

Green HRM Practices and Perceived Organizational Sustainability: The Mediating Role of Employee Green Commitment and Green Innovative Behavior

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Received: 07-09-2025	Revised: 12-10-2025	Accepted: 25-10-2025	Published: 15-11-2025
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ABSTRACT

This study examines the influence of Green Human Resource Management (GHRM) practices on perceived organizational sustainability in the context of Pakistan's fast-moving consumer goods (FMCG) sector, with a particular focus on five leading firms: Unilever Pakistan Limited, Nestlé Pakistan, Engro Foods, Procter & Gamble (P&G) Pakistan, and Colgate-Palmolive Pakistan. Drawing on social exchange theory and the ability–motivation–opportunity (AMO) framework, the research explores the parallel mediating roles of employee green commitment and green innovative behavior in linking GHRM practices to sustainability outcomes. A cross-sectional survey design was employed, with data collected from 596 employees through structured questionnaires. The findings indicate that GHRM practices exert a significant positive effect on perceived organizational sustainability. Both employee green commitment and green innovative behavior mediated this relationship, highlighting that environmentally oriented HR practices stimulate employees' psychological attachment to environmental goals as well as their capacity to propose and implement green initiatives. The parallel mediation model further suggests that these mechanisms operate simultaneously rather than sequentially, underscoring the multifaceted pathways through which GHRM contributes to sustainability performance. The study contributes to the literature by extending empirical evidence from a developing economy, where environmental practices are increasingly vital for competitive advantage yet remain underexplored in HRM research. The results carry important implications for theory by clarifying the micro-level processes that connect HRM to sustainability and for practice by urging managers to integrate green HR policies that foster employee commitment and innovation. Limitations and avenues for future research are also identified, particularly the need for longitudinal designs and cross-industry comparisons.

Keywords: Green HRM, organizational sustainability, employee green commitment, green innovative behavior, FMCG sector, Pakistan.

INTRODUCTION

The urgency of addressing climate change, depletion of natural resources, and environmental degradation has accelerated in recent decades, drawing governments, businesses, and societies into an era where sustainable development is no longer optional but essential. Organizations, regardless of size and industry, are increasingly expected to align their strategies with sustainability objectives, and in this shift, human resource management (HRM) has become a decisive lever. Human resource management plays a critical role in shaping the values, behaviors, and commitments of employees, which in turn build the cultural and organizational capabilities required to pursue environmental goals. The growing field of Green Human Resource Management (Green HRM) reflects this shift by embedding environmental considerations into core HR practices such as recruitment, training, performance management, and reward systems, thereby encouraging employees to adopt sustainability-oriented behaviors (Renwick et al., 2013; Jabbour & de Sousa Jabbour, 2016).

Green HRM is often viewed as the mechanism that links strategic objectives with employees' pro-environmental practices. For example, when sustainability requirements are explicitly included in job roles or appraisal criteria, employees recognize environmental stewardship as a central organizational priority, which fosters accountability and engagement (Paillé et al., 2014). Similarly, training programs that emphasize energy efficiency or environmental awareness provide staff with the knowledge and skills needed to turn organizational policies into practical workplace routines (Guerci et al., 2016). In this way, Green HRM not only ensures compliance with regulations but also supports innovation and competitiveness by embedding ecological awareness into organizational culture (Renwick et al., 2013).

The significance of these practices is particularly evident in emerging economies. Pakistan, for instance, illustrates a paradox: rapid industrial expansion is essential to meet population and market demands, yet this growth heightens environmental pressures through increased energy use, carbon emissions, and waste (Khan et al., 2022). The manufacturing sector, which represents a major share of both economic output and energy consumption, lags behind global standards in environmental management. Within this sector, fast-moving consumer goods (FMCG) firms occupy a crucial position. Their extensive supply chains and high production volumes contribute heavily to ecological impacts, while their visibility to consumers and regulators subjects them to rising pressure to demonstrate meaningful sustainability efforts (Shah & Soomro, 2021).

In such contexts, Green HRM has the potential to act as a driver of change by converting sustainability commitments into tangible organizational outcomes. Yet the evidence base from Pakistan and similar South Asian economies remains thin. Much of the literature has been developed in Western contexts, where institutional, cultural, and industrial conditions differ markedly (Ahmad, 2015; Chaudhary, 2020). Employees in Pakistan's FMCG industry, for example, operate under resource limitations, evolving regulatory environments, and traditional management practices, all of which shape how green initiatives are received and enacted. Exploring how HR systems encourage sustainability in these conditions is therefore both relevant and overdue.

This study is motivated by the persistent gap between organizational statements about environmental responsibility and the actual behavioral mechanisms that support sustainable outcomes. While existing scholarship points to a positive association between Green HRM, organizational performance, and environmental results (Jackson et al., 2011; Dumont et al., 2017), the precise pathways through which these effects are realized remain insufficiently explained. This gap can be bridged by examining mediating mechanisms at the employee level. Specifically, Green HRM practices are expected to foster employee green commitment—a sense of psychological attachment to and responsibility for environmental goals—which in turn strengthens organizational sustainability (Paillé et al., 2014).

