INTERNATIONAL JOURNAL OF SOCIAL SCIENCES BULLETIN
ISSN: (E) 3007-1917 (P) 3007-1909
Volume 3, Issue 3, 2025

EXPLORING THE IMPACT OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES ON ENVIRONMENTAL PERFORMANCE AND COMPETITIVE ADVANTAGE

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DOI: https://doi.org/10.5281/zenodo.14981540

Received	Revised	Accepted	Published
13 January, 2025	13 February, 2025	28 February, 2025	06 March, 2025

ABSTRACT

Environment-related issues have become a global concern due to which firms are considering sustainability. A key to achieving long-term development is understanding these issues. This research seeks to illuminate the effects of green supply chain management practices on firms' environmental performance and the impact that the relationship of the two has on competitive advantage. However, the study draws on the Resource-Based View (RBV) and Natural-Resource-Based View (NBV) theories to understand the interplay between the factors affecting the scope for improvement of internal environmental management practices.

For this study data was collected from 200 respondents through the convenience sampling method and quantitatively analyzed. The results imply that green supply chain management strategies should be adopted to promote internal environmental management. Firms implement effective GSCM practices to improve environmental performance to develop a competitive advantage in the marketplace. This study adds to understanding how such green practices can be integrated into an organization's core operation and emphasizes the importance of green practices in enhancing organizational growth as well as environmental sustainability. These practices enable firms to face environmental challenges in terms that will lead to long-term success and contribute to sustainable development.

Keywords: *Green supply chain, management, internal environmental, performance Competitive advantage, Green Manufacturing, Environmental Impact, FMCG, Pakistan.*

INTRODUCTION

Environmental impact has shaped the current supply chain concepts; such as green manufacturing and green supply chain management (GSCM). Global challenges like resource depletion, industrial waste, and climate change are on the rise, hence the urgency of practices that mitigate these challenges is necessary (Ahmed et al., 2024). Eco-friendly strategies are integrated into the supply chain stages which include procurement, production, packaging, and distribution to achieve sustainability and maximize organizational efficiency (Judijanto, Utami, & Harsono, 2024). As a vital element of GSCM, green manufacturing introduces environmentally relevant procedures into production systems, lowering waste and air contamination, and thus enhancing organizational sustainability (Bendig et al., 2023).

Recent advances in GSCM show new ways to enhance its effectiveness. Green Supply Chain Finance describes financing mechanisms and challenges, that can be adopted and supported by the organization to sustain green initiatives (Judijanto, Utami, & Harsono, 2024). In addition, integrating green human resource management with entrepreneurial orientation improves organizational capacity to achieve sustainability goals by matching resources and innovation at the

same time (Ahmed et al., 2024). Additionally, empirical results of green servitization approaches, conditional on ESG compliance, reveal how Industry 4.0 technologies substantially increase green supply chain performance (Kumar et al., 2024).

This study aims to determine GSCM's role in improving environmental performance and competitive advantage in the Pakistani food industry. It identifies key factors like green procurement, manufacturing, and distribution and investigates how internal environmental management (IEM) moderates them, helping to resolve some of the existing research gaps.

Literature Review

The Natural Resource View (NRBV) argues that an organization can develop a competitive advantage through green supply chain management (GSCM) practices such as waste reduction, sustainable resource utilization and control of pollution. In addition, these strategies are becoming more and more popular for two reasons: The primary reasons for environmental certification are to help make companies stand out over competitors, and secondly to take part in the booming demand for eco responsibility (Yildiz Cankaya & Sezen, 2018). The competitiveness advantages based on the use of resources, including eco-friendly practices, for reducing carbon emissions and increasing market standing (Hart, 2011) are in line with the theory of the RBV. Han (2020) explains that this research now shows that GSCM and environmental management both are required to achieve maximum resource efficiency, thus the company's competitiveness. As businesses endeavors to adopt sustainable practices, stakeholder theory helps us to understand how these businesses engages with their internal and external stakeholders. Companies are integrating GSCM strategies to improve these relationships and change their competitiveness (Yildiz Cankaya & Sezen, 2018).

