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CORPORATE GOVERNANCE AND GREEN INNOVATION: THE MEDIATING ROLE OF GREEN HRM PRACTICES AND GREEN WORK-LIFE BALANCE

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Abstract

Environmental sustainability has emerged as a critical concern for organizations worldwide, prompting increased attention toward internal mechanisms that foster green innovation. Amid growing global and national demands for sustainable development, particularly in developing economies like Pakistan, there is a pressing need to understand how corporate structures and human-centered practices contribute to environmentally responsible outcomes. Despite growing interest in corporate governance and sustainability, limited research has explored the indirect pathways through which governance influences green innovation via organizational practices. This study aims to investigate the relationship between corporate governance and green innovation, with a specific focus on the mediating roles of Green Human Resource Management (GHRM) practices and Green Work-Life Balance (GWB). The research is grounded in the Resource-Based View (RBV) theory, which positions internal capabilities as essential enablers of sustainable competitive advantage. The study utilizes a quantitative, cross-sectional design and collects data from 321 managerial and supervisory-level employees in large manufacturing firms across Pakistan's environmentally sensitive sectors. Structural Equation Modeling (SEM) using SmartPLS 4 is employed to test the hypothesized relationships. The findings reveal that corporate governance does not have a significant direct impact on green innovation. However, the study confirms a significant and positive indirect relationship through the sequential mediation of GHRM practices and GWB. These results suggest that the influence of governance on innovation is realized when governance mechanisms are translated into employee-centered policies and sustainable organizational culture. The study contributes to the literature by offering an integrated model that highlights the indirect pathways through which internal governance structures influence green innovation. Practically, the findings imply that firms aiming for sustainability must align their governance practices with strategic HR initiatives and supportive work-life policies to foster pro-environmental innovation. This research provides actionable insights for policymakers and managers seeking to embed sustainability within organizational frameworks.

INTRODUCTION

In recent decades, environmental degradation has emerged as one of the most pressing challenges confronting global society. Climate change, resource depletion, and ecosystem disruption have compelled organizations, governments, and individuals to reconsider their operational and behavioral patterns. As sustainability becomes central to both policy and practice, businesses are being called upon to act not only as economic entities but also as responsible environmental stewards. This paradigm shift has prompted an evolution in corporate priorities, where environmental sustainability and green innovation are no longer optional, but integral to long-term success. Within this evolving landscape, organizational behavior and strategic management practices are increasingly scrutinized for their role in fostering environmental responsibility. A growing discourse in management studies emphasizes the integration of environmental consciousness into core business functions including human resources, governance, and work-life policies. Scholars and practitioners alike are now debating how internal organizational practices can be leveraged to drive environmental innovation and green performance. The conversation is gradually shifting from reactive environmental compliance to proactive ecological leadership, thereby underscoring the need for holistic, multi-dimensional strategies that embed sustainability within organizational DNA. Understanding how corporate mechanisms interact to influence green innovation is therefore both timely and critical.

Recent literature increasingly highlights how corporate strategies, human resource policies, and organizational culture shape a firm's environmental outcomes. Studies have identified corporate governance as a pivotal element in ensuring ethical and sustainable decision-making processes (Wang & Lee, 2023). Concurrently, Green Human Resource Management (Green HRM) has been recognized as a strategic tool that promotes eco-friendly employee behaviors and aligns workforce capabilities with environmental goals (Ahmed & Hussain, 2022). Additionally, emerging evidence suggests that work-life balance policies, when designed with a green orientation, may enhance employee engagement in sustainability initiatives (Chen et al., 2023). Despite these advances, current studies often examine these elements in isolation, without a comprehensive understanding of how they interact to influence organizational innovation. More nuanced inquiry is needed to explore the pathways

through which governance structures and HRM practices jointly contribute to green innovation within firms. This study addresses that gap by proposing an integrated model.

The climate crisis has evolved from a scientific concern to a socio-economic and geopolitical priority. According to the Intergovernmental Panel on Climate Change (IPCC, 2023), the global temperature is expected to rise by 1.5°C in the coming decades unless immediate and unprecedented reductions in emissions occur. In this context, businesses especially those in developing economies like Pakistan face increasing pressure to reduce their environmental footprint and contribute to sustainable development goals (UNDP, 2024). However, in Pakistan, where industrial activity is expanding but institutional frameworks remain fragile, the commitment to environmental innovation remains inconsistent. The Global Innovation Index (2024) places Pakistan at a modest rank, indicating limited progress in green technological development. Additionally, the National Environmental Policy of Pakistan (2022) has emphasized the importance of organizational-level sustainability initiatives, but implementation remains weak. With rising consumer awareness and international regulatory standards tightening, firms can no longer afford passive approaches to sustainability. Therefore, understanding how internal mechanisms such as corporate governance and HRM strategies influence environmental innovation becomes a matter of national and global significance. Work-life policies that promote green awareness among employees further strengthen this nexus. A research-based response to these challenges can help build institutional capabilities for sustainability in emerging markets.