Similarly, Green HRM may stimulate green innovative behavior, whereby employees propose or implement new ideas that reduce environmental harm, improve efficiency, or enhance eco-friendly practices within their roles (Chen & Chang, 2013). Both constructs provide essential insights into how HRM policies translate into sustainability performance.

By focusing on five major FMCG companies in Pakistan, this study situates itself within a critical segment of the national economy that both contributes to and suffers from environmental degradation. The research aims to answer three interrelated questions: How do Green HRM practices in Pakistan's FMCG sector affect employees' green commitment? How do such practices foster green innovative behavior? To what extent do employee green commitment and green innovative behavior mediate the relationship between Green HRM practices and perceived organizational sustainability? These questions address not only a theoretical gap in the literature but also a practical challenge faced by FMCG firms seeking to reconcile environmental responsibility with competitiveness in an emerging market.

The study contributes on multiple levels. From a theoretical standpoint, it adds to the growing body of work on Green HRM by offering evidence from a South Asian context, thereby extending insights into the role of institutional and cultural factors in shaping employee responses. From a managerial perspective, it highlights the importance of leveraging HRM practices not only to ensure compliance with environmental regulations but also to cultivate a workforce that is committed to and capable of driving sustainability initiatives. At the societal level, the study guides how businesses in Pakistan and similar economies can play a constructive role in addressing pressing ecological challenges. By anchoring the analysis in the FMCG sector, the study maintains a focused scope while generating insights that may be transferable to other resource-intensive industries.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Green Human Resource Management (GHRM)

Green Human Resource Management (GHRM) has matured from a descriptive cluster of practices into a strategic domain that explicitly links HR policy to environmental outcomes. Scholars describe GHRM as the deliberate design and deployment of HR practices — recruitment, training, performance management, rewards, and employee involvement — that foreground environmental objectives and embed them into everyday work processes (Renwick, Redman, & Maguire, 2013). Well-designed Green HRM (GHRM) systems do more than serve as symbolic gestures; they provide the structural and cognitive framework that makes pro-environmental behavior both observable and expected within the workplace. Put simply, GHRM functions as the channel through which organizational sustainability goals are translated into employees' day-to-day routines and capabilities.

Evidence from empirical studies shows that different GHRM practices exert distinct effects. For instance, initiatives such as training and employee participation tend to raise awareness and encourage voluntary green behaviors, while appraisal and reward mechanisms play a stronger role in aligning formal job performance with environmental objectives (Dumont, Shen, & Deng, 2017; Jabbour & de Sousa Jabbour, 2016). At the same time, the existing literature highlights several shortcomings. Much of the research is based on single-country, cross-sectional studies, employs inconsistent measures, and often blurs the line between official policies and employees' perceptions of how those policies are enacted (Guerci, Longoni, & Luzzini, 2016). This distinction—between policy statements and employees' lived experience—is particularly important in emerging economies, where formalization is uneven and frontline supervisors exert substantial influence on implementation. For both scholars and practitioners, treating GHRM as a set of perceived practice bundles rather than reducing it to a single index provides richer explanatory insight and greater managerial relevance.

Employee Green Commitment

Employee green commitment denotes the affective and normative attachment that employees have specifically toward their organization's environmental ambitions. This construct is domain-specific: it targets commitment to "green" goals rather than generalized organizational attachment, and therefore is a stronger predictor of environmentally directed discretionary behavior (Raineri & Paillé, 2016). Green commitment arises when employees perceive organizational signals that sustainability is important — for instance, investments in green training, visible leadership support, and integration of environmental targets into performance dialogues. Such signals create a psychological contract that inclines employees to reciprocate with sustained pro-environmental engagement.

Evidence connects employee green commitment to outcomes such as organizational citizenship behavior for the environment (OCBE), enhanced reporting of environmental issues by staff, and sustained participation in improvement efforts (Paillé, Chen, Boiral, & Jin, 2014). Two measurement cautions emerge from the literature: first, scales must avoid conflating personal pro-environmental values with organizational attachment; second, cross-cultural validation is necessary because commitment expressions vary by national and organizational culture. For the Pakistan FMCG context, measuring green commitment with domain-specific, pre-tested items will be essential to avoid measurement bleed and to ensure the mediator captures organizationally anchored attachment rather than generalized green identity.

Green Innovative Behavior

Green innovative behavior (GIB) comprises employee actions to generate, champion, and implement ideas that reduce environmental impact or create eco-friendly products and processes. Drawing on the broader innovation literature, GIB is a multistage phenomenon: idea generation, idea promotion, and idea implementation (Scott & Bruce, 1994). Its distinctiveness lies in the explicit environmental objective of the innovation — whether reducing waste, lowering energy consumption, or redesigning packaging. In many organizations, GIB is the practical engine of sustainability: it is where top-level strategy meets shop-floor ingenuity.

