

IMPACT OF GREEN HUMAN RESOURCE MANAGEMENT ON SUSTAINABLE PERFORMANCE WITH THE MEDIATING ROLE OF GREEN SUPPLY CHAIN MANAGEMENT

Noorulain Waheed

Lecturer, University of Education,
Lahore (Multan Campus), Pakistan.
noorulain.waheed@ue.edu.pk
Ph.D. Scholar NCBA&E Multan, Pakistan.
Email: noorulain.waheed@gmail.com

Adeel Akhtar

Professor, Bahuddin Zakariya
University, Multan, Pakistan
Email: dradeelakhtar@yahoo.com

ABSTRACT

This paper aims to propose that green human resource management (GHRM) can be a potential source for enhancing the sustainable performance (SP) of organization with the mediating role of green supply chain management (GSCM). Four dimensions of GHRM practices are bootstrapped on the three dimensions of SP. Data collected from the different hospitals of Punjab, Pakistan by including 200 usable questionnaires. For data analysis and interpretation Smart PLS was used. The results indicated a strong and statistically significant positive effect of GHRM on SP underscoring the idea that sustainable practices are affected by GHRM and mediated by GSCM.

Keywords: Green HRM, green SCM, sustainable performance

Introduction

In recent times, environmental sustainability has become an important priority for businesses worldwide due to increasing regulatory pressures, stakeholder expectations, and the urgent need to combat climate change (Renwick et al., 2021). Nowadays, businesses are fitting in sustainability into their core functions, such as supply chain management (SCM) and human resource management (HRM). Emerging construct GHRM is aligning the HR practices along with environment sustainable goals, focusing on employee engagement, training, and performance management to foster eco-friendly behaviors (Yong et al., 2021).

Similarly, GSCM plays a vital role in ensuring sustainable business performance by incorporating environmentally responsible practices in procurement, production, and logistics (Zhu et al., 2022). While previous plethora of studies inspected the direct effects of GHRM on organizational performance, there is limited research on how GSCM mediates this relationship (Pham et al., 2023). Understanding this mediating

mechanism is crucial for businesses aiming to enhance their sustainability performance through effective HR and supply chain strategies.

Despite growing awareness of GHRM and GSCM, many organizations struggle to achieve sustainable performance due to a lack of integration between these two functions (Jabbour et al., 2021). Existing research primarily focuses on the direct relation of GHRM on environmental performance, neglecting the mediation role of construct GSCM (Kim et al., 2022). This gap limits the understanding of how HR practices influence supply chain sustainability and, ultimately, overall business performance. Additionally, most studies have been conducted in developed economies, leaving a research gap in developing countries where sustainability adoption is still evolving (Mousa & Othman, 2023). This study intends to focus on following

Research objectives:

To examine Green HR impact on Sustainable Performance.

Investigate Green SCM as a mediator in the relationship between GHRM and SP.

Provide practical recommendations for organizations to boost sustainability through integrated GHRM and GSCM practices.

This study makes multiple contributions to business practices and scholarly literature.

Theoretical Contribution: It extends the existing literature by exploring the mediating role of GSCM in the GHRM-SP relationship, providing a more comprehensive understanding of sustainability mechanisms (Tang et al., 2023).

Practical Implications: Organizations can use the findings to develop integrated HR and supply chain strategies that enhance sustainability performance (Daily & Huang, 2021). **Policy Implications:** Policymakers can encourage businesses to adopt GHRM and GSCM practices through incentives and regulations (Al Kerdawy, 2022). By addressing these aspects, this study aimed to bridge the gap between HR and supply chain sustainability, offering valuable insights for businesses striving for long-term environmental and economic success.

Literature Review and Hypothesis Development

2.1 Green Human Resource Management (GHRM) and Sustainable Performance

GHRM) are the use of HR practices to implement eco-friendly policies in hiring, employee engagement, training and, performance management, and to help the environment (Renwick et al., 2021). GHRM practices encourage employees to take part in sustainability projects, which makes the environment better (Yong et al., 2021). Research shows that GHRM can help organizations be more environmentally friendly by creating a green culture, cutting down on waste, and making better use of energy (Jabbour et al., 2021).

