

Green supply chain management practices and implementation in the construction industry

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ABSTRACT

This study aims to define and describe Green Supply Chain Management (GSCM) in the construction industry. GSCM is one of the most critical initiatives for integrating environmental factors into supply chain management. It aids in the reduction of carbon emissions and the improvement of organizational environmental performance. As a result, most construction organizations have included GSCM in their strategic planning. Barriers and problems are predicted to exist in the execution or operational process of GSCM in construction or building firms, as in the case of radical innovations. As a result, organizations must identify any potential hurdles to GSCM implementation and develop strategies for achieving success. This study undertakes a complete literature evaluation on GSCM procedures to address the difficulties of establishing a conceptual framework. According to the data, the biggest weaknesses or disorders to applying GSCM canister are divided into five categories: expertise, information and facts, funds, contract out, administration, and supervision. Moreover, uppermost managing commitment, varied in present strategies and know-hows, expanded consciousness of harmless to the ecosystem matters, preparing and instruction, and executing effective materials and waste administration frameworks are systems to improve GSCM performances in building organizations. To successfully implement GSCM in construction firms, the provided framework can be used to recognize the crucial mechanisms of GSCM and self-assessment of obstacles and policies.

Keywords: Green supply chain management, Sustainability, Green practices, Environmental management, Organizational performance

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1. Introduction

1.1 Background of the Study

With increased environmental concerns about global warming, regular asset exhaustion, energy usage, and other difficulties, the corporate climate faces a huge shift to address these issues (Rashid et al., 2024a). A few administrative and non-legislative protests have been held to shrink the control of enterprises happening in the atmosphere. A global government understanding was fixed as an excellent model. The signing states were asked to give legislation or specialized impetuses to organizations to incorporate green practices into their jobs at the Paris Environment Meeting (2015), which merged emissions, transformation, money, and transparency obligations. These green practices involve collaboration between providers, manufacturers, and clients within the inventory network to grow and get healthier than additional cost-effective resolutions intended for businesses (Rashid et al., 2022b).

The contributions of the construction industry to Pakistan's foundational strengthening have helped promote equitable financial development. Despite this, the development business has a major environmental impact. Project managers need compelling management frameworks to ensure that missions are finished on time and economically while also allowing them to track progress. Partners, on the other hand, require knowledge about the movement's development stream. Projects can be profitable by focusing on lean principles and reducing energy use and waste. The development sector's store network differs from that of the assembling business. However, to diminish or eliminate development failure, the fundamental issue of discontinuity must be addressed. The inventory network board is being utilized to boost the efficiency and precision of materials used in the ecosystem. Implementing eco-kindness into development initiatives aims to incorporate the notion of eco-kindness into all contact, from upstream to downstream and across the PLC phases (Hashmi et al., 2020b).

1.2 Problem Statement

The concept of GSCM is broad enough to be applied to various industries, but each has its own set of characteristics. The supply chain in the construction industry is more complex than in other industries because it involves a varied range of shareholders, including solid contractors, customers or users of the planners, services, and owners, all of whom are involved in some way through the mission. On the other hand, supply chain management geared towards the building trade can help improve efficiency and cut costs and time. According to Jeong and So (2020), a good construction supply chain is the outcome of methods that address the contrasts between a regular manufacturing supply chain and a construction supply chain. Hence, this study aims to determine the effect of internal environmental management and customer cooperation on organizational performance.

1.3 Research Questions

- a) To what extent does internal environmental management affect organizational performance?
- b) To what extent does cooperation with customers affect organizational performance?

1.4 Significance of the Study

The construction industry is one of the world's largest waste generators, and the idea of ecological sustainability in the building area gives help in a variety of ways, including trash lessening, carbon production lessening, improved material collection, and so on. Because these sectors include multiple stakeholders throughout a project's life cycle, using a Green Supply Chain Management (GSCM) canister aids in the sustainability of structures. The thought of green supply chain management remained successfully applied in added trades; though the creation trade needs unique characteristics that necessitate a unique operation technique, capturing into account the distinctions across the sectors, a thorough literature review was done to address this issue and determine in what way the perception

of green supply chain management may be used in the construction industry.