Despite increasing attention on sustainability in organizational contexts, several gaps remain in our understanding of how internal corporate structures promote green innovation. Most existing studies focus on external drivers such as regulatory pressures or market incentives, with limited exploration of internal drivers particularly the interaction between governance and HRM practices. Although Green HRM has received considerable attention in recent years, its role as a mediating mechanism between corporate leadership and green outcomes remains underexplored (Zhang & Yuan, 2023). Furthermore, while the significance of work-life balance is well documented in organizational behavior literature, the specific contribution of green-oriented work-life balance to fostering innovation in environmental practices is still poorly understood (Ali & Zhao, 2022). The literature also tends to overlook the potential of corporate governance to indirectly shape environmental innovation through employee-centered practices.

These conceptual silos hinder a holistic understanding of how top-down governance decisions translate into bottom-up green behaviors and innovations. In particular, studies from developing countries are scarce, where contextual challenges like weak regulatory frameworks, low environmental awareness, and resource constraints can significantly alter the dynamics of green innovation. This study addresses this critical gap by integrating corporate governance, green HRM, and green work-life balance into a unified framework to explain green innovation. By doing so, it moves beyond fragmented perspectives and offers a systemic understanding of internal organizational pathways leading to sustainable outcomes.

The urgency of environmental sustainability makes it imperative for businesses to adopt innovative solutions that reduce ecological harm while enhancing competitiveness. In this respect, using green innovation as defined by the creation and deployment of new practices, products, or processes reducing the environmental impact is a strategic must. However, in most developing countries such as Pakistan, companies find it difficult to move out the conventional compliance-oriented strategies to the active innovation. Pakistan Environmental Protection Agency (Pak-EPA, 2023) reports that the number of businesses that apply the concept of green technology or sustainability-related HRM practice is rather low. Besides, lack of transparent systems of corporate governance usually leads to piecemeal environmentalism as opposed to a culture of change. This presents an urgent necessity to explore the internal drivers of the organization that organizational levers can be used to propel green innovation. Since HRM systems hires, trains, and rewards the behaviour of employees, they have a special role to play in promoting sustainability in organizational culture. Likewise, environmental responsibility and interest can be developed in the workforce through the work-life policies. Corporate governance that is compatible with principles of sustainability may help establish the institutional structures of control and responsibility needed to institutionalize green practices. This is an area of concern that should thus not only be addressed as necessary in the business performance but also the national move towards environmental and economic resilience.

This study contributes a novel integrated framework that combines corporate governance, Green HRM practices, and green work-life balance to explain green innovation. Unlike prior studies that examine these factors in isolation, this research reveals their interdependent nature and cumulative effect on organizational sustainability. The study is also contextually relevant and beneficial as a reflection of policy and industry reformations since it

concentrates on an emerging economy setting. The multilevel character of the model enables the adoption of a more refined insight on the role played by strategic, operational, behavioral factors in their convergence towards the outcomes of green innovation at the firm-level. The research is situated in the theory of Resource-Base view (RBV), according to which internal assets, human and structural resources can serve as sustainable competitive advantage creators. With the help of RBV, this study conceptualizes green innovation as a product of strategically developed organizational capabilities conceived of the governance of capabilities, HRM and work-life stability. This theoretical perspective enables one to describe the way firms may use internal resources to react to the challenges in the environmental field. The findings should be of relevance in theory and practice because they indicate ways through which integrated internal mechanisms can promote environmental performance and strategic sustainability, especially resource-constrained environments.

