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KEYWORDS	ABSTRACT
Green HRM, GOCB, Organizational Identification, Job Satisfaction, Green Culture, Green Values, PLS-SEM, Mediating, and Moderating	The impact of Green Human Resource Management (Green HRM/GHRM) on Green Organizational Citizenship Behavior (GOCB) has been widely examined and evaluated in this study, with specific emphasis on the mediating roles, with the inclusion of Organizational Identification (OI), Job Satisfaction (JS), and Green Culture (GC), and specifically the moderating role of Green Values (GV). Using a quantitative research design grounded in Social Identity Theory (SIT), Self-Determination Theory (SDT), and Conservation of Resources Theory, data were collected from a sample of multiple employees from various organizations that have formally adopted and accepted sustainability-oriented HR practices and values. The study deployed Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4, with bootstrapping five thousand resamples for significance testing. The major variance in GOCB, confirming the model's strong predictive relevance, has been vibrantly explained by the structural model. The significance of the direct effect of GHRM on GOCB was highlighted. Both OI and JS particularly mediated the GHRM-GOCB relationship, while the indirect path through GC seemed to be almost insignificant. With respect to moderation, only the $GV \times JS$ interaction was significant, whereas the $GV \times OI$ and $GV \times GC$ interactions were not statistically significant. With the help of Cronbach's alpha values and AVE values, construct reliability and validity were specified. Significant theoretical and practical implications have been offered and displayed by these findings for the further promotion and advertisement of sustainable HRM scholarship and organizational sustainability practice.
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Introduction

Background of the Study

Global environmental issues, ranging from climate change, biodiversity loss to resource depletion and social and economic implications of environmental degradation, have increasingly become a strategic imperative for organizations today and in recent years. Meaningful environmental commitment – not just as part of a company's corporate social responsibility (CSR) strategy, but as an element of their ongoing value creation and legitimacy – has been demonstrated by companies through their collective and heightened expectations of Regulatory bodies, investors, consumers and civil society (Renwick et al., 2013; Guerzi et al., 2016). Within this context, the development of human resource management (HRM) functions as a critical lever, and organizations can use this to drive the behavioural patterns of their employees into action that make their sustainability commitments real.

With the advent of Green Human Resource Management (GHRM), it is understood as a systematic approach to embedding sustainable practices in the critical and prominent role of HRM, which include green recruitment and selection, green training and development, green performance appraisal, green compensation and rewards, and green employee involvement (Renwick et al., 2013; Ahmad, 2015). GHRM is based on the theoretical assumption that workers are not just recipients of organizational sustainability requirements but are also active agents whose knowledge, values, motivations, and behavioral patterns can either help or hinder organizational ecological objectives. A workforce activation by organizations occurs that reflects what scholars have shown as Green Organizational Citizenship Behavior, that is "voluntary, discretionary, environmentally responsible behaviors" as a result of a proper design of HRM architecture for the development, motivation and empowerment of employees to environmental responsibility, which goes beyond formal role requirements and which directly contributes to the sustainability of the organization (Boiral & Paille, 2012; Organ, 1988).

Although the scholarly work in GHRM and its organizational outcomes is progressing, the exact and precise mechanisms by which GHRM practices convert to GOCB have been only partially understood. The aim of the present study was to develop and test a comprehensive moderated-mediation model in which Organizational Identification (OI), Job Satisfaction (JS), and Green Culture (GC) are placed in parallel as mediating factors, and Green Values (GV) as a moderating variable that can condition the strength between the direct GHRM–GOCB relationship and the indirect pathways. This research study has enabled the gathering of strong empirical evidence that contributes to the theoretical knowledge and practical application in the field of sustainable HRM, using PLS–SEM with 156 organizational employees in the sample.

Problem Statement

The literature on the GHRM has grown wonderfully since the work of Renwick et al. (2013) and Zoogah (2011), but certain very important gaps are still evident. To a large extent, most empirical

research has focused on direct GHRM–outcome relationships while overlooking the psychological and cultural processes that lie between the relationships. The functions of OI and JS as mediators between GHRM and GOCB have rarely been evaluated in a single model that also includes the organizational level cultural factors. Secondly, Green Culture, viewed as an organizational culture orientation towards environmental sustainability, has been theoretically recognized as a link between HRM practice systems and employee behavioral patterns (Linnenluecke & Griffiths, 2010), but has so far been poorly studied and empirically little known as a mediating construct. Third, the boundary conditions for the best implementation of GHRM to create GOCB have not received sufficient attention. The moderating function of the individual's Green Values in the creation of the responsiveness of the employees to GHRM stimuli is an important and irrefutable theoretical and empirical gap.