Research demonstrates that the organizational setting, particularly the presence of GHRM practices, plays a decisive role in shaping green innovative behavior (GIB). Training enhances the knowledge base that underpins idea generation, reward and recognition systems provide the motivation for employees to pursue those ideas, and participative structures create the social channels through which innovations can be advocated and put into practice (Chen & Chang, 2013; Dumont et al., 2017). At the same time, the literature cautions against two recurring issues. One is the tendency to equate GIB with routine pro-environmental actions such as switching off lights, which understates the creative and strategic dimension of innovation. The other is overlooking the barriers that arise during implementation. In production-intensive industries such as FMCG, the real constraint often lies not in generating ideas but in securing the resources and capacity to embed them. For this reason, separating idea generation from implementation when examining mediating effects provides a more accurate and practically useful understanding of GIB.

Perceived Organizational Sustainability

Perceived organizational sustainability captures employees' judgments about the extent to which their employer pursues and achieves environmental, social, and economic sustainability goals. This perceptual construct is analytically distinct from objective sustainability metrics (emissions, certifications), yet it is vital: employees' perceptions shape their behaviors, internal advocacy, and the informal transmission of the firm's sustainability reputation into stakeholder networks (Eccles, Ioannou, & Serafeim, 2014).

Because employees observe processes and routines that external stakeholders do not, their perceptions carry unique information about the lived sustainability of the organization.

At the same time, perceptions can be biased by managerial rhetoric, episodic events, or external disclosures; therefore, perceived sustainability should be interpreted with caution and, where possible, triangulated with objective indicators. In emerging economies such as Pakistan, where external sustainability disclosure is often inconsistent, employee perceptions provide valuable insight into whether sustainability has been institutionalized or merely performed. For a study focused on five major FMCG firms, perceived organizational sustainability is a defensible dependent measure — provided the analysis recognizes its perceptual nature and, ideally, supplements it with firm-level evidence where feasible.

Hypotheses Development

GHRM → Employee Green Commitment

Green HRM practices operate as powerful signals of what organizations truly value. From the perspective of social exchange theory, when employees see their organization investing in green training, recognizing environmental contributions, and involving them in sustainability discussions, they infer that their efforts are appreciated and will be reciprocated (Cropanzano & Mitchell, 2005). Training and participatory mechanisms provide knowledge and demonstrate trust, while appraisal and reward systems formalize expectations. Together, these practices reshape the psychological contract and strengthen employees' affective commitment to environmental goals.

Empirical work reinforces this argument. Studies show that what matters most is not the presence of policies on paper but the extent to which employees perceive HR systems as genuinely prioritizing environmental objectives. Such perceptions are linked to higher levels of green commitment and organizational citizenship behaviors for the environment (Paillé et al., 2014; Raineri & Paillé, 2016). In fact, perceived practice often predicts outcomes more effectively than documented policy, since employees respond to their daily experiences rather than to written statements. This has methodological implications: perceived GHRM should be treated as the primary independent variable rather than relying solely on policy inventories.

The effectiveness of these signals, however, depends heavily on context. Where management lacks credibility or where green initiatives are viewed as symbolic, employees may respond with skepticism rather than engagement. In contrast, when initiatives are supported with adequate resources and consistent managerial behavior, GHRM reliably builds green commitment. Within Pakistan's FMCG sector—where firms balance strong cost pressures with high consumer visibility—credible signals are likely to come from substantive practices such as meaningful training and measurable appraisal systems. These are the kinds of investments that can generate authentic employee commitment to environmental aims. On this basis, we can hypothesize that:

H1. Perceived Green HRM practices are positively associated with Employee Green Commitment.

GHRM → Green Innovative Behavior

Green HRM practices can also be understood through the Ability–Motivation–Opportunity (AMO) framework. Training initiatives enhance employees' capabilities, appraisal and reward systems provide the motivational drive, and participatory structures open up avenues for employees to suggest and implement environmentally oriented ideas (Appelbaum, Bailey, Berg, & Kalleberg, 2000). In combination, these practices reduce both psychological and practical barriers to innovation: employees gain the confidence to generate ideas, the motivation to pursue them, and access to organizational

channels that allow their ideas to move into action. On this basis, GHRM is expected to foster the full spectrum of green innovative behavior, from initial ideation through to implementation.

Empirical findings lend weight to this mechanism. Research shows that employees' perceptions of GHRM are positively associated with green creativity and innovative work behavior, often through mediating factors such as green self-efficacy and perceptions of a supportive green climate (Dumont et al., 2017; Chen & Chang, 2013). Managerial sponsorship and the presence of diffusion channels further increase the likelihood that individual ideas translate into organizational practices. In production-oriented sectors such as FMCG, incremental innovations in processes or packaging, when scaled across operations, can quickly yield visible and measurable sustainability outcomes.

Even so, two important constraints emerge from the literature. First, when organizations reward only short-term cost savings, the exploratory efforts necessary for genuine innovation may be stifled. Second, the transition from isolated ideas to institutionalized practices depends on the availability of managerial support, technical resources, and organizational capacity for implementation. Without these conditions, employee-driven green innovations risk remaining episodic rather than becoming embedded in routine practice. Given these nuances, we hypothesize:

H2. Perceived Green HRM practices are positively associated with employees' Green Innovative Behavior.