First-hand research supports the positive relationship between GHRM and SP. For example, Kim et al. (2022) found that companies implementing green recruitment and training programs reported higher sustainability outcomes. Similarly, Pham et al. (2023) demonstrated that GHRM practices, such as eco-friendly reward systems,

significantly contribute to long-term environmental and financial performance. Based on these findings, the first hypothesis proposed is:

H1: Green Human Resource Management (GHRM) has a positive impact on Sustainable Performance.

2.2 The Mediating Role of Green SCM

Green SCM is considering environment as a pivotal concern of supply chain, such as green buying, sustainable production, and eco-friendly logistics (Zhu et al., 2022). GHRM can have an effect on GSCM by teaching employees about the environment and giving them the knowledge they need to use sustainable supply chain procedures (Al Kerdawy, 2022).

Several studies highlight the mediating role of GSCM in sustainability performance. For instance, Tang et al. (2023) found that GHRM enhances GSCM practices, which in turn improve overall sustainability outcomes. Similarly, Mousa and Othman (2023) argued that employees trained in sustainability are more probable to support green procurement and waste reduction initiatives, strengthening the supply chain's environmental performance. Thus, the following hypotheses are proposed:

H2: GHRM posits a positive influence on GSCM.

H3: GSCM has a positive impact on SP.

H4: GSCM play mediating role in the relationship between Green Human Resource Management and Sustainable Performance.

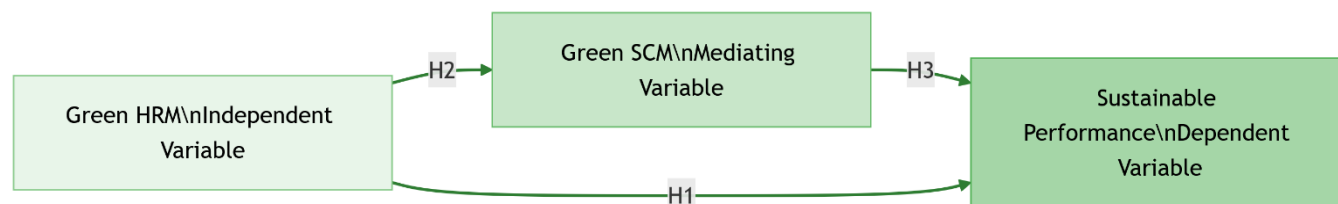
Research Framework

Current study is grounded in two key theories:

Resource-Based View (RBV) Theory: As per RBV, companies can get an edge in the market by making use of their distinctive assets, such as green HR practices and sustainable supply chain strategies (Barney, 1991). GHRM and GSCM act as valuable resources that enhance long-term sustainability performance.

Ability-Motivation-Opportunity: AMO theory explains how HRM practices improve performance by implying employees' abilities, motivation and opportunities (Appelbaum et al., 2000). GHRM fosters employees' green skills (ability), incentivizes eco-friendly behavior (motivation), and a supportive workplace (opportunity), which collectively improve GSCM and sustainability outcomes.

Conceptual Model



GHRM (IV) → Sustainable Performance (DV)

GHRM (IV) → GSCM (Mediator)

GSCM (Mediator) → Sustainable Performance (DV)

Materials and Methodology

Data Collection and Sample

The context of the study focused on hospitals in Multan, Pakistan, and required data was collected from employees working in administrative and operational departments involved in sustainability and supply chain functions. More than 300 questionnaire were distributed out of which 200 usable questionnaire were included in this study.

Data analysis method

For the examination of the proposed research model, PLS-SEM was utilized with Smart PLS 4 software. This method was chosen for its appropriateness in complicated models with several components and mediating variables, as well as its efficacy in managing data that may not conform to the assumptions of multivariate normality. The research model investigated the influence of GHRM on SP, with GSCM serving as a mediating variable. The data analysis procedure comprised two parts. The initial phase was assessing the measurement model for the validity and reliability of the constructs. The outer loadings results, with values beyond 0.70 considered acceptable, confirmed the reliability of the indicator. Composite reliability (CR) was employed to assess internal consistency, with CR values over 0.70 signifying strong dependability. A threshold value of 0.50 was employed to demonstrate convergent validity by average variance extracted (AVE). Both concepts satisfied the Fornell-Larcker criterion for discriminant validity, defined as a value below 0.90.