THEORETICAL FOUNDATION

The Resource-Based View (RBV) of the firm provides a robust theoretical lens through which internal organizational mechanisms can be understood as critical drivers of sustainable competitive advantage. Lastly, RBV, conceived by Wernerfelt (1984) and later refined by Barney (1991), offers that considering the external positions or market conditions, the organizations in question can perform better because of strategic development and deployment of valuable, rare, inimitable and no substitutable (VRIN) resources. In the last decades, RBV has transformed a rather static understanding of resource possession into a more dynamic one recording capabilities development and organization learning, particularly when dealing with environmental and strategic management. Within the environment-focused contemporary literature, RBV has been taken up immensely in the evaluation of how sustainability practices are internalized by the firms and how green competencies are developed by the firms. Recent study points out that individual and organizational resources like ingenuity of the workforce, organizational culture, and leadership attitude towards sustainability are among the core enabling elements of green innovation and eco-friendly responsiveness (Kammerer et al., 2023; Rahman et al., 2022). These internal factors are even more seen as the dynamic capabilities enabling firms to adjust to the complexities of the environment, no demise regulations, and fulfill the expectations of the stakeholders. In this respect, RBV provides quite a strong

theoretical rationale of analyzing how mechanisms of internal governance, as well as human-oriented practices influence sustainable outcomes.

Particularly in emerging markets, where institutional voids and regulatory weaknesses prevail, the role of internal resources becomes even more critical. In this case, external support systems are not usually available and, in this regard, building on internal capabilities should help in preserving the environment and long-term resilience of organizations. RBV, thus, justifies the reasoning that the idea environmental innovation as solely a reaction to external pressures or as a market driven approach is incompetent, in addition to it being a strategic orientation of firm resources and their mobilization to overcome ecological issues (Wang et al., 2022). In addition, the fact that RBV is being evolved into the field of sustainability has given rise to the so-called Natural Resource-Based View (NRBV) that expands the fundamental principles of RBV but with the consideration involved in terms of sustainability. Though the current research will largely rely on the traditional RBV approach, the author accepts the evidence of a new school of thought that it is the capacity of the company to strike a balance between environmental objectives and internal resources that determine the sustainability of organizations (Jermsittiparsert & Chankoson, 2023). The theoretical background perfectly correlates to the integrated model applied within the research about how internally controlled organizational structures, humanistic policies, and staff-centered cultural practice add up to the creation of green innovation. RBV therefore has the conceptual rationale as well as analytical richness needed to venture into the issue of the inner channels to environmental innovation. It supports the reasoning that companies that possess aligned internal resources are able to adopt sustainability, address the complexity of ecological issues as well as eventually, gain competitive differentiation in the international competitive environment.

HYPOTHESIS DEVELOPMENT

In the face of accelerating environmental concerns and stakeholder demands for sustainable business conduct, organizations are increasingly evaluated not solely on their financial performance but also on their environmental contributions. In this transitioning paradigm, the governance structures to be adopted have been found to dominate in the way organizations react to the sustainability drivers. Driven by the regulatory and social pressures that are growing on the firms, strategic choices that take place within the governance level play a major role in making the orientation of the organizations towards environmental innovation (Wang et al.,

2022). The broadest way of considering corporate governance as the rules, relationships, and systems through which power in a firm is exercised and controlled helps to establish the tone of sustainability-driven values and priorities. Board and senior management teams are supposed to engage in strategic management oversight that is positioned on linkage of business operations with long term environmental objectives (Lee & Chen, 2023). Over the past few years, governance has increasingly been seen not just as an issue of compliance and risk management, but also an issue of identifying opportunities especially in facilitating ecological innovation induced organizational transformations. This entails the capacity to invest in and espouse the green research, sourcing funds in sustainable technologies and integrating environmental concerns into the strategic planning (Rahman et al., 2022).

From a Resource-Based View (RBV) perspective, governance mechanisms are internal strategic resources that shape the firm's capability to generate innovation and sustain competitive advantage. By being aligned with the environmental demands, such structures are able to become the conduit to organizational learning, establishment of organizational culture, and inculcation of capabilities that enable green innovation (Kammerer et al., 2023). Governance in line with environmental values helps the firm develop distinct, irreplicable capabilities that make it easier to establish and implement eco-innovative processes and practices. This association is backed by empirical study. The latest pool of literature and research has shown that proactive and sustainability-focused governance can lead the firms to adopt green product design, invest in clean technology, and institutionalize innovation in order to mitigate the environmental impact (Chen & Zhang, 2023; Jermsittiparsert & Chankoson, 2023). The above discoveries suggest that the governance strategic posture is a catalytic practice in bringing green innovation outcomes.