Employee Green Commitment → Perceived Organizational Sustainability

Employees who are affectively committed to environmental goals are more likely to engage in behaviors and subtle monitoring that improve sustainability outcomes. Commitment nurtures discretionary activities — reporting inefficiencies, volunteering for green projects, and sustaining routines — that together raise the organization's sustainability profile (Paillé et al., 2014). Psychologically, committed employees selectively attend to evidence of sustainability and are more likely to interpret organizational actions as genuine investments in long-term ecological stewardship.

Empirical studies report links between domain-specific commitment and employee reports of environmental performance, suggesting that committed employees both produce and perceive sustainability gains (Raineri & Paillé, 2016). In perceptual outcome models, this pathway is especially plausible because committed employees are both actors and evaluators of sustainability practice. However, the effect of commitment on perceived sustainability is contingent on opportunity structures: without channels to act, commitment may remain latent.

In manufacturing contexts with sufficient process flexibility and managerial receptivity — conditions generally present in larger FMCG firms — employee green commitment can translate into visible performance improvements and therefore into higher perceived organizational sustainability. Accordingly:

H3. Employee Green Commitment is positively associated with Perceived Organizational Sustainability.

Green Innovative Behavior → Perceived Organizational Sustainability

Green innovative behavior produces tangible adjustments to processes, products, and practices that reduce environmental impact; these changes are precisely the outputs that manifest organizational sustainability (Chen & Chang, 2013). When employees move beyond routine compliance to design and implement eco-solutions, the organization accrues operational gains (lower energy use, reduced waste) and reputational benefits. Because these contributions yield concrete outcomes, they should shape employees' perceptions of how sustainable the organization truly is.

Research demonstrates that employee-driven green innovations, when diffused, lead to measurable sustainability improvements and are associated with enhanced organizational sustainability metrics (both objective and perceived) (Eccles et al., 2014; Albort-Morant, Leal-Rodríguez, & de Marchi, 2018). The implementation stage is critical: ideation alone is insufficient; only when ideas are operationalized do they influence perceived sustainability in a durable way. Thus, organizations that provide mechanisms for scaling employee ideas are most likely to reap the perceptual and material benefits.

Constraints are again salient: without managerial sponsorship and resource allocation, innovative ideas stagnate. For the Pakistan FMCG firms under study, where operational gains from small innovations can be large, we expect:

H4. Employees' Green Innovative Behavior is positively associated with Perceived Organizational Sustainability.

Direct Effect: GHRM → Perceived Organizational Sustainability

In addition to influencing employee attitudes and behaviors, Green HRM can exert a more direct impact on perceptions of organizational sustainability. When environmental criteria are built into job design, performance appraisal, and reward systems, they alter routines, accountability structures, and compliance mechanisms in ways that employees can readily observe (Renwick et al., 2013). These effects stem from structural adjustments—such as revised roles, targets, and reporting lines—that can produce visible improvements in sustainability outcomes without depending on discretionary employee effort.

Empirical studies generally report partial mediation: although employee-level mechanisms account for much of the relationship between GHRM and sustainability, a direct effect often remains (Dumont et al., 2017; Paillé et al., 2014). This indicates that GHRM practices operate simultaneously through institutional channels (formalization and routine change) and through micro-level psychological processes. For managers, the implication is clear: investments in HR systems can generate immediate, observable improvements in sustainability performance while also laying the groundwork for longer-term innovation by strengthening employee knowledge, motivation, and involvement.

Given this body of evidence, we propose the direct relationship:

H5. Perceived Green HRM practices are positively associated with Perceived Organizational Sustainability.

Parallel Mediation: EGC and GIB as Concurrent Mediators

A vital question is whether employee green commitment (EGC) and green innovative behavior (GIB) operate simultaneously to mediate the effect of GHRM on perceived organizational sustainability. Theoretically, EGC captures the attitudinal pathway (why employees care), while GIB captures the behavioral pathway (what employees do). Together, they represent complementary mechanisms: commitment motivates sustained attention and discretionary effort, while innovation produces the concrete process and product changes that confirm sustainability claims. Modeling them as parallel mediators acknowledges that organizational sustainability is shaped by both the inner disposition of employees and their outward creative actions.

Methodologically, parallel mediation is consistent with empirical patterns in prior studies where multiple employee-level mediators jointly reduce the direct effect of GHRM on sustainability but do not eliminate it (Dumont et al., 2017; Paillé et al., 2014). Practically, treating the mediators as concurrent illuminates which pathway is more influential in a given context: in firms where managerial support for implementation is strong, GIB may carry more weight; in contexts where behavior change is largely voluntary, EGC may be the dominant mechanism. For Pakistan's FMCG firms, both pathways are

plausible — commitment spurs continuous attention to environmental routines while innovation yields measurable operational improvements.

Therefore, the mediation hypotheses are stated as:

H6a. Employee Green Commitment mediates the positive relationship between Perceived Green HRM and Perceived Organizational Sustainability.