Subsequent to the examination of the measurement model, the structural model was reviewed to examine the proposed relationships. This entailed computing the route coefficients and assessing their statistical significance via a bootstrapping process with 5,000 resamples. The model's explanatory power was assessed using the coefficient of determination (R^2), and effect sizes (f^2) were analyzed to measure the contribution of each independent variable. The predictive relevance (Q^2) was computed utilizing the blindfolding procedure to verify the model's predictive efficacy. The mediating effect of GSCM was evaluated by analyzing the significance of indirect effects through the bootstrapping method, with mediation being significant if the confidence interval of the indirect effect excluded zero.

Robustness and reliability of the results was ensured by the comprehensive results, allowing for valid conclusions regarding the role of GHRM in enhancing sustainable performance through the mediation of GSCM in the hospital sector of Multan.

Results

The constructs' reliability and validity were assessed using multiple indicators. Table 1 illustrates that all constructs had exceptional internal consistency. Cronbach's alpha scores varied from .843 (SP) to .956 (GSCM), surpassing the suggested minimum of .70. The composite reliability (CR) values were elevated, ranging from .883 to .966, hence affirming internal consistency reliability. Convergent validity was affirmed, as all constructs exhibited Average Variance Extracted (AVE) values beyond .50; GHRM=.823, GSCM=.849, and SP=.607.

Table 1

Reflective constructs	Items	Factors Loading	CA	CR(rho _c)	(AVE)
GHRM	Our company integrates environmental considerations into HR policies.	0.928	0.946	0.959	0.823
	Employees receive training on environmental sustainability.	0.868			
	We comply with all environmental regulations and policies.	0.911			
	Our recruitment process prioritizes environmentally conscious candidates.	0.891			
	Incentives are given for environmentally friendly behaviors.	0.936			
GSCM	Our company ensures suppliers follow environmental regulations.	0.901	0.956	0.966	0.849
	Green logistics and waste management are integrated into supply chain practices.	0.898			
	We prioritize suppliers with eco-friendly policies.	0.940			
	Supply chain decisions consider carbon footprint reduction.	0.928			
	We have sustainable procurement strategies in place.	0.940			
SP	Our company has improved environmental performance through green practices.	0.680	0.843	0.883	0.607
	We have reduced waste and emissions significantly.	0.653			
	Green initiatives have led to	0.927			

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	better financial performance.				
	Sustainable practices have enhanced our brand reputation.	0.687			
	We comply with all environmental regulations and policies.	0.903			