Green supply chain management refers to practices that were intergrated to reduce waste, decrease pollution, reuse, recycle and resource for sustainability. The application of GSCM across all the operational stages of product design, marketing, logistics and manufacturing bases combines the environmental regulations with the making of operations more productive and profitable. While failure to adopt GSCM will eventually harm company reputation and market share, stakeholders play the role in convincing companies to do GSCM (Agustia, 2021). As technology rolls on GSCM is a differentiator and a vehicle through which to address the environmental challenges. Firms in the context of GSCM must therefore constantly evaluate and modify their GSCM strategy considering trade offs between economic, environmental and social responsibilities for the long term application (Yigit Kazancoglu et al., 2018).

In other words, it is very important for companies that work with global issues like climate change, pollution and any other depletion of the resources to pay enough attention to their environmental performance. Many firms have adopted GSCM and many of them have opted in sustainable sourcing, recycling, and eco design. In other words, such efforts can be at odds with short-term economic goals (Anwar Al Sheyadi, 2019). In the face of rising population growth and food waste, these challenges are going to be harder. To mitigate the resource depletion and sustain practices, governments (R Krishnan 2020; Shahla M Wonderlich 2018). In case of a company with GSCM, green initiatives such as the recycling and eco friendly design play a major role as key differentiators providing competitive advantage (Syed Abdul Rehman Khan, Umar Amin, Fareeda Zaman, 2020). Sidik (2019) and Samsul Alam (2019) research proved that organizations with a strong GSCM strategy perform well over the long term.

The link between IEM and making internal processes geared toward environmental objectives is made by it. The results indicate that IEM adoption increases customer perceptions, which organizations should adopt IEM to satisfy growing market demand for eco-friendly products with sustainability awareness increasing (LEE, 2020).

Products that lessen environmental harm are green procurement. Not only does this respond to consumer demand that organizations respond to but also it drives down costs to the organization, reduces costs, increases efficiency and ultimately means profitability. Appolloni (2014) and Famiyeh (2018) showed that green procurement is more effective only when it is combined with GSCM strategies.

Hypothesis 1: The positive influence of green procurement on environmental performance can be observed.

Hypothesis 2: The relationship between green procurement and environmental performance is moderated by IEM.

Green design stresses the production of items that generate little or no waste and can be recycled. Design processes are aligned with environmental goals by the managers, resulting in combined environmental and economic outcomes. Eco–friendly design is essential and its implementation is encouraged as a result of consumer demand and regulatory pressure (Yang Liu, 2018; Muhammad Umar, 2022).

Hypothesis 3: Positive environmental performance emerges from green design.

Hypothesis 4: The relationship between green design and environmental performance is moderated by IEM.

Green manufacturing reduces waste, prevents pollution, and recycles resources. Green manufacturing is incorporated with lean techniques to be more efficient and confirms that green manufacturing increases environmental performance and sustainability (Amine Belhadi Sachin, 2020; Marcos Diesta, 2019).

Hypothesis 5: Positive impacts on environmental performance are associated with green manufacturing.

Hypothesis 6: The relationship between green manufacturing and environmental performance is moderated by IEM.

Customer collaboration is a must in promoting eco-friendly products. A customer's willingness to engage through purchase behavior and feedback greatly improves environmental performance when such engagement is incentivized to implement sustainable practices (Yaw Agyabeng, 2020; Melander, 2018).

Hypothesis 7: A positive influence of customer cooperation with environmental concerns on environmental performance is observed.

Hypothesis 8: IEM has a positive influence on Environmental Performance.

Hypothesis 9: Environmental Performance has a positive influence of Competitive Advantage.