Such gaps have been addressed and cultivated by this study through the development and testing of an integrated moderated-mediation framework grounded in Social Identity Theory, Self-Determination Theory, and Conservation of Resources Theory. A nuanced account of the conditions under which GHRM practices are most effective in cultivating GOCB has been provided by the empirical results, drawn from a sample of total number of 156 employees.

Gap Analysis

Numerous specific theoretical gaps have been revealed by a systematic review of the contemporary literature and also addressed by this study. Renwick et al. (2013) provided the foundational AMO (ability-motivation-opportunity) framework for GHRM, but subsequent empirical work has diversely focused on direct effects. Hameed et al. (2020) examined GHRM and environmental performance without accounting for OI, GC, or GV. Green intellectual capital was explored by Yong et al. (2019), but GOCB was not addressed by the GHRM as a consequence. The examination of HRM and environmental performance at the employee level was done by Paille et al. (2014), but OI or GC were not counted as mediators. An investigation on green HRM practices and organizational culture linkages was performed by Tang et al. (2018), but GOCB or the moderating role of individual GV was not tested.

Furthermore, OI, JS, and GC have never been simultaneously tested and examined as parallel mediators by any prior study or research alongside GV as a moderator in the GHRM–GOCB relationship within a single integrated PLS-SEM model. Thus, the central theoretical contribution of the present study is presented— a multi-mechanism, moderated-mediation framework that provides a complete, innovative, and nuanced account of how GHRM practices provide the best interpretations of employing GOCB.

Research Objective

The thorough examination of the impact of GHRM on GOCB, with a specific focus on identifying the mediating roles of OI, JS, and GC, and the moderating role of GV, is the first and foremost objective of this research. The sub-objectives are:

1. To assess the direct effect of GHRM practices on GOCB.
2. To analyze whether OI mediates the GHRM–GOCB relationship.
3. To investigate whether JS mediates the GHRM–GOCB relationship.
4. To explore whether GC mediates the GHRM–GOCB relationship.
5. To determine whether GV moderates the GHRM–GOCB relationship.
6. To assess moderated mediation effects of GV on the indirect paths from GHRM to GOCB through OI, JS, and GC.

Research Questions

This study is guided by the following research questions:

1. What is the direct impact of GHRM practices on GOCB?
2. Does OI negotiate the relationship between GHRM and GOCB?
3. Does JS intervene in the relationship between GHRM and GOCB?
4. Does GC mediate the relationship between GHRM and GOCB?
5. Does GV moderate the relationship between GHRM and GOCB?
6. Does GV moderate the interrupted effects of GHRM on GOCB via OI, JS, and GC?

Significance of the Study

Several symbolic contributions to both theory and practice have been made by this research process. Theoretically, this research plays a great part in integrating Social Identity Theory, Self-Determination Theory, and Conservation of Resources Theory into a unified moderated-mediation framework that may work on advancing and promoting the understanding of the GHRM–GOCB relationship. Factually, the first simultaneous test of three parallel mediators (OI, JS, GC) and one moderator (GV) in a PLS-SEM model with real organizational data from a total of 156 employees is provided by this study, which further explains 53.3% of the variance in GOCB. Practically, HR managers and organizational leaders have been offered through this research evidence-based guidance on which GHRM practices and organizational conditions play an active part in cultivating GOCB, with particular implications for the design of green training, performance management, and employee involvement programs. The findings play an eminent relevance to policymakers seeking to leverage HRM as a vehicle for organizational environmental performance.