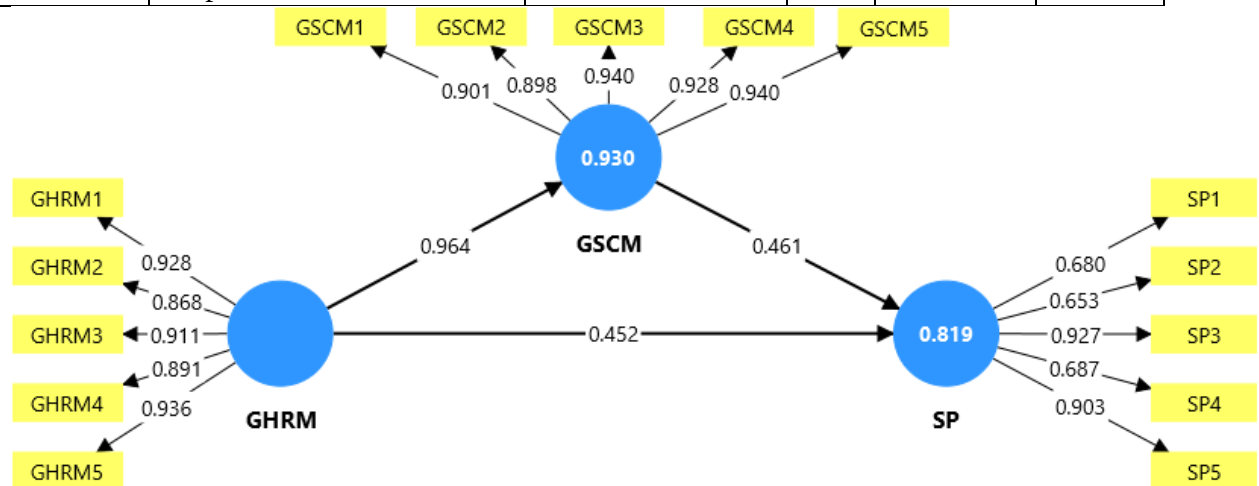


Figure 1: PLS Measurement Model Output

The measurement as well as the structural model was evaluated in this work using Smart PLS 4 and (PLS-SEM). The analysis was conducted in a two-stage process which also involved testing hypotheses and doing mediation analysis.

Table 2: Discriminant Validity through Fornell- Larcker criterion

	GHRM	GSCM	SP
GHRM	.907		
GSCM	.964	.922	
SP	.897	.897	.779

In order to determine discriminant validity, the Fornell-Larcker criterion was used. The square root of AVE for each construct (diagonal values) was higher than the correlations with other constructs (off-diagonal values), indicating discriminant validity. As an example, compared to its correlations with GSCM (.964) and SP (.897), GHRM's square root of AVE (.907) was higher.

Table 3: Path Coefficient and Significance Testing

	Original sample	Sample mean	Standard deviation	T statistics	P values	VIF

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GHRM -> GSCM	.964	.965	.011	83.908	.0000	1.000
GHRM -> SP	.452	.446	.224	2.017	.044	14.260
GSCM -> SP	.461	.471	.225	2.047	.041	14.260

The structural model was evaluated by examining the path coefficients, their significance levels, and the model's explanatory power (R^2 values). As shown in Table 2, the relationship between Green Human Resource Management (GHRM) and Green Supply Chain Management (GSCM) was strong and statistically significant ($\beta=.964$, $t=83.908$, $p<.001$). GHRM also had a significant direct effect on Sustainable Performance (SP) ($\beta=.452$, $t=2.017$, $p=.044$). Furthermore, GSCM significantly influenced SP ($\beta=.461$, $t=2.047$, $p=.041$).

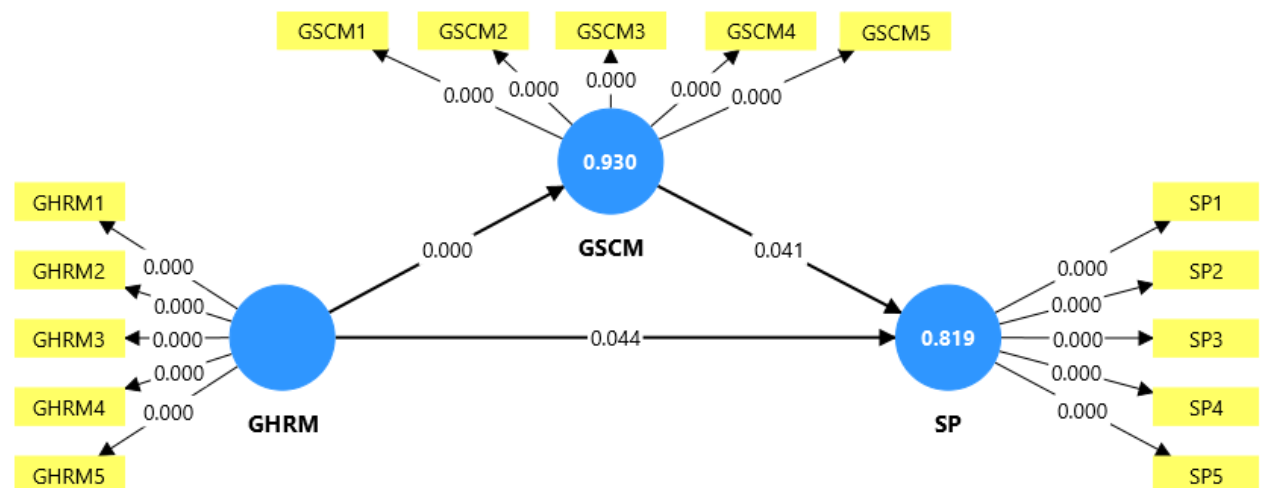


Figure 2: PLS Structural Model Output

Table 4: Coefficient of Determination (R^2)