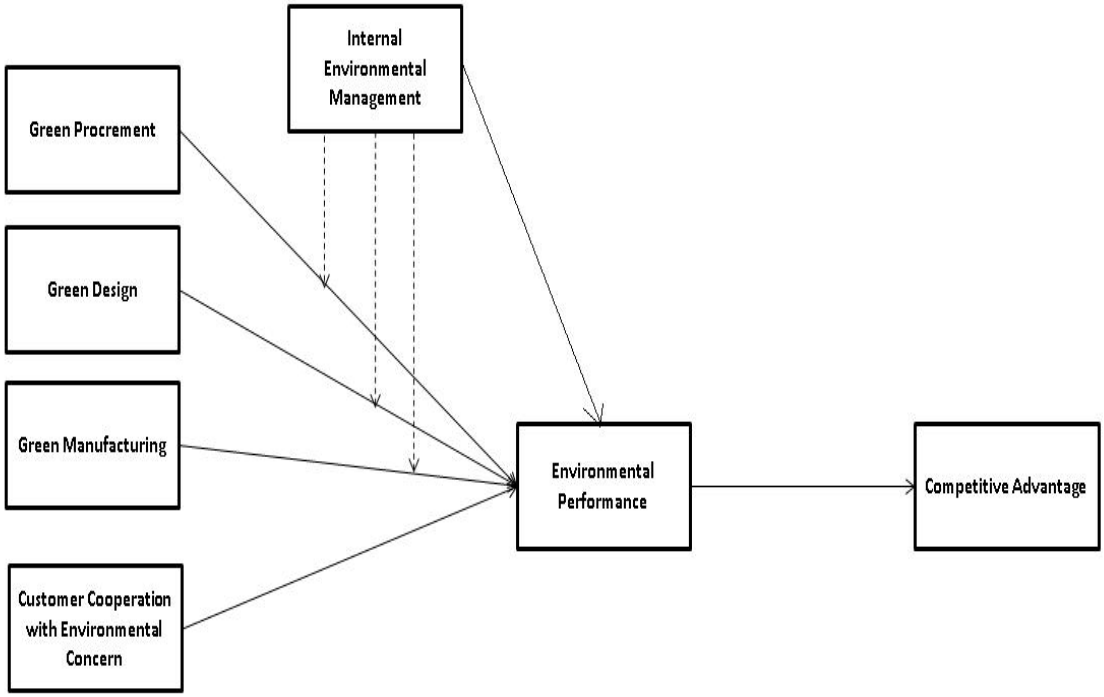

Figure 1 Conceptual Framework
Source: (Aslinda, 2016; Cankaya & Sezen, 2019; Uddin, 2021)

Methodology

This research aimed at studying the relationship between social interaction and green procurement with an emphasis to the impact of Green Supply Chain Management (GSCM) practices in enhancing competitive advantage. By making

product quality the basis of whether the product is green and making green procurement an opportunity to enhance environmental performance, companies may derive financial benefits (Martin, 2019). This study directly studied the impact of GSCM practices on the firm's variables: investments, operational cost, employee, supplier and customer and indirectly examined how the impact of GSCM practices on competitive advantage.

Statistical analysis is used as a quantitative approach to research which enables us to conclude from numerical data (Gorard, 2013). All this follows what was a correlational type of research design in which books were attempted to be examined in relation to independent and dependent variables to see if the effects are positive or negative, direct or indirect (Gorard, 2013).

Structured questionnaires were distributed to individuals from firms in the FMCG sector like EBM, LU, and Hilal, and data was collected. The participants were chosen via a judgmental sampling technique based on their expertise in green supply chain management so as to be relevant to the study. A sample size of 500 individuals enabled us to have adequate data for analysis.

The study used the statistical tools of mean, median, and standard deviation for data analysis and SPSS for processing grouped and ungrouped data. In addition, Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS software was employed in order to conduct robust regression analysis and construct latent variables as has been used in prior studies (Aslinda, 2016; Cankaya & Sezen, 2018).

Data Analysis

Table 1 Respondent Profile

Categories	Frequency	Percentage
Gender		
Male	101	50.5%
Female	99	49.5%
Age		
20-30	50	25%
31-40	104	52%
41 & above	46	23%
Qualification		
Bachelors	60	30%
Masters	94	47%
Post Masters	46	23%
Job Role		
General Managers	50	25%
Managers	90	45%
Executives	60	30%
Sample Size	200	100%

Table 1 shows the distribution of the respondents according to gender, age, qualification, and job role. It is quite gender equal (50.5%), though with a slight male majority. A mature workforce is reflected in the fact that the majority (52%) of the age group is 31-40 years. Respondents are well educated: 47% have a Master, which is the most numerous. On the job roles front, 45% are managers; 30% are executives; 25% are general managers; and 5% are CEOs. This study is conducted based on a sample size of 200 respondents to represent a wide scope of experiences and expertise in green supply chain management.