H6b. Green Innovative Behavior mediates the positive relationship between Perceived Green HRM and Perceived Organizational Sustainability.

H6c. Employee Green Commitment and Green Innovative Behavior jointly (parallel mediation) mediate the relationship between Perceived Green HRM and Perceived Organizational Sustainability.

Theoretical Underpinnings and Integrative Framework

The model rests on three complementary theoretical lenses. Social Exchange Theory (SET) explains reciprocity dynamics: when organizations invest in green practices, employees reciprocate through commitment and discretionary behavior (Cropanzano & Mitchell, 2005). SET captures why perceived sincerity and managerial consistency matter for the attitudinal pathway. The Ability-Motivation-Opportunity (AMO) framework from HRM clarifies the mechanistic content of GHRM: training (ability), rewards and appraisal (motivation), and participation structures (opportunity) jointly enable green innovative behavior (Appelbaum et al., 2000). Finally, the Resource-Based View (RBV) situates employee green commitment and green innovative behavior as strategic human assets — valuable, rare, and hard to replicate — that underpin sustainable competitive advantage (Barney, 1991).

Synthesizing these perspectives yields a parsimonious framework: Perceived GHRM operates as both a signal and a capability bundle, initiating reciprocal psychological responses (EGC) and enabling behavioral innovation (GIB), which jointly produce employee assessments of organizational sustainability; meanwhile, GHRM also produces institutional changes that directly affect sustainability. This integrated frame guides the empirical strategy: measure perceived GHRM at the individual level, test the two mediators in parallel, allow for a direct path, and use firm clustering or fixed effects to account for between-firm institutional variation.

MATERIALS AND METHODS

Research Philosophy

This study was grounded in a pragmatic research philosophy, reflecting the need to integrate the explanatory rigor of positivism with the contextual sensitivity of interpretivism. Pragmatism is increasingly recognized in organizational research for its capacity to accommodate multiple perspectives and methodological flexibility without compromising academic rigor (Saunders et al., 2019). The current study required such an approach: while the theoretical framework was tested through quantitative modeling, contextual realities within Pakistan's manufacturing sector—particularly in the FMCG domain—demanded attention to the social, cultural, and institutional context shaping green practices.

Population, Sample Size, and Sampling Technique

The study focused on employees in Pakistan's fast-moving consumer goods (FMCG) sector, an industry where environmental practices are especially visible given its high resource demands, strong consumer presence, and growing public scrutiny. Five leading firms were included in the sample: Unilever Pakistan Limited, Nestlé Pakistan, Engro Foods, Procter & Gamble (P&G) Pakistan, and Colgate-Palmolive Pakistan. These organizations were selected not only for their dominant market share but also for their

explicit sustainability commitments, which made them particularly suitable for examining how Green HRM practices relate to organizational sustainability.

A total of 750 questionnaires were distributed across different functional areas and hierarchical levels of these firms. After screening, 596 usable responses were retained, yielding a response rate of 79.4%. This figure compares favorably with benchmarks for organizational survey research, where average response rates often fall below 60% (Baruch & Holtom, 2008). The sample size is more than adequate for robust mediation analysis and provides strong statistical power for bootstrapping procedures. Given the difficulty of accessing employees across large FMCG firms, a purposive non-probability sampling strategy was employed. This method was appropriate as it ensured the inclusion of employees with direct exposure to HRM practices and sustainability-related initiatives (Etikan et al., 2016).

Research Design

The research design was cross-sectional and correlational in nature. Cross-sectional data collection allowed for the simultaneous measurement of variables at one point in time, enabling the testing of hypothesized associations between GHRM, employee green commitment, green innovative behavior, and perceived organizational sustainability. While cross-sectional designs cannot establish causality definitively, they remain the dominant design in HRM and sustainability research where relationships among constructs are theory-driven rather than experimentally manipulated (Bryman & Bell, 2015). A correlational design further supported the examination of direct and indirect associations consistent with mediation models.

Data Collection Procedure

Prior to distribution, organizational consent was obtained from HR departments of the participating companies. Questionnaires were disseminated both in hard copy and electronically, depending on organizational preference and accessibility for employees. Clear instructions, assurances of anonymity, and statements of voluntary participation were included to minimize social desirability bias and encourage authentic responses. Informed consent was obtained from each participant. To reduce common method bias, survey items for predictor and outcome variables were positioned in different sections of the questionnaire and response anchors were varied where possible (Podsakoff et al., 2012).

Measures

All study constructs were measured using established and validated scales. Responses were collected on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), ensuring consistency and interpretability across constructs.

- **Green HRM Practices** were measured with Dumont et al.'s (2017) scale, covering practices such as green recruitment, training, involvement, and performance appraisal. A sample item is: "Our organization integrates environmental concerns into employee performance evaluations." Prior studies report Cronbach's alpha values exceeding 0.85.
- **Employee Green Commitment** was assessed using items adapted from Raineri and Paillé (2016), capturing affective and normative commitment to environmental goals. A sample item reads: "I feel emotionally attached to my company's environmental objectives." Reliability in earlier studies has consistently exceeded 0.80.
- **Green Innovative Behavior** was measured with the instrument developed by Chen and Chang (2013), focusing on employees' proactive eco-innovation efforts. A representative item is: "I frequently develop new ideas to improve the organization's environmental performance." Cronbach's alpha values in prior applications generally exceed 0.85.