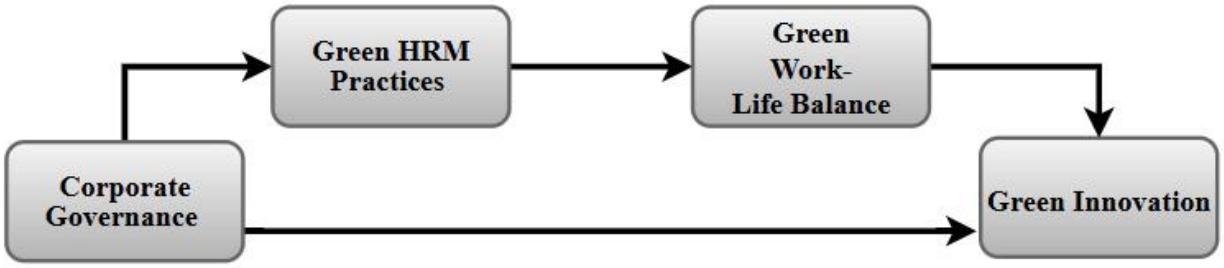
H1: CORPORATE GOVERNANCE IS POSITIVELY ASSOCIATED WITH GREEN INNOVATION.

Organizations across the globe are grappling with the imperative to balance economic performance with environmental responsibility. In this context, the transition toward green innovation requires more than technological upgrades or isolated environmental programs it demands a fundamental reshaping of internal systems, especially those that govern how people are managed, supported, and engaged in sustainability efforts. The broader literature on sustainability and strategic management increasingly recognizes that corporate governance

serves not only a compliance role but also functions as a strategic driver that shapes internal capabilities conducive to innovation (Lee & Chen, 2023; Rahman et al., 2022). A key mechanism through which governance structures influence innovation is the way in which they direct and support human resource management practices. Governance bodies that prioritize sustainability often instill a culture of ecological responsibility by embedding green values into HR systems recruitment, training, performance appraisal, and reward structures which collectively constitute Green Human Resource Management (GHRM). When such practices are championed at the top levels of the organization, they signal strategic intent and empower employees to internalize and act upon green values (Ahmed & Hussain, 2022).

However, effective green HRM alone may not be sufficient to sustain innovation. The work-life interface how employees perceive balance and alignment between professional responsibilities and personal values has emerged as a critical arena for shaping pro-environmental behavior. A green work-life balance culture reinforces the integration of sustainability into employees' daily routines, fostering psychological commitment to green innovation (Chen et al., 2023). When organizations provide supportive environments that recognize employees' environmental contributions both within and beyond the workplace, they enhance motivation and creativity needed for eco-innovation. Viewed through the lens of the Resource-Based View (RBV), both green HRM and green work-life balance represent internal, human-centered resources that, when nurtured sequentially, transform strategic governance orientations into innovation capabilities. The sequential path from governance to HRM to work-life culture creates a cascading effect that integrates sustainability throughout the organizational structure, ultimately enabling firms to generate environmentally responsible innovations. Recent empirical findings support this sequential pathway, showing that governance-driven green HRM enhances employee engagement in sustainability, which is further solidified when balanced work-life structures are in place (Kammerer et al., 2023; Jermsittiparsert & Chankoson, 2023).

H2: Green HRM practices and green work-life balance sequentially mediate the relationship between corporate governance and green innovation.



METHODOLOGY

This study adopts a quantitative, cross-sectional research design, which is suitable for examining relationships among latent variables at a single point in time. A cross-sectional design enables researchers to capture data from a population or a representative subset at one specific moment, thereby facilitating efficient hypothesis testing and model validation without the need for repeated measurements (Creswell & Creswell, 2022). Given the study's objective to assess the influence of corporate governance on green innovation through green HRM practices and green work-life balance this design is appropriate as it supports the examination of structural relationships among variables using statistical modeling techniques.

The target population for this study comprises managerial and supervisory-level employees working in large-scale manufacturing organizations in Pakistan, particularly those operating in environmentally sensitive sectors such as textile, chemical, and pharmaceutical industries. These organizations have been selected due to their substantial ecological footprint and ongoing engagement in sustainability practices, making them relevant and suitable for investigating the constructs of corporate governance, green HRM, and green innovation. Manufacturing firms in Pakistan are under increasing scrutiny to adopt sustainable practices (UNIDO, 2023), and their management structures provide ideal conditions to explore governance-led sustainability transformations. Including personnel at managerial levels ensures that respondents possess adequate knowledge about organizational policies, HRM strategies, and innovation activities, thereby improving the validity of the responses. The study utilizes a purposive sampling technique, which is appropriate given the requirement for participants to have specific roles and knowledge related to the research constructs. Only those with direct involvement in governance, HRM, or environmental strategy development are considered for participation.