Construct	R^2 Value	R^2 Adjusted	Interpretation
GSCM	.930	.929	Substantial explanatory power
SP	.819	.816	Substantial explanatory power

Interpretation follows Hair et al. (2021): R^2 values of .75, .50, and .25 are considered substantial, moderate, and weak respectively. The coefficient of determination (R^2) for GSCM was .930, indicating that 93% of the variance in GSCM is explained by GHRM. Similarly, the R^2 for SP was .819, meaning that 81.9% of the variance in Sustainable Performance is accounted for by GHRM and GSCM, reflecting strong explanatory power in the model.

Table 5: Hypothesis Testing Results

Hypothesis	Path	β (Coefficient)	t- value	p- value	Results
Hypothesis1	GHRM $\rightarrow$ GSCM	.964	83.908	.000	Supported
Hypothesis2	GHRM $\rightarrow$ SP	.452	2.017	.044	Supported
Hypothesis3	GSCM $\rightarrow$ SP	.461	2.047	.041	Supported
Hypothesis4	GHRM $\rightarrow$ GSCM $\rightarrow$ SP	.451	2.046	.001	Supported

The structural model results revealed that all hypothesized relationships in the study were statistically significant, thereby supporting the proposed model. Specifically, the relationship between Green Human Resource Management (GHRM) and Green Supply Chain Management (GSCM) was found to be very strong and highly significant ($\beta=.964$, $t=83.908$, $p<.001$), indicating that hospitals that adopt green HRM practices are highly likely to implement green supply chain strategies. This finding supports Hypothesis 1 and emphasizes the critical role that HRM plays in driving environmental initiatives across the supply chain.

Additionally, GHRM was shown to have a significant direct effect on Sustainable Performance (SP) ($\beta=.452$, $t=2.017$, $p=.044$), thus supporting Hypothesis 2. This suggests that green HRM practices, such as eco-friendly training, performance appraisals, and employee involvement in sustainability, contribute positively to the hospital sector's overall sustainability outcomes, including economic, environmental, and social performance.

Moreover, GSCM also had a significant positive effect on SP ($\beta=.461$, $t=2.047$, $p=.041$), thereby supporting Hypothesis 3. This implies that adopting green supply chain practices—such as green procurement, waste reduction, and reverse logistics—enhances the sustainable performance of healthcare organizations. Collectively, these results confirm that both green HRM and green supply chain initiatives are essential strategic levers in improving sustainability outcomes in the hospital sector. GSCM plays a mediation effect ($\beta=.451$, $t=2.046$, $p=.001$) in GHRM and SP relationship. So, our fourth hypothesis is also supported.

The strong and significant relationships among the variables also suggest the potential mediating role of GSCM between GHRM and SP. While the direct and indirect effects need to be further examined for full mediation analysis, the results thus far highlight that hospitals aiming to enhance their sustainable performance should invest in both green HRM and supply chain practices to achieve optimal results.

DISCUSSION AND CONCLUSION

The study purpose was to examine the impact of Green Human Resource Management (GHRM) on Sustainable Performance (SP) in the hospital sector of Multan, with Green Supply Chain Management (GSCM) acting as a mediating variable. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), the findings confirmed the hypothesized relationships and provided meaningful insights into the role of green practices in healthcare management.

Strong and statistically significant positive effect of GHRM on GSCM ($\beta=.964$, $p<.001$) was observed in the current study, underscoring the idea that internal human

resource strategies have a substantial influence on environmental supply chain initiatives. This aligns with previous studies emphasizing the strategic alignment between HRM practices and organizational environmental goals (Renwick et al., 2013). Hospitals that engage employees through green training, eco-conscious performance appraisals, and sustainability-oriented HR policies are more likely to adopt green procurement, waste reduction, and eco-design across their supply chains. Furthermore, GHRM also exhibited a significant direct effect on Sustainable Performance ($\beta=.452$, $p=.044$), confirming that environmentally conscious HR strategies contribute to enhanced environmental, social, and economic outcomes in healthcare organizations. This supports the argument that human capital is a vital enabler of sustainability in service industries, particularly in sectors like healthcare where resource efficiency and environmental sensitivity are increasingly important.