2. Literature Review

2.1 Theoretical Review

2.1.1 Internal environmental management

Internal environmental management includes cross-functional partnerships for environmental developments within the organization, total quality environmental management, and environmental obedience and auditing programs, all of which demand the commitment, support and care of middle and senior managers and environmental improvements. According to the researchers, managers' commitment to successful SCM inside the organization could go outside the SCM's success and result in the organization's success. They inspected how environmentally aware corporate management by middle- and upper-level officials may divide customer and government demand for environmentally friendly services, products, and processes (Jeong & So, 2020).

Internal environmental management is described as enhancing the environmental performance of an organization. Improving environmental performance requires top management support. Companies have widely embraced green supply chain management (GSCM), which integrates environmental concerns into supply networks to improve performance. According to several studies, GSCM can improve both environmental and economic performance. Companies have widely embraced green supply chain management (GSCM), which integrates environmental concerns into supply networks to improve performance. Several studies show that GSCM can improve environmental and economic performance (Zhu et al., 2017).

2.1.2 Cooperation with customers

The initiative for green supply chain management is client collaboration. It is a process-oriented viewpoint focusing on the various buyer relations in green supply chain management. The compression from customers acts as a major motivator intended for businesses to advance their ecological appearance and performance (Zhu et al., 2017). Customer green cooperation also allows a constructor to comply with various ecological standards popular in various marketplaces, thereby improving effective performance and attractiveness. A company canister includes a green philosophy in the design of distribution and transportation processes by partnering with customers to support environmental objects, lowering carbon emissions, wastewater, and hard wastelands, and feeding risky products in downstream supply chains (Huang et al., 2020).

2.1.3 Internal environmental management and organizational performance

Growing environmental consciousness presents businesses with ever-increasing hurdles. Many businesses prioritise environmental goals and engage in eco-design, sustainable sourcing, recycling, and remanufacturing activities as part of their Green Supply Chain Management (GSCM) strategy. These activities have a significant impact on competitiveness. According to certain studies, environmental management and organizational effectiveness are linked (Al-Sheyadi et al., 2019). The potential negative impact of a business on the environment through the usage and release of substances from/into the environment is known as organizational impact. Internal costs that directly impact a company's financial statement are referred to as organizational costs.

2.1.4 Impact of green supply chain management practices on organizational performance

Green supply chain techniques have been embraced in the hopes of having a good impact on a environmental and financial performance of the company, according to the findings of many researchers. According to the shareholder theory, shareholders are groups and individuals who can directly or indirectly influence a company's performance and/or are affected by its actions. According

to this, businesses generate externalities, which can lead to stakeholders placing pressure on corporations to reduce unwanted outcomes (Khan & Qianli, 2017).

2.1.5 Cooperation with customers and organizational performance

Customers or clients are the most important shareholders in the supply chain and are likely to put the burden on enterprises to eradicate any detrimental or negative effects of their operations. To put it another way, customers can influence company behaviour. Customer pressure is generally helpful in encouraging companies to implement green supply chain strategies. Customer cooperation directly and positively impacts organizational success (Khan & Qianli, 2017). Supply chain partners who work closely with green ideas and practices are more likely to be adopted and implemented by customers. As a result, this technique would aid in reducing the negative environmental impact of supply chain operations. Conversely, green supply chains embrace and implement green technologies that benefit their customers. Green products and commercial potential, for instance, healthier buyer collaboration in supply chains, create a win-win situation for addressing consumer expectations while boosting sustainability efficacy.

In order to create and strengthen green supply chains, senior management's commitment to sustainability and strong collaboration with supply chain partners are essential. This study defines top management commitment (TMC) as a firm's top management's concrete support for sustainable operations and practices. When a company's senior management encourages and implements sustainable practices with its supply chain partners, the supply chain gains the strategic power it needs to deliver triple-bottom-line results. (Burki et al., 2019)

2.2 Theoretical Model

Figure 1 below represents the theoretical framework.