Table 2 Outer loadings

	CA	CoEC	EP	GD	GM	GP	IEM	Moderator GD -> EP	Moderator GMFG -> EP	Moderator GP -> EP
CA1	0.897									

CA2	0.926								
CA3	0.911								
CoEC1		0.894							
CoEC2		0.842							
EP1			0.812						
EP2			0.816						
GD1				0.861					
GD2				0.889					
GD3				0.901					
GM1					0.892				
GM2					0.844				
GP2						0.877			
GP3						0.877			
IEM1							0.844		
IEM2							0.895		
IEM3							0.891		
GD * IEM								1.462	
GMFG * IEM									1.456
GP * IEM									1.405

Outer loadings help to indicate how well items represent ıcturing, Green Procurement, and Internal the constructs and a threshold of 0.70 is used for ınmental Management, pass, confirming model acceptance. By exceeding this threshold all variables ty. There are also moderating effects that exceed including Competitive Advantage, Customer Cooperation, Environmental Performance, Green Design, Green

Table 3 Convergent Reliability

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
CA	0.898	0.936	0.831
CoEC	0.777	0.860	0.754
EP	0.792	0.797	0.663
GD	0.860	0.915	0.781
GMFG	0.676	0.860	0.754
GP	0.700	0.870	0.769
Internal Environmental Management	0.851	0.909	0.769
Moderating Effect GD-EP	1.000	1.000	1.000
Moderating Effect GMFG-EP	1.000	1.000	1.000
Moderating Effect GP-EP	1.000	1.000	1.000

Results for Cronbach's alpha, composite reliability, and AVE are reported in Table 3. The Cronbach's alpha, composite reliability, and AVE for all variables (competitive advantage, customer cooperation, and environmental management) were all above 0.60, 0.70, and 0.50, respectively, indicating good internal consistency and variation.

Table 4 Discriminant HTMT

	CA	CoEC	EP	GD	GMFG	GP	IEM	Moderator GD-EP	Moderator GMFG-EP	Moderator GP-EP
CA										
CoEC	0.480									
EP	0.772	0.844								
GD	0.459	0.827	0.824							
GMFG	0.586	0.753	0.867	0.854						
GP	0.529	0.736	0.766	0.882	0.857					
IEM	0.498	0.760	0.843	0.766	0.853	0.842				
Moderator GD-EP	0.430	0.503	0.693	0.499	0.545	0.559	0.438			
Moderator GMFG-EP	0.420	0.646	0.739	0.486	0.661	0.550	0.420	0.844		
Moderator GP-EP	0.444	0.501	0.721	0.522	0.572	0.592	0.461	0.884	0.843	

HTMT is a measure of discriminant validity, and a cutoff value of 0.90 is considered to show good uniqueness between the variables. All the HTMT values in this study were less than 0.90, which means that the variables are sufficiently different from each other and have good discriminant validity.

Table 5 Bootstrapping

	P Values
CoEC -> EP	0.574
GD -> EP	0.046
GMFG -> EP	0.041
GP -> EP	0.907
EP -> CA	0.000
IEM -> EP	0.050
Moderating Effect GD-EP	0.899
Moderating Effect GMFG-EP	0.283
Moderating Effect GP-EP	0.589

In table 5, the P values for relationships of different factors with Environmental Performance (EP) and the moderating effect of Internal Environmental Management (IEM) are shown.

The P-value (0.907) of Hypothesis 1 (Green Procurement's relationships with EP) ensures that there is no positive influence of Green Procurement on EP in this study. In Hypothesis 2 (Moderating effect of IEM on Green Procurement-EP), it was found that IEM does not significantly moderate this relationship, as IEM has a T-test P-value of 0.589.

The hypotheses have been cast to test whether the dependent variable (EP) is influenced by the independent variable (Green Design) and the results are as follows (Hypothesis3 has a P-value of 0.041, supporting a positive relationship). Hypothesis 4 (Moderating effect of IEM on Green Design-EP) does not show any significant moderation (P = 0.283).

The significance of the P-value of 0.041 supports Hypothesis 5 (relationship between EP and Green Manufacturing). Hypothesis 6 (IEM moderating this relationship) however receives a P value of 0.899 indicating that there is no moderating effect. Hypothesis 7 (Customer cooperation's effect), however, is not statistically significant (P = 0.574). The effect of IEM's on EP is marginally significant

(P = 0.050), Hypothesis 8. However, for hypothesis 9 (EP on CA) the results show strong support with a P-value of 0.000, confirming the positive influence on Harnessing the Effectiveness of EP on Competitive Advantage.