In addition, the positive relationship between GSCM and Sustainable Performance ($\beta=.461$, $p=.041$) suggests that green supply chain initiatives play a direct role in improving sustainability outcomes. This is consistent with findings in manufacturing and logistics sectors (Zhu & Sarkis, 2004) and extends their relevance to the healthcare context. Hospitals that integrate sustainability into their procurement, logistics, and waste management processes are more likely to achieve sustainable growth, compliance, and social trust.

The high R^2 values for GSCM (.930) and SP (.819) indicate that GHRM and GSCM together explain a substantial proportion of the variance in sustainable performance, demonstrating the strong predictive power of the model. This highlights the importance of aligning HRM and supply chain strategies for organizational sustainability, especially in resource-sensitive sectors like healthcare.

This study provides empirical evidence for the critical role of Green Human Resource Management in enhancing Sustainable Performance, both directly and indirectly through Green Supply Chain Management. The results suggest that hospitals in Multan and potentially in broader contexts can benefit from integrating green practices into both human resources and supply chain functions. Doing so not only supports environmental goals but also contributes to the overall sustainability of healthcare institutions.

The findings contribute to the growing body of literature on sustainability in service industries by confirming the importance of internal organizational drivers, such as GHRM, in influencing external operational outcomes like GSCM and sustainable performance. For hospital administrators and policymakers, this study offers practical insights into where investments in green initiatives can yield the greatest returns.

Future research could expand this study by including additional mediators (e.g., green innovation), testing the model in different regional or industrial contexts, or employing longitudinal data to assess causality over time. Additionally, qualitative methods could further enrich the understanding of how green practices are implemented and perceived by employees within the healthcare sector.

Recommendations and Limitations

In light of the current study finding several useful recommendations could be proposed to boost the applicability of the sustainable performance in the hospital sector. First, healthcare institutions, particularly hospitals in Multan, should

institutionalize Green Human Resource Management (GHRM) practices. These include implementing green training programs, environmental performance appraisals initiatives, and involving employees in sustainability agenda. Such practices not only improve environmental awareness but also cultivate a culture that supports sustainable development. Second, hospital administrators should strengthen the alignment between human resource functions and supply chain operations. This can be achieved by encouraging interdepartmental collaboration and establishing green performance incentives, which collectively support the integration of Green Supply Chain Management (GSCM) into the broader strategic goals of the organization.

Moreover, investments should be made in GSCM infrastructure, including eco-friendly procurement systems, waste management technologies, and regular training sessions to ensure the workforce is well armed with abilities, skills and knowledge needed for sustainable supply chain practices. Policymakers and regulatory bodies also have a role to play; they should offer support through policy guidelines, training subsidies, and performance-based incentives to encourage the implementation of green practices in healthcare settings. Lastly, hospitals should promote environmental awareness and employee engagement by initiating internal communication campaigns and participatory programs that involve staff in sustainability-related decision-making. These efforts can enhance employee commitment and contribute to a more comprehensive and effective implementation of green strategies.

Current research finding provides significant insights into the interrelationship between GHRM, GSCM, and Sustainable Performance (SP), but it is not without limitations. One primary limitation is the geographic scope of the research, which was confined to the hospital sector in Multan, Pakistan. Consequently, generalizability is confined to the specific geographical location. Future research should consider expanding the geographic and sectoral coverage to improve the external validity of the model. Additionally, to enhance the causality of the studied variables longitudinal studies are recommended instead of cross sectional research design.

The reliance on self-reported data through questionnaires is another limitation, as it may introduce common method bias or social desirability bias. Although statistical techniques can partially control for such biases, future studies could incorporate qualitative methods or triangulate data sources for more robust and comprehensive findings. Furthermore, this study focused solely on GHRM and GSCM as predictors of sustainable performance, omitting other potentially influential factors such as green leadership, regulatory pressures, or organizational culture. Incorporating these variables could enrich the model and provide a more holistic understanding of sustainability drivers in healthcare. Lastly, the sample size, although appropriate for PLS-SEM, was limited to a specific group of hospital employees. Subsequent study ought to use larger and more heterogeneous samples to enhance the reliability and generalizability of the findings.

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