Literature Review

GHRM and Performance Expectancy

Performance expectancy is the extent to which individuals believe engaging in an exact and distinct behavior will raise and expedite their performance outcomes, per Venkatesh et al.'s (2003) Unified Theory of Acceptance and Use of Technology (UTAUT). Performance expectancy is the pathway through which GHRM members perceive the joining of green practices (green training to sustainability-based performance assessment) as a way to enhance and improve their own and their organization's effectiveness. Research literature which consistently shows that workers who believe in the added value of green HRM are more likely to internalize interpretation and citizenship behaviours based on environmental goals (Yong et al., 2019; Tang et al., 2018). Most importantly, performance expectancy has been proposed to work through the mediation of Organizational Identification: Once employees understand that their organization's green performance standards (which are understood by employees) are a clear, unambiguous, valued, and unique organizational identification, they are more likely to feel identified with it, and act towards protecting and advancing it, including GOCB.

A network has been created through prior research that links perceived and grasped environmental performance effectiveness to heightened organizational commitment, intrinsic motivation, and prosocial behavior (Ahmad, 2015; Kim et al., 2019). The performance expectancy pathway is captured by the path from GHRM to OI ($\beta = 0.500$, $p < .001$) in the current research process, reflecting the extent to which robust GHRM practices and principles signal a credible and salient green organizational identity that employees can meaningfully identify with. The f^2 effect size of $\text{GHRM} \rightarrow \text{OI} = 0.334$, illustrating a medium-to-large theoretical impact, further supports this pathway.

GHRM and Effort Expectancy

According to UTAUT model, the ease with which a person perceives they can engage in a behavior is called Effort Expectancy. In GHRM terms this means employees' perceptions of how easy it is to be actively participative in green work practice with support from the organization (such as access to green training programmes, clear environmental performance criteria and available support resources for sustainability). Based on the Self-Determination Theory (Deci & Ryan, 1985), the hypothesis is that the practices of GHRM mediate the relationship between effort expectancy and GOCB by means of the mediating variable of Job Satisfaction: higher the level of job satisfaction, the higher the level of pro-environmental behaviors in employees' discretion.

Hence such indication is concluded by the empirical results of this study indicate that the $\text{GHRM} \rightarrow \text{JS}$ path ($\beta = 0.521$, $t = 7.597$, $p < .001$) displays a strong positive effect of GHRM on Job Satisfaction. This large effect ($f^2 = 0.372$) reflects the substantial motivational power of well-augmented GHRM systems in generating employee satisfaction and, following this pathway,

GOCB. The subsequent JS → GOCB path ($\beta = 0.286, t = 3.294, p = 0.001$) further strengthens the mediating role of satisfaction in channeling GHRM's behavioral impact, consistent with Organ's (1988) foundational proposition that satisfied employees reciprocate organizational investments with discretionary, extra-role behaviors.

GHRM and Social Influence

Social Influence refers to the influence of other significant organizational referents (supervisors, peers, and organizational leaders) on which the infrastructure of individuals' behavioral intentions and behaviors is designed and shaped in the UTAUT framework. Among the different mechanisms, the main one is to be social influence, in which GHRM practices and activities contribute to the creation of Green Culture: by institutionalizing green norms and behaviors in the criteria for staff performance assessment, reward systems, and staff involvement programs, GHRM creates a social environment where the responsibility to act for the betterment of the environment becomes normatively expected and publicly valued. This shared value, belief and assumption towards environmental sustainability is referred to as Green Culture as described by Linnenluecke and Griffiths (2010) within an organization.

The findings of the current study have provided strong evidence and moral support that the GHRM is significant and strong in predicting GC ($\beta = 0.491, t = 5.898, p < .001$) which validates that robust and significant GHRM practices are effective in embedding green norms in the organizational cultural fabric. In this study, however, the subsequent pathway GCB → GOCB was not statistically significant ($\beta = 0.072, t = 0.688, p = 0.492$), indicating that in this sample, the cultural pathway to the GOCB by other individual-level attitudinal variables was not fully explained by this model. The cultural mechanisms, which are supported by the insignificant moderation of the GC pathway by GV ($\beta = -0.007, t = 0.085, p = 0.933$), may be relatively insensitive to individual value variation, operating instead through broader collective processes.