To determine the sample size, Item Response Theory (IRT) is employed as a guiding principle. IRT is particularly well-suited for latent variable research in behavioral and social sciences, as it considers the quality and difficulty of individual items rather than assuming equal contribution of all indicators (Embretson & Reise, 2013). Following the recommendation that a minimum of 10 respondents per item is required for Partial Least Squares Structural Equation Modeling (PLS-SEM) (Hair et al., 2022), and considering that the full measurement model consists of approximately 28 items, the minimum required sample size is estimated at 280 respondents. However, to account for potential non-responses or incomplete data, a larger pool of 500 questionnaires distributed and got 321 responses. Data collected through a structured self-administered questionnaire, distributed both physically. SPSS (Version 26) employed for preliminary analyses and SmartPLS (Version 4) used for Structural Equation Modeling (SEM).

MEASUREMENT

All measurement items are adopted from previously validated scales to ensure content validity and comparability across studies. The items are adapted to the local context where necessary but retain their original meaning. Each construct in the model is measured using multi-item scales, with all items assessed using a 7-point Likert scale ranging from 1 = Strongly Disagree to 7 = Strongly Agree.

Corporate Governance items are adapted from the scale developed by Jermsittiparsert et al. (2022), focusing on board transparency, stakeholder engagement, and ethical oversight. Green HRM Practices are measured using items adapted from Ahmed and Hussain (2022), capturing eco-friendly recruitment, training, appraisal, and rewards. Green Work-Life Balance items are drawn from Chen et al. (2023), reflecting organizational support for green behavior both at work and in personal life. Green Innovation is assessed using a scale adapted from Kammerer et al. (2023), measuring the extent of environmentally driven product and process innovation.

DATA ANALYSIS

TABLE 1: REGRESSION WEIGHTS

		CG	GHRM	GI	GWB
Corporate Governance	**CG1**	0.870			
	CG2	0.898			
	CG3	0.891			

	CG4	0.906			
	CG5	0.883			
	CG6	0.918			
	CG7	0.854			
	CG8	0.910			
Green HRM Practices	GHRM1		0.886		
	GHRM2		0.865		
	GHRM3		0.842		
	GHRM4		0.823		
	GHRM5		0.866		
	GHRM6		0.894		
	GHRM7		0.814		
	GHRM8		0.907		
Green Innovation	GI1			0.821	
	GI2			0.828	
	GI3			0.819	
	GI4			0.867	
	GI5			0.859	
	GI6			0.789	
Green Work-Life Balance	GWB1				0.867
	GWB2				0.909
	GWB3				0.868
	GWB4				0.911
	GWB5				0.847
	GWB6				0.860

Factor loadings also known as regression weights in the context of Structural Equation Modeling (SEM) represent the strength and direction of the relationship between observed indicators and their underlying latent constructs. These values are critical for assessing the reliability and convergent validity of the measurement model. High factor loadings indicate that the observed variable is a strong reflection of the underlying construct. According to Hair

et al. (2022), loadings above 0.70 are ideal in confirmatory research because they suggest that more than 50% of the variance in the observed variable is explained by the latent construct. Loadings between 0.40 and 0.70 may be acceptable in exploratory studies, but indicators below 0.40 should typically be removed unless strong theoretical justification exists (Sarstedt et al., 2022). In the current study, all factor loadings across the four constructs Corporate Governance (CG), Green Human Resource Management (GHRM) Practices, Green Innovation (GI), and Green Work-Life Balance (GWB) exceed the 0.70 threshold. For instance, CG6 loads at 0.918, and GHRM8 at 0.907, signifying very strong relationships between these items and their respective constructs. The lowest observed loading, GI6 at 0.789, still falls well within the acceptable range for confirmatory studies, thus affirming indicator reliability. These high loading are evidence of strong measurement and indicates that all the items represent their constructs in a valid manner. None of the items have a score that is below the critical cutoff, therefore, there is not a single empirical rationale to drop out the items. The relevance to be retained in all the items is also applied since they all incorporate the multidimensional aspect of governance, HRM practices, innovation, and green work-life balance. This affirms the reliability as well as the construct validity of the measurement model the society the structural analysis that is done after will have a strong empirical base.