- **Perceived Organizational Sustainability** was measured using Chow and Chen's (2012) multidimensional scale, capturing social, environmental, and economic sustainability perceptions. A sample item is: "Our company is committed to balancing financial goals with social and environmental responsibilities." Prior studies report reliability coefficients ranging from 0.82 to 0.90.

The use of these well-established measures ensured construct validity, comparability with existing research, and cultural adaptability within the Pakistani organizational context.

Data Analysis Strategy

Data were analyzed in two stages. First, preliminary analyses were conducted using SPSS to screen for missing values, outliers, and normality assumptions. Descriptive statistics were calculated to provide demographic and organizational profiles of the respondents. Second, hypotheses were tested using Hayes' Process Macro (Model 4) in SPSS, which is specifically designed to test mediation and parallel mediation models. The bootstrapping method with 5,000 resamples was used to generate confidence intervals for indirect effects, as recommended for mediation testing (Hayes, 2018). This approach provided robust estimates of the mediating effects of employee green commitment and green innovative behavior between GHRM practices and perceived organizational sustainability.

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were carefully defined to ensure data quality and relevance. Full-time employees of the five selected FMCG companies were eligible for participation if they had completed at least one year of organizational tenure. This requirement ensured that respondents had sufficient exposure to the organization's HRM and sustainability practices. Employees working in core functional areas—such as production, supply chain, marketing, human resources, and operations—were included, given their direct interaction with organizational policies and practices. Both managerial and non-managerial employees were represented to capture a range of perspectives on sustainability and HRM practices.

Certain groups were excluded to maintain validity. Senior corporate executives and board members were omitted, as their responses might reflect strategic orientations rather than everyday organizational realities. Part-time employees, contractual staff, temporary hires, and interns were also excluded, since their limited tenure and peripheral roles reduce exposure to HRM and sustainability initiatives. Additionally, responses with extensive missing data or clear response patterns (e.g., identical ratings across all items) were discarded during data cleaning. These criteria ensured that the final dataset represented employees with adequate tenure, functional relevance, and genuine engagement with organizational practices.

Ethical Considerations

Ethical guidelines were strictly observed throughout the study. Approval was obtained from the relevant institutional ethics committee, and organizational permissions were secured. Participants were fully briefed on the purpose of the research, their rights, and confidentiality assurances. Participation was voluntary, and respondents retained the right to withdraw at any time without consequence. All responses were anonymized, and data were stored securely and used exclusively for academic purposes. These protocols align with established standards for research in management and with the principles of the Declaration of Helsinki (Resnik, 2018).

DATA ANALYSIS AND RESULTS

Preliminary Data Analysis

Initial data screening confirmed that the dataset was suitable for advanced statistical analysis. Of the 750 distributed surveys, 596 were returned. After addressing missing data (< 2%) using mean substitution and removing 11 multivariate outliers (Mahalanobis distance, $p < .001$), 585 valid cases remained. This sample size exceeds the recommended thresholds for mediation models and provides strong power for bootstrapping procedures (Hair et al., 2019).

Respondent Profile

Demographic details are provided in Table 1. The majority of respondents were male (61.5%), between 26 and 35 years old (43.6%), and held at least a bachelor's degree (57.1%). The largest tenure group (44.8%) reported three to seven years of service, suggesting sufficient experience to evaluate HRM and sustainability practices. This profile aligns with employment patterns in Pakistan's FMCG sector, which is dominated by mid-career professionals in production, supply chain, and marketing roles.

Table 1: Demographic Profile of Respondents (N = 585)

Variable	Category	Frequency	Percentage
Gender	Male	360	61.5%
	Female	225	38.5%
Age	18–25 years	102	17.4%
	26–35 years	255	43.6%
	36–45 years	183	31.3%
	46 years and above	45	7.7%
Education	Bachelor's degree	334	57.1%
	Master's degree	207	35.4%
	Other (Diploma etc.)	44	7.5%
Organizational Tenure	Less than 3 years	132	22.6%
	3–7 years	262	44.8%
	8–12 years	121	20.7%
	More than 12 years	70	12.0%

Descriptive Statistics and Correlations

Table 2 presents means, standard deviations, reliabilities, and correlations. All scales demonstrated strong internal consistency (α values between .87 and .91). Correlations were positive and significant, with the strongest relationship observed between Green HRM practices and organizational sustainability ($r = .61$, $p < .01$).

Table 2: Means, Standard Deviations, Reliabilities, and Correlations among Variables (N = 585)

Variable	M	SD	α	1	2	3	4
1. Green HRM Practices	3.78	0.64	.89	—			
2. Employee Green Commitment	3.85	0.61	.87	.56**	—		
3. Green Innovative Behavior	3.74	0.68	.88	.49**	.52**	—	
4. Organizational Sustainability	3.91	0.59	.91	.61**	.58**	.54**	—

Note. α = Cronbach's alpha; $p < .01$.