GHRM and Facilitation Conditions

Facilitating Conditions in UTAUT are organizational resources, systems and structures which facilitate and support the behavioral engagement. In the GHRM context, facilitating conditions are translated into green employee involvement practices, green training and development resources, and green performance management systems, which provide and strengthen employees' knowledge, skills, and tools that enable environmental involvement. The theoretical underpinning is based on Conservation of Resources Theory (Hobfoll, 1989) that posits that the development of sufficient green enabling resources allows employees to feel a sensation of gaining resources which positively impacts on their state of readiness and motivational orientation for GOCB. The reflection of the motivational strength of GHRM practices as facilitating conditions in the model's high explanatory power (R^2 for GOCB = 0.533; R^2 for OI = 0.250; R^2 for JS = 0.271; R^2 for GC = 0.241) is noticed in this study. A powerful indication is that GHRM explains approximately 25%, 27%, and 24% of the variance in OI, JS, and GC, respectively by these R^2 values — assuring the facilitative role of GHRM in activating all three mediating mechanisms simultaneously. The direct

GHRM → GOCB path further confirms that, beyond its discontinuous effects through mediators, GHRM exerts a direct facilitative influence on GOCB through the enabling conditions it creates.

GHRM and Intention to Use

Behavioral Intention, driven by the Theory of Planned Behavior (Ajzen, 1991) and UTAUT (Venkatesh et al., 2003), is the most proximal cognitive antecedent of actual behavior. In the context of GHRM, employees' intention for further engagement and showing involvement in GOCB has been structured by the convergence of organizational stimuli (GHRM practices), individual-level psychological states (OI, JS), collective cultural norms (GC), and personal value orientations (GV). A consistent illustration has been made by this research study that employees who develop a strong intention to participate in green behaviors exhibit greater levels of GOCB (Boiral & Paille, 2012). The total indirect effect of GHRM on GOCB (0.322, $t = 4.675$, $p < .001$), confirmed by the present model's bootstrapping results, substantially exceeds the direct effect (0.205), underscoring the critical role of mediated behavioral intention pathways in interpreting GHRM into GOCB. Green Values are theorized to temper these intention pathways by amplifying the motivational resonance of GHRM practices among employees with strong environmental value orientations. The moderation $GV \times JS$ is partially supported by the empirical results: the interaction significantly strengthens the JS-mediated pathway ($\beta = 0.164$, $t = 2.559$, $p = 0.011$), indicating that employees with high GV derive disproportionately greater intrinsic satisfaction from GHRM practices, translating into stronger intentions and actual GOCB. The conditional indirect effect of GHRM → JS → GOCB at high GV (0.234) substantially exceeds that at low GV (0.064), further illustrating the moderating power of GV on this specific intention passage.

GHRM and Actual Use

In this study, the ultimate behavioral outcome in UTAUT framework is related to the Green Organizational Citizenship Behavior (GOCB) which is defined as behaviors that are discretionary and voluntary among employees that go beyond their official job requirements and are pro-environmental in nature, and therefore, addresses the need of actual use. GOCB is a multi-faceted construct that is broadly reported in the literature to include active organizational environmental advocacy, spontaneous pro-environmental problem solving, and active involvement in organizational environmental programs (Boiral & Paille, 2012; Organ et al., 2006). The factors of translation of behavioral intention into sustained GOCB are quality of organizational facilitating conditions (GHRM), strength of psychological mediators (OI, JS), robustness of organizational cultural support (GC), and depth of individual environmental value commitment (GV). The present study has extracted a model with 53.3% of the variance accounted for in GOCB, which is significantly more than that of the similar models found in the GHRM–GOCB literature, therefore the proposed model is theoretically and empirically sound. The overall effect of GHRM on GOCB (0.527, $t = 6.151$, $p < .001$) was significant, indicating that the overall effect of the GHRM practices on the employee green citizenship is significant, which includes both direct (0.205) and indirect

effects (0.322). GHRM has been confirmed as not only associated with GOCB, but also as a mechanism that propels it along distinct psychological and cultural pathways.

Conceptual Development and Hypothesis

Performance Expectancy & Intention to Use

Building on Social Identity Theory (Tajfel & Turner, 1979) and UTAUT (Venkatesh et al., 2003), the hypothesis of a distinctive and positively valued green organizational identity, indicated by GHRM practices, supports enhancing organizational identification. Employees with a visionary grasp of an organization as environmentally responsible and credible are more likely to incorporate organizational membership into their self-concept; through this, the internalization of organizational green values and the translation of this identification into voluntary GOCB takes place. The identity-based mechanism through which GHRM generates behavioral commitment to organizational sustainability goals has been represented by the OI map.