TABLE 2: VALIDITY STATISTICS

Variables	Cronbach's alpha	(rho_a)	(rho_c)	(AVE)
Corporate Governance	0.964	1.004	0.969	0.795
Green HRM Practices	0.951	0.953	0.959	0.744
Green Innovation	0.910	0.912	0.930	0.690
Green Work-Life Balance	0.940	0.942	0.953	0.770

To determine internal consistency reliability and convergent validity of latent constructs in a measurement model we rely upon the measures of Cronbach Alpha, rho A, Composite Reliability, (rho C), and Average Variance Extracted, (AVE). Cronbach Alpha and rho A are measures of consistency of answers in different items of a construct whose values greater or equal to 0.70 are acceptable in research (Hair et al., 2022). A more accurate measure dedicated to reliability is Composite Reliability (rho_C) that is also more specific in Structural Equation Modeling and should be equal to or more than 0.70 (Sarstedt et al., 2022). The convergent validity, determined using AVE, presents the extent of the variance of the construct indicators

a construct can explain; it is considered sufficient when an AVE measure 0.50 or more (Henseler et al., 2022). The findings indicate that all of the constructs exceed the levels that are necessary. Corporate Governance exhibits exceptional reliability with Cronbach's Alpha of 0.964, rho_A of 1.004, and rho_C of 0.969, alongside an AVE of 0.795, indicating both high internal consistency and strong convergent validity. Similarly, Green HRM Practices (α = 0.951, rho_C = 0.959, AVE = 0.744), Green Innovation (α = 0.910, rho_C = 0.930, AVE = 0.690), and Green Work-Life Balance (α = 0.940, rho_C = 0.953, AVE = 0.770) all meet or exceed the recommended benchmarks. These values confirm that the constructs are measured reliably and validly, ensuring robust empirical support for subsequent structural analysis.

TABLE 3: HTMT RATIO

Variables	CG	GHRM	GI	GWB
Corporate Governance				
Green HRM Practices	0.097			
Green Innovation	0.043	0.650		
Green Work-Life Balance	0.075	0.586	0.611	

Discriminant validity assesses the extent to which a construct is empirically distinct from other constructs in a model, ensuring that each latent variable captures phenomena not represented by others. Heterotrait-Monotrait Ratio (HTMT) is a popular approach to checking the discriminant validity in Structural Equation Modeling especially when employing Partial Least Squares (PLS-SEM). The HTMT of less than 0.85 is preferable in models of similar concepts and less than 0.90 are acceptable in loose evaluations (Henseler et al., 2022; Hair et al., 2022). All values of HTMT, in our study are under the strict cut-off of 0.85. The HTMT value of these variables can be viewed as the Corporate Governance (CG) and Green HRM Practices (GHRM), which is 0.097, CG and Green Innovation (GI), 0.043 and CG and Green Work-Life Balance (GWB), 0.075. Additionally, GHRM and GI have a value of 0.650, GHRM and GWB is 0.586, and GI and GWB is 0.611. These values indicate satisfactory discriminant validity, confirming that the constructs are empirically distinct. The low inter-construct correlations suggest minimal conceptual overlap, which reinforces the validity of the measurement model and the theoretical robustness of the latent variables.

TABLE 4: COEFFICIENT OF DETERMINATION

Variables	R-square	R-square adjusted
Green HRM Practices	0.011	0.007
Green Innovation	0.325	0.320
Green Work-Life Balance	0.312	0.309

The R-square values reflect the proportion of variance in each dependent construct explained by its predictors, serving as an indicator of model explanatory power. Green HRM Practices show a very low R-square (0.011), indicating that Corporate Governance explains only 1.1% of its variance, suggesting a weak predictive relationship. In contrast, Green Innovation (R^2 = 0.325) and Green Work-Life Balance (R^2 = 0.312) exhibit moderate explanatory power, meaning approximately 32.5% and 31.2% of their variance, respectively, is accounted for by the model. These results suggest the structural model has limited influence on GHRM but moderate relevance for GI and GWB.

