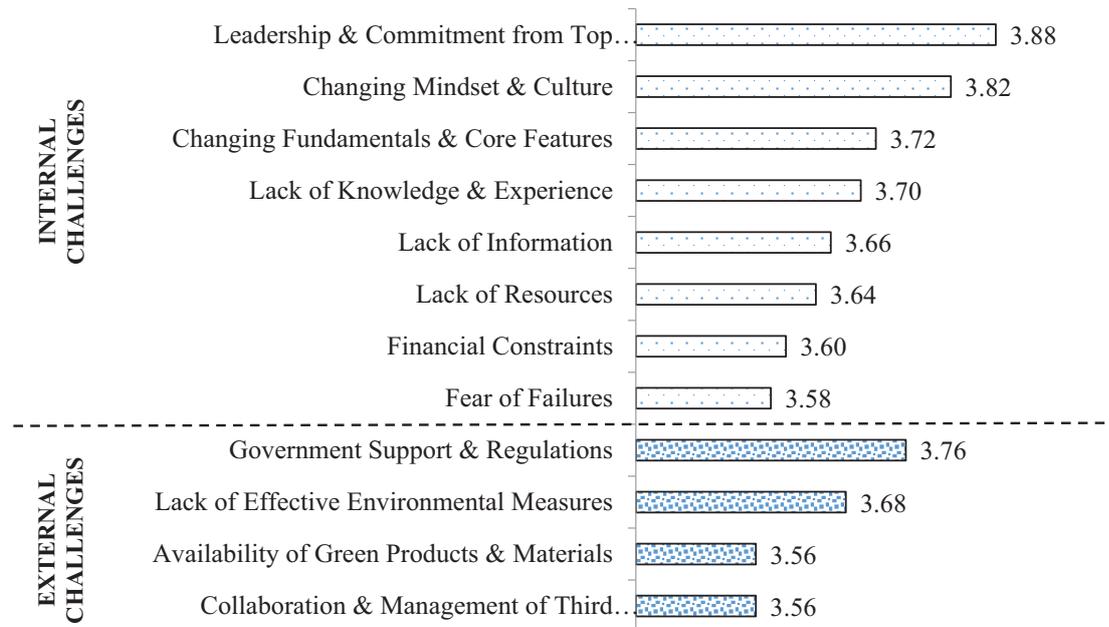
Figure 2 presents the mean score ranking for the identified twelve challenges under the challenges in the implementation of GSCM. It can be seen clearly from Figure 2, that almost all the challenges give a mean value more than 3.00. These results show that these challenges are consensually agreed by the respondents as critical in obstructing the effectiveness of GSCM implementation in the construction industry.

For internal challenges, the three most critical challenges perceived by the respondents are Leadership & Commitment from Top Management (3.88), Changing Mindset & Culture of the Organization (3.82) and Changing Fundamentals & Core Features of the Organization (3.72). The finding was in line with the literature review where, according to Balasubramaniam (2012), top management support and commitment plays a significant role in implementing successful GSCM. Mathiyazhagan (2013) also adds that some of the top management resisted in changing the existing practice, information, and habits to the new sustainable supply chain practice since it involved a lot of costs and time. While Financial Constraint and Fear of Failure become the lowest challenges ranked for internal challenges. The respondents felt that by implementing GSCM, cost-saving could be realized by reducing energy consumption and subsequently, reducing the emissions of carbon dioxide from the construction activities which have less deteriorated to the environment (Zulkefli & Ling, 2018).

Where for external challenges, the most significant challenges faced by the construction industry players was due to Lack of Government Support and Regulations. As explained by Khidir and Zailani (2009), there is limited institutional support for the ideas embodied in environmental management. Besides, there are not many efforts by the government regarding legislation and regulation with regards to environmental practice (Mathiyazhagan, 2013). It is not easy for an organization to change its organizational goals, forms of authority, core technology, and operational and marketing strategy (Khidir and Zailani, 2009). Amongst all of the variables, availability of green products and materials, and collaboration and management of the third party recorded the lowest mean score, which was 3.56.

## 5. Conclusion and Recommendations

Overall, the survey findings revealed that leadership and commitment from top management, changing mindset, and culture of the organization and lack of government support



**Figure 2:** Overall ranking of the mean score for challenges faced in implementing GSCM.

and regulations as the most critical challenges faced by the construction industry in GSCM implementation. However, other challenges identified in this research also need to be tackled systematically. The authors believe that the challenges found in the research together with their influence power will help practitioners to plan for appropriate actions to be taken and strategies to overcome those challenges and strengthen the activities involved in GSCM implementation. In doing so, Jabbour et al., (2017) suggested that all top leaders and managers be equipped with sufficient knowledge on GSCM practices and employed green concept in staff recruitment, training, performance evaluation, and rewards. This will help organizations to cultivate and institutionalize green culture and lead to the success of GSCM implementation. There is a need for coordination between all members involved in the construction chain beside industry leaders, governments, and consumers before the successful GSCM implementation. Besides that, with appropriate financial incentives like tax incentives and subsidies from the government, it will indirectly encourage and increase construction sustainability through the GSCM implementation. One of the measures for the government to ensure the implementation of GSCM as part of the construction standard is through the development of rules and regulations. This can be applied through a compulsory mandate of GSCM approach for public or government buildings. Ultimately, by reducing or eliminating the presence of these challenges will increase the level of success of GSCM implementation in the construction industry. This research can be further

enriched by including an in-depth study on the GSCM challenges through qualitative research.

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