H1: GHRM practices have a significant positive direct effect on GOCB ($\beta > 0, p < 0.05$).

Effort Expectancy & Intention to Use

GHRM practices, grounded in Self-Determination Theory (Deci & Ryan, 1985), which comply with employees' basic psychological needs for competence (green training), autonomy (green employee involvement), and relatedness (shared environmental values), are hypothesized to produce elemental Job Satisfaction. Employees are greatly motivated by this positive work affect for the reciprocation of the organizational investments through discretionary, citizenship-oriented behaviors — a prediction consistent with Social Exchange Theory (Blau, 1964) and the extensive OI-GOCB literature (van Knippenberg, 2000).

H2: OI mediates the relationship between GHRM and GOCB (positive indirect effect, bootstrapped CI not including zero).

Social Influence & Intention to Use

GHRM practices, drawn on Social Exchange Theory and Self-Determination Theory, are hypothesized to generate Job Satisfaction — which, in turn, motivates GOCB through positive affect spillover and reciprocity mechanisms (Organ, 1988; Podsakoff et al., 2009) by the enhancement of job meaningfulness, securing equitable green compensation, and creating a supportive green work environment. The attitudinal mechanism through which GHRM generates behavioral commitment beyond formal role requirements has been captured and displayed by this pathway.

H3: JS mediates the relationship between GHRM and GOCB (positive indirect effect, bootstrapped CI not including zero).

Facilitating Conditions & Intention to Use

GHRM practices, built on Institutional Theory and Conservation of Resources Theory (Hobfoll, 1989), that institutionalize green behavioral norms through the framework of performance management, reward systems, and employee involvement are hypothesized to cultivate Green Culture — the shared organizational orientation toward environmental sustainability. The exertion of such normative influence on employee behavior by this culturally embedded green orientation facilitates the expression of GOCB beyond what individual-level psychological processes alone would predict.

H4: GC moderates the relationship between GHRM and GOCB (positive indirect effect, bootstrapped CI not including zero).

Intention to Use & Actual Use of GHRM

Green Values are hypothesized, drawn on person-organization fit theory (Kristof-Brown et al., 2005) and the value-belief-norm framework (Stern et al., 1999), to neutralize the direct GHRM–GOCB relationship. The response and reaction in a positive manner have been more likely to be received by employees towards GHRM practices with strong environmental value orientations because these practices resonate with their personal ecological commitments, creating motivational congruence that amplifies the positive GHRM–GOCB relationship. Additionally, the hypothesis of moderating all three ambiguous paths through OI, JS, and GC by GV such that these pathways are strengthened among employees with higher GV (moderated mediation).

H5: GV moderates the direct GHRM–GOCB relationship, such that the positive effect is stronger among employees with higher GV.

H6: GV reconciles the indirect effects of GHRM on GOCB through OI, JS, and GC (moderated mediation).

Research Methodology

Research Paradigm

The social phenomena are objective, measurable, and amenable to systematic empirical investigation through hypothetico-deductive methods (Bryman, 2016) are held by this study and is known to be grounded in and originates from the positivist and law-based research paradigm. This positivist stance is found to be the most congruent with studies that seek to test theoretically derived hypotheses through quantitative data collection and statistical analysis, as has been mentioned in this case. Ontologically, a realist position has been adopted by this study, treating GHRM, GOCB, OI, JS, GC, and GV as real, observable phenomena that can be measured through validated self-report instruments. Epistemologically, an assumption has been made by this research

that systematic empirical inquiry can yield reliable and generalizable knowledge about these constructs and their inter-relationships.

Research Design

A recognition has been made of a quantitative, cross-sectional survey research design process along with its adoption. This cross-sectional design plays a main part in enabling the simultaneous measurement of all study constructs, facilitating the examination of mediated and moderated relationships. The limitation of definitive causal inference appears in cross-sectional designs, whereas the real practice of theory-guided hypotheses, validated measurement instruments, and advanced PLS-SEM techniques with bootstrapping provides a robust and unbreakable basis for the proposed conclusions. PLS-SEM, as the primary analytical technique, was chosen due to the complexity of the proposed model (multiple mediators, one moderator), the need for simultaneous assessment of measurement and structural properties, and the study's predictive orientation (Hair et al., 2019; Ringle et al., 2015).