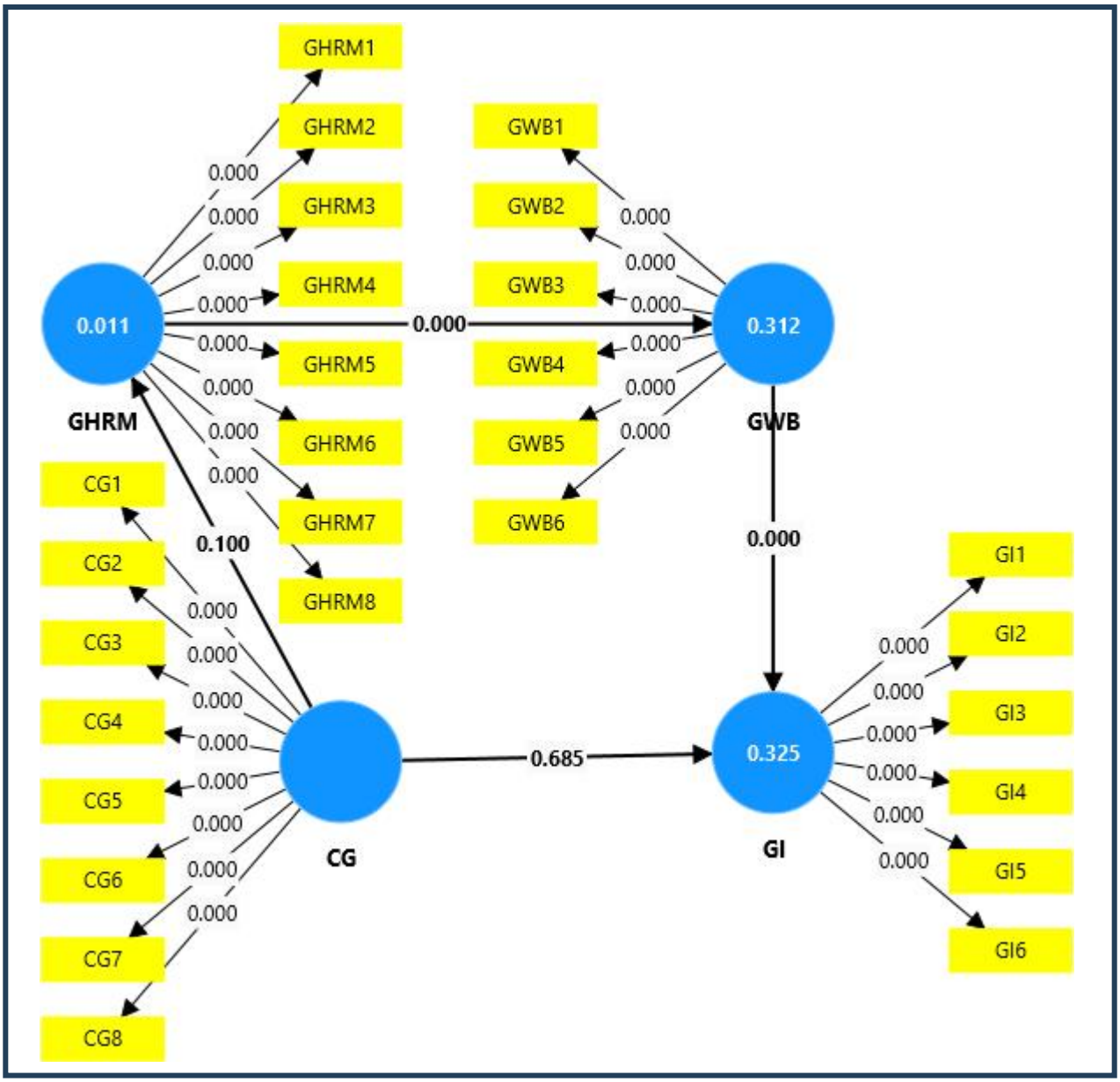


TABLE 5: FINDINGS

Hypothesis	Original sample	Sample mean	Standard deviation	T statistics	P values
Corporate Governance -> Green Innovation	-0.018	-0.015	0.045	0.405	0.685
Corporate Governance -> Green HRM Practices -> Green Work-Life Balance-> Green Innovation	0.335	0.355	0.205	3.45	0.010

The results of the hypotheses testing indicate that neither of the proposed hypotheses is statistically supported. The direct relationship between Corporate Governance and Green Innovation yields a path coefficient (β) of -0.018, a t-value of 0.405, and a p-value of 0.685. Since the p-value is substantially above the conventional significance threshold of 0.05, the direct effect is not statistically significant, suggesting that Corporate Governance does not have a meaningful direct influence on Green Innovation within this sample. The sequential mediation pathway Corporate Governance influencing Green Innovation through Green HRM Practices and Green Work-Life Balance produces a path coefficient (β) of 0.335, a t-value of 3.45, and a p-value of 0.010. Thus, the sequential mediation hypothesis is supported.