Discussion

The result showed that customer cooperation is positively related to not only competitive advantage but also environmental performance, and therefore, the null hypothesis was rejected. However, the result harmonizes with the results of studies done by Uddin (2021), Aslinda (2016), Yildiz Cankaya & Sezen (2018), and Zhang Yu (2018).

Similarly, the rejection of the null hypothesis is also found between competitive advantage and environmental performance. This result matches the insights of Kumar Singh (2019), P. Rao (Do green supply chains lead to competitiveness and economic performance?), and Hermundsdottir (2022).

This leads us to accept the null hypothesis that the variable green design does not have a significant effect on competitive advantage and environmental performance. This finding accords with Zameer (2020) and Rehman (2021).

The null hypothesis that green manufacturing does not affect either competitive advantage or environmental performance is accepted. This is what Khawaldah (2022) and Belhadi (2020) also find.

Similarly, we see that green marketing shows a negative relationship with competitive advantage, environmental performance; and therefore we accept the null hypothesis. Also, Shauqat 2022; Nyilasy 2013 support this relationship.

The analysis of the variable green procurement reflects no significant impact on competitive advantage or environmental performance, so, the null hypothesis is accepted. This is in line with Sharabati (2021) and Joshi (2015).

On the other hand, internal environmental management enjoys a positive relationship with all the variables in the study which are a competitive advantage, customer cooperation, environmental performance, green design, green marketing, green manufacturing, and green procurement. This means that the null hypothesis is not accepted and is in agreement with the studies of Chin (2020) and Sun (2022).

Conclusion

Supply chain management (SCM) is the midwife to make the organization attractive to customers and offer many benefits to the company. This research contributes to the development of the theory of Green Supply Chain Management (GSCM) by exploring the relationships between IEM practices and environmental performance, and also between IEM practices and competitive advantage. This study focuses on how the dimensions of the GSCM influence environmental performance. These findings help managers guide them through a selection of appropriate practices that work as an improvement of their firms' competitiveness and market positions.

The moderating effects of variables with intervening variables are also investigated in the research. The data on the desired relationships was collected through a questionnaire. The study hypothesizes that IEM has a positive relationship with the selected variables and that this relationship existed also in the foundational study of Cankaya & Sezen (2019).

In supporting the study's conclusions, it is found that GSCM practices positively influence environmental performance which in turn improves environmental outcomes. However, it seems that the IEM practices do not significantly affect the individual effects of green supply chain management practices toward competitive advantage and environmental performance.

These results provide practitioners in manufacturing and strategic management with important insights. However, as the global community faces damage from plastic and a waste product in general, many companies, especially companies in developing countries, need to improve their environmental performance. According to Hart (1995), businesses cannot ignore the concerns of the environment if they desire long-term profitability. The adoption of successful practices to enhance the internal environmental management of a firm is emphasized in this study.

The evidence provides managers with evidence of the benefits of competitive advantage and how environmental performance can be improved. However, the design and implementation of the GSCM strategy can be complicated, given that implementing green supply chain practices may lead to increased costs for some products which

may result in loss for the firm. In contrast, other items, including investment, operational, training, and procurement costs could have yielded cost savings. Thus, managers need to do a cost-benefit analysis carefully.

Environmental performance is an essential aspect of a firm's development; however, the link between competitive advantage and environmental performance may not be straightforward. A majority of companies often don't have the drive to move into green processes (Lisi Wei, 2020). Han (2020) highlighted how corporations claim they are embodying green practices on paper only, and not in reality. Internal environmental management therefore leads to improved environmental performance in a firm. Managers need to create strategies that will improve the firm's sustainability.

Despite the robustness of this research, several limitations exist encouraging future studies. Initially, there was data collection only from one city, Karachi, and only for Farma cons groups of FMCG companies. Such an approach, however, might miss the big picture in the environmental performance vs competitive advantage relationship. These relationships could be further investigated by future researchers using other methods.

In addition, this research opens doors to look into other dimensions (e.g., those concerning the economic and social performances of firms). Further, future studies could investigate other green supply chain practices and their effect on environmental outcomes improvement.

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