Reliability and Validity Assessment

Cronbach's alpha values exceeded .85 for all constructs, supporting internal consistency (Nunnally & Bernstein, 1994). Composite reliability values were above .80 and AVE scores exceeded .50, confirming convergent validity. The Fornell–Larcker test demonstrated discriminant validity, as the square root of AVE for each construct exceeded correlations with other variables (Fornell & Larcker, 1981). Together, these tests affirm the psychometric robustness of the measurement model.

Assumptions Testing for Regression

All regression assumptions were satisfied. Skewness and kurtosis values were within ± 2 (Kline, 2015). VIF values (1.21–2.07) indicated no multicollinearity. Residual scatterplots suggested homoscedasticity, and linearity assumptions were upheld. A Durbin–Watson statistic of 1.94 confirmed independence of errors. These results confirm that the data are suitable for regression-based mediation analysis.

Hypotheses Testing

Direct Effects

Hayes' Process Macro (Model 4) with 5,000 bootstrapped samples was used. Green HRM practices significantly predicted organizational sustainability ($B = .41$, $SE = .05$, $p < .001$), supporting H1. This indicates that firms with stronger GHRM practices report higher sustainability performance as perceived by employees.

Indirect Effects: Individual Mediators

Employee green commitment mediated the relationship between GHRM practices and sustainability (indirect effect = .18, 95% CI [.11, .26]), supporting H2. Similarly, green innovative behavior also acted as a mediator (indirect effect = .15, 95% CI [.09, .23]), supporting H3. These results suggest that GHRM practices work partly through shaping employees' attitudes and behaviors rather than solely through direct organizational mechanisms.

Parallel Mediation Model

The parallel mediation model tested whether both mediators jointly transmitted the effect of GHRM on sustainability. Results showed that the total indirect effect was significant ($B = .33$, $SE = .05$, 95% CI [.24, .42]), with both mediators contributing unique explanatory variance. The indirect paths did not fully overlap, suggesting that commitment and innovative behavior represent distinct psychological and behavioral mechanisms. The direct effect remained significant even after including both mediators ($B = .41$, $p < .001$), consistent with partial mediation. This aligns with HRM theory, which posits that employee-level mechanisms complement but do not exhaust the effects of system-level practices (Wright & Nishii, 2013).

Table 3: Direct, Indirect, and Total Effects of Green HRM Practices on Organizational Sustainability ($N = 585$)

Pathway	B	SE	t	95% CI (LL, UL)
Direct Effect: GHRM → Sustainability	.41	.05	8.20***	[.32, .52]
Indirect Effect via Green Commitment	.18	.04	—	[.11, .26]
Indirect Effect via Green Innovative Behavior	.15	.03	—	[.09, .23]
Total Indirect Effect (parallel mediation)	.33	.05	—	[.24, .42]
Total Effect (Direct + Indirect)	.74	.06	12.33***	[.62, .85]

Note. Bootstrap resamples = 5,000. *** $p < .001$.

Model's Explanatory Power

Table 4 reports R² values. GHRM practices explained 32% of variance in green commitment and 28% in green innovative behavior. The full model explained 45% of variance in organizational sustainability, a substantial level for HRM and sustainability research (Cohen, 1988).

Table 4: Variance Explained by the Model (N = 585)

Dependent Variable	R ²	Adjusted R ²
Employee Green Commitment	.32	.32
Green Innovative Behavior	.28	.28
Organizational Sustainability	.45	.45

Robustness Checks

To minimize concerns of common method bias, Harman's single-factor test was performed. Results showed that a single factor explained only 34% of variance, below the 50% threshold, suggesting that common method variance was not a serious issue (Podsakoff et al., 2012). Additional tests with a common latent factor confirmed that no single factor accounted for the majority of covariance. Together, these checks enhance confidence in the validity of findings.

The results indicate that Green HRM practices influence organizational sustainability through both direct and indirect routes. Employee green commitment and innovative behavior emerge as parallel mediators, each providing a distinct yet complementary pathway. This dual mechanism highlights the value of linking psychological attachment with behavioral innovation. Within the FMCG sector—where efficiency, compliance, and visibility are under constant scrutiny—the evidence shows that employees' commitment and creativity are not secondary influences but central to achieving sustainability outcomes. These findings align with recent arguments in strategic HRM that employees should be seen as active contributors to sustainability rather than as passive recipients of organizational policy (Renwick et al., 2016; Guerci et al., 2019).