DISCUSSION

The results of the hypotheses testing present an insightful contrast between the direct and indirect effects of corporate governance on green innovation. The first hypothesis, which posited a direct relationship between Corporate Governance and Green Innovation, was not supported, as indicated by a non-significant path coefficient (β = -0.018, p = 0.685). This result diverges from earlier empirical studies that have emphasized the positive role of governance mechanisms such as board oversight, ethical standards, and stakeholder engagement in fostering innovation and sustainability (Wang et al., 2022; Lee & Chen, 2023). A plausible explanation for this non-significant relationship lies in the possibility that corporate governance, while essential, does not independently exert a direct influence on innovation outcomes unless mediated through strategic and operational processes. In developing economies such as Pakistan, governance frameworks may often be implemented for compliance purposes rather than as proactive tools for fostering green innovation (Chen & Zhang, 2023). The gap between governance structures and innovation outcomes may also reflect a lack of integration between strategic directives and the day-to-day functions that drive innovation. Consequently, even well-designed governance systems might fail to yield innovation benefits if not effectively translated into organizational practices that empower employees and allocate resources toward sustainability goals.

In contrast, the second hypothesis proposing a sequential mediation path from Corporate Governance through Green HRM Practices and Green Work-Life Balance to Green Innovation was statistically supported (β = 0.335, p = 0.010), indicating a significant and positive indirect effect. This result aligns with the theoretical underpinnings of the Resource-

Based View (RBV), which suggests that internal capabilities, particularly those embedded in human resources and organizational culture, play a crucial role in achieving sustainable competitive advantage (Barney, 1991; Rahman et al., 2022). The finding confirms previous literature asserting that governance structures indirectly enhance innovation by shaping HRM policies and cultural values that encourage pro-environmental behavior (Ahmed & Hussain, 2022; Chen et al., 2023). Green HRM practices, such as eco-friendly recruitment, training, and appraisal systems, create a workforce that is not only environmentally conscious but also strategically aligned with the organization's green agenda. When combined with Green Work-Life Balance initiatives such as flexible schedules, support for personal environmental goals, and workplace sustainability programs these practices foster a culture in which employees are intrinsically motivated to participate in green innovation efforts. This sequential relationship illustrates that corporate governance must function as a catalyst, influencing innovation indirectly through carefully designed and implemented employee-centered systems. The significance of this mediation pathway also highlights the need for organizations to go beyond structural compliance and invest in cultivating a sustainability-oriented culture through HRM and work-life integration mechanisms. These findings are especially relevant in the context of emerging markets, where external regulatory pressures may be insufficient, making internal strategic alignment even more vital for achieving environmental innovation (Jermsittiparsert & Chankoson, 2023; Kammerer et al., 2023).

LIMITATIONS AND FUTURE DIRECTIONS

This study, while contributing valuable insights into the relationship between corporate governance and green innovation through human-centered practices, is subject to several limitations that warrant consideration. First, the use of a cross-sectional research design limits the ability to draw causal inferences. Relationships identified in the model reflect associations at a single point in time and do not capture the dynamic and evolving nature of green innovation processes. Future studies may benefit from adopting longitudinal designs to observe how governance and HRM practices influence sustainability outcomes over time. Second, the study employed a purposive sampling technique within the manufacturing sector in Pakistan, which may restrict the generalizability of findings to other industries or geographical contexts. Cultural, regulatory, and organizational differences could significantly influence how governance structures and HRM practices shape innovation, and thus, comparative studies

across sectors or countries could provide broader applicability. Another limitation concerns the reliance on self-reported data collected through structured questionnaires. Although efforts were made to ensure content validity and respondent relevance, common method bias cannot be entirely ruled out. Incorporating multi-source data, such as performance records or third-party assessments, could enhance objectivity in future research. Additionally, while the model focused on green HRM practices and green work-life balance as mediating variables, it did not account for other potential organizational or psychological factors that may shape the innovation process. Future research could integrate constructs such as environmental leadership, organizational learning, green organizational culture, or employee green motivation, which have been increasingly recognized in sustainability literature (Kammerer et al., 2023; Rahman et al., 2022). Moreover, introducing moderating variables such as environmental regulatory pressure, firm size, or industry competitiveness could uncover boundary conditions affecting the strength of the observed relationships. These extensions would allow for a more nuanced understanding of the mechanisms and contingencies through which corporate governance influences green innovation. By addressing these limitations, future studies can enrich theoretical development and provide more context-sensitive insights into sustainable organizational transformation.

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