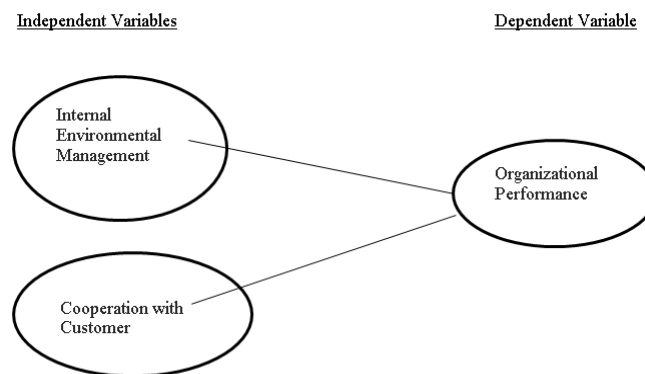


Figure 1: Theoretical Framework
Source: Author's creation with the support of literature

2.3 Empirical Review

GSCM is still a hot topic among academics. However, there are relatively few studies that look into GSCM techniques and implementation, particularly in Pakistan. Because environmental challenges are new and evolving in Pakistan, ongoing research is required to completely comprehend and update information in this field. Developing-country businesses, such as those in Pakistan, are still learning how to implement green supply chain management principles into their daily operations. As a result, the green supply chain encompasses a variety of actions, such as collaboration and coordination among businesses to reduce the logistical impact of material movements or data gathering on product features to ensure the success of operations. As a result, collaboration between organizations or partnerships is critical in developing a supply chain strategy and gaining a competitive edge. In other words, it is possible to argue that successful supply chain strategies and practices are contingent on each party's

integration. Considering this, it is feasible to identify several well-known aspects of GSCM practices. Environmental management in the supply chain can be defined as managing environmental activities or coordinating two or more firms (Rashid et al., 2024c; Hassan et al., 2016). Based on the literature, the following hypotheses are proposed:

H1: The effect of internal environmental management on organizational performance is significant.

H2: The effect of cooperation with customers on organizational performance is substantial.

3. Research Method

The research model for this study is detailed further down. In this study, the elements listed below were examined in depth. The study employed a post-positivist technique, gathering quantitative data via a deductive procedure and a questionnaire. A single-method approach was used to analyze the data (Rashid et al., 2021; Hashmi et al., 2021). A descriptive study was adopted based on the research objective. A questionnaire was used to assemble the study's information and facts (Rashid et al., 2024d).

3.1 Sampling

The study's target population is the construction industry's supply chain and other operational concerns. A minimum sample size of 100 is adequate (Rashid & Rasheed, 2023). However, this study collected 131 satisfactory and correct responses to outline the effect I am supposed to recognize through this research. It consisted of each male and female because it is better to use both genders for accuracy (Hashmi et al., 2020; Rashid, 2024b). The researcher used a random sampling methodology, in which sampled respondents are given an equal probability of being chosen for the study based on their company tiers (Amirah et al., 2024).

3.2 Instrument of Data Collection

Data collection is one of the most important aspects of research; similar to the spinal cord in the human body; it provides specific and vivid reasons to support the research or the problem's conclusion. Because the target population is manageable and readily available, random sampling was employed to collect data from various national and global organizations, including students. The data was evaluated using SPSS software to determine if the null hypothesis should be accepted or rejected (Rashid, 2016; Gandhi et al., 2017). The statistical series was a questionnaire with a Likert scale consisting of 5 points. With the help of this above-scale analysis of data, it became easier. The questionnaire was distributed through Google Docs (Rasheed et al., 2024; Rashid & Rasheed, 2024).

3.3 Statistical Technique

The results were obtained using the statistical software "SPSS," and a multiple-regression investigation technique was used for the analysis of this research (Rashid et al., 2023). It shows the cause-and-effect relationship between independent variables (IV) and dependent variables (DV), as well as the prediction of a change in one variable as a result of a change in another (Rashid et al., 2022a).

4. Results and Findings

In this chapter, we'll go over the descriptive characteristics of our data and audience, then use SPSS analysis to interpret the findings and test hypotheses to see if they're supported by the data. The data was collected from 131 respondents who are working in national and multinational organizations in order to extract the most variety in the data and extrapolate the findings to the general population. A total of 131 people responded to the survey via Google Form, as you can see in below table 1 among that 131 respondent 69.5 percent males and 26 percent females. And 36.6 percent have a Bachelor's

degree, 52.7 percent have a Master's degree, 3.1 percent have a Ph.D., and 7.6 percent have earned another degree.