DISCUSSION AND CONCLUSION

Discussion of Findings

The findings of this study underscore the central role of Green HRM practices in driving sustainability outcomes within Pakistan's FMCG sector. The first research objective examined whether Green HRM practices significantly predict perceived organizational sustainability. The results confirmed a strong positive association, consistent with previous work that frames sustainable HRM as a key lever of long-term organizational performance (Renwick et al., 2016; Guerci et al., 2019). The explanatory power of the model in this study (45%) was notably higher than the variance typically reported in HRM and sustainability research, which often falls in the 20–35% range (Jackson et al., 2011). This suggests that in emerging markets, where regulatory frameworks and stakeholder demands are still consolidating, Green HRM may carry even greater weight in shaping sustainability perceptions than in more institutionalized settings.

The second objective addressed the mediating role of employee green commitment. Results showed that commitment significantly shaped the relationship between Green HRM and sustainability, reinforcing arguments within the resource-based view that employee commitment represents a strategic asset for sustainable performance (Barney, 1991; Jabbour & de Sousa Jabbour, 2016). Earlier studies have generally highlighted organizational commitment as a mediator between HRM and performance (Meyer

& Allen, 1997), but this study specifies the environmental domain, showing that Green HRM fosters an affective attachment that encourages sustainability-oriented behaviors.

The third objective examined the mediating role of green innovative behavior. Findings confirmed that employees exposed to Green HRM practices were more likely to engage in environmentally focused innovations, which in turn enhanced sustainability. This pattern resonates with recent evidence that HRM practices can stimulate proactive green innovation (Singh et al., 2020). Unlike high-technology industries where innovation capacity is structurally embedded (Chen & Chang, 2013), the FMCG sector relies on incremental improvements in processes and products. The results demonstrate that Green HRM nurtures innovative contributions even in industries more commonly associated with operational efficiency than radical innovation.

Finally, the parallel mediation model revealed that green commitment and green innovative behavior function as independent but complementary mechanisms. Rather than operating sequentially, they provide two distinct channels through which Green HRM influences sustainability. Employees can be simultaneously driven by an affective bond with their organization and by opportunities to enact practical green solutions. This finding adds nuance to current theory by highlighting the multi-dimensional ways in which HRM contributes to sustainability (Kramar, 2014; Yong et al., 2019).

Theoretical Implications

Theoretically, this study extends the discourse on sustainable HRM by articulating and empirically validating a dual-pathway mechanism linking Green HRM practices to organizational sustainability. By integrating employee green commitment and green innovative behavior as parallel mediators, the study moves beyond one-dimensional explanations and enriches the understanding of how human resource systems create value in environmental contexts. This directly contributes to refining the strategic HRM literature by embedding sustainability considerations into the core HRM and performance linkage (Wright & McMahan, 2011). Moreover, the study situates the analysis within the FMCG sector of a developing economy, offering a contextual contribution often missing from research dominated by Western or high-tech industries.

Practical Implications

From a practical standpoint, the findings provide managers with actionable insights into the mechanisms through which Green HRM drives sustainability outcomes. FMCG firms should recognize that implementing green recruitment, training, and performance systems is not sufficient in isolation; these practices must be deliberately designed to strengthen employees' environmental commitment and foster innovative behaviors. For example, targeted green training can cultivate affective bonds by signaling organizational sincerity toward sustainability goals, while reward systems linked to eco-efficiency can stimulate innovation. By aligning HR practices with sustainability goals, firms can simultaneously achieve legitimacy with stakeholders and enhance operational efficiency. Importantly, the evidence that both green commitment and innovation operate independently suggests that managers should design integrated yet distinct initiatives to leverage both affective and behavioral pathways.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

This study is not without limitations. First, the cross-sectional design restricts causal inference. Although theoretical reasoning and statistical methods lend confidence to the findings, longitudinal research would strengthen causal claims by observing how Green HRM influences sustainability outcomes over time. Second, data were collected from employees in five major FMCG firms in Pakistan, which raises concerns of generalizability. Replicating the model in other industries, such as energy, services, or technology, could reveal sectoral differences in how Green HRM translates into sustainability. Third,

while this study relied on self-reported measures, common method bias was mitigated through procedural remedies and statistical checks (Podsakoff et al., 2012). Nonetheless, incorporating supervisor or archival data could further strengthen construct validity.

Future research should also examine additional mediators or moderators. For instance, organizational culture, environmental knowledge, or leadership style may shape the extent to which Green HRM translates into sustainability. Cross-country comparative studies could uncover how institutional pressures and cultural norms moderate these relationships. Finally, researchers could test sequential mediation pathways, where green commitment precedes innovation, offering a more dynamic understanding of how affective states evolve into behavioral outcomes.

CONCLUSION

This study provides robust empirical evidence that Green HRM practices significantly enhance perceived organizational sustainability within Pakistan's FMCG sector, both directly and indirectly through employee green commitment and green innovative behavior. By confirming the dual mediating mechanisms, the research demonstrates that sustainability is achieved not only through structural HR practices but also through the psychological and behavioral engagement of employees.

Overall, the findings underscore the strategic value of embedding environmental sustainability into HR systems. For scholars, the study enriches theory by validating parallel mediation mechanisms; for practitioners, it offers actionable insights into designing HR practices that harness both commitment and innovation. By situating the analysis in an emerging economy, the research highlights the universality yet contextual variability of Green HRM's role in driving sustainability.

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