Table 1: Demographic Profile of Respondents

Variable	Category	Frequency	Percentage
1. Gender	Male	91	69.5
	Female	40	30.5
	Total	131	100
2. Age	Less than 25	10	7.6
	25 to 30	48	36.6
	30 to 35	51	38.9
	35 to 40	16	12.2
	40 or above	06	4.7
Total		131	100
3. Education	Graduate	48	36.6
	Masters	69	52.7
	PhDs	04	3.1
	Others	10	7.6
Total		131	100

Source: SPSS output

4.2 Findings, Interpretation, and Summary

To obtain the results, the collected data was evaluated and processed. Regression was used in this study to determine how an independent variable affects a dependent variable.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Standard. Error of the Estimate
1	.406 ^a	.165	.151	.56325

a. Predictors: constant, CC, and IEM

Source: SPSS output

Table 2 indicates that 16.5% of the exact prediction of organizational performance (the dependent variable) is possible through internal environmental management and cooperation with customers (the independent variables) (Rasheed & Rashid, 2023).

Table 3: ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.995	2	3.998	12.601	<.001 ^b
	Residual	40.609	128	.317		
	Total	48.604	130			

a. Dependent Variable: OP

b. Predictors: constant, CC, and IEM

Source: SPSS output

The ANOVA table 3 suggests an F value of 12.601, which suggests the high significance of independent variables, and F statistics similarly elaborate that the model is significant (sig value < 0.05).

Table 4: Coefficients^a

Model		Unstandardized Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.106	.393		5.362	<.001
	IEM	.198	.083	.202	2.377	.019
	CC	.285	.082	.294	3.460	<.001

a. Dependent Variable: OP

Source: SPSS output

Table 4 shows the impact of independent variables on the dependent variable. Internal

environmental management and cooperation with customers (independent variables) significantly impact organizational performance (dependent variables) since the sig value is less than 0.05.

4.3 Hypotheses Assessment Summary

Table 5: Hypotheses Assessment Summary

S. No	Hypotheses	Empirical Conclusion
01	H1: The effect of internal environmental management on organizational performance is significant.	Accept
02	H2: The effect of cooperation with customers on organizational performance is substantial.	Accept

Source: SPSS output

5. Conclusion, Discussion, Limitations, and Recommendations

This chapter comprises a concluded result from the study and data collected from the population; it includes implications, discussion, limitations, and future research recommendations.

5.1 Conclusion

The building industry substantially enhances the built environment; nonetheless, operations impact the environment. Supply chain management (SCM) aims to make the building process more efficient by increasing project quality, cost, and timeliness. After the strategy stage, which involves cutting-edge selection and acquisition of resources for construction projects, Green SCM attempts to lessen environmental impact by choosing ecologically approachable materials. This study aims to apply GSCM concepts to the manufacturing and construction industries. A work analysis was carried out to learn from previous research into the operation of green supply chain management in the industrial sector and to use this concept to establish GSCM implementation criteria in the construction industry. Further research aims to improve the implementation of GSCM in construction plans by applying the industrial GSCM concept to the construction sector, with a few tweaks and changes based on manufacturing GSCM research. Applying GSCM to construction is expected to reduce unnecessary energy consumption and the negative environmental consequences of construction methods.

5.2 Discussion

Based on a literature review, this research has provided a framework for adopting GSCM in the construction industry. For environmental sustainability, the GSCM concepts are applied to manufacturing businesses. This approach is being applied to the construction industry in order to lessen the environmental impact of building. The researchers did a literature assessment of the GSCM idea in the manufacturing business in the early stages of the research and attempted to adapt the findings for application in the construction industry. Green Design, Green Materials Management, Green Construction Processes, Green Marketing Management, and Reverse Logistics are the five dimensions of GSCM in the construction sector. Each of these topics is a metric for measuring the sustainability of supply networks (Zhou & Shaikh, 2019)

5.3 Limitations and Recommendations

There are some limitations including, the data was collected only within the geographical location of Karachi. The study focused on only two independent variables. Lastly, the study faced difficulty finding related answers in the questionnaire due to a lack of knowledge.

Data collection errors may occur due to the questionnaire design; however, this error can be minimized by collecting data directly from the relevant supply chain specialists through face-to-face interviews. The data was only acquired in the Karachi area. It would be desirable to include data from additional Pakistani regions to widen the scope of the findings. We only looked at two independent variables in this study (internal environmental management and customer cooperation). However,

future researchers could expand on this work by including more independent variables to better understand the relationship between business performance and independent variables.

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