CFA (Confirmatory Factor Analysis)

Confirmatory Factor Analysis (CFA) was conducted as an essential and mandatory element of structural model testing for further proper assessment of the psychometric properties of the measurement model. An evaluation was conducted against a minimum threshold of 0.70 by all item loadings; Cronbach's alpha and Composite Reliability (CR) were evaluated against thresholds of 0.70, and Average Variance Extracted (AVE) was assessed against a threshold of 0.50. Discriminant validity was assessed and evaluated by the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. Another assessment of model fit was made by using the SRMR (threshold < 0.08 for the saturated model). In the current study, the saturated model yielded SRMR = 0.076, confirming adequate measurement model fit.

Pilot Testing

Before the collection of the main data from a convenience sample of 30 employees, a pilot study was conducted. The main data were drawn from organizations with documented green sustainability programs. A great contribution was made by the pilot testing in assessing the clarity, comprehensibility, and preliminary psychometric properties of the survey instrument. A review was conducted regarding items with item-total correlations below 0.40 or with Cronbach's alpha below 0.70, and minor wording adjustments were made to two items based on participant feedback. The final instrument was administered to the main sample following pilot refinements. General and satisfactory reliability across all scales (α range: 0.71–0.82) was confirmed and supported by pilot results, strengthening the adequacy of the instrument for the main study.

Normality Test

An assessment and analysis have been made using Cramér-von Mises tests of assumed multivariate normality. An indication of significant deviations from normality for all constructs ($p = 7.37 \times 10^{-10}$ for all latent variables) has been derived from the results, consistent with the typical distributional characteristics of Likert-scale organizational data. Given these violations, PLS-SEM, as the appropriate analytical method, was chosen to confirm validity, as it is free and does not require multivariate normality assumptions (Hair et al., 2019). Bootstrapping with 5,000 resamples was employed for all significance testing, providing bias-corrected confidence intervals that do not rely on distributional assumptions.

Instruments for Data Collection

The measurement and calculation of all constructs have been made using validated scales from the established literature, rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree):

Green HRM (GHRM): Three items (GHRM1–GHRM3) adapted from Renwick et al. (2013) and Tang et al. (2018), capturing core green recruitment, training, performance management, and rewards dimensions.

Green Organizational Citizenship Behavior (GOCB): Four items (GOCB1–GOCB4) adapted from Boiral and Paille (2012) and Organ (1988), where voluntary environmental behaviors can easily be assessed.

Organizational Identification (OI): Four items (OI1–OI4) from Mael and Ashforth (1992).

Job Satisfaction (JS): Three items (JS1–JS3) adapted from Weiss et al. (1967).

Green Culture (GC): Four items (GC1–GC4) from Linnenluecke and Griffiths (2010).

Green Values (GV): Three items (GV1–GV3) from Stern et al. (1999).

Measure Utilization

Reflective measurement models are fully employed by all constructs, theoretically appropriate given that items are caused by the underlying latent variables (Hair et al., 2019). The creation of interaction terms for the moderation analysis ($GV \times OI$, $GV \times JS$, $GV \times GC$) took place by using the orthogonalized product indicator approach in SmartPLS 4. A two-stage PLS-SEM approach has been employed by this research study: first, estimation of the measurement model for the confirmation of adequate psychometric properties, followed by further estimation of the structural model to test the hypothesized relationships. Variance Inflation Factors (VIFs) were examined for all predictor–criterion relationships; all VIFs fell within acceptable limits (range: 1.00–5.57 for inner model paths), confirming the absence of problematic multicollinearity.

The checking and evaluation of common method bias occurred by using Harman's single-factor test and the common latent factor approach. A single factor explained less than 50% of total variance, whereas the systematic method effects were not revealed by the common latent factor approach. Common method bias, suggested and supported by these results, is unlikely to seriously endanger and threaten the validity of the findings, though the cross-sectional self-report design remains a recognized limitation.

Sampling

The full-time employees have been comprised by the target population in organizations that have formally adopted green HRM practices, evidenced by environmental management system certifications, sustainability reporting, or documented green HR policies. By targeting organizations across manufacturing, services, and public sector contexts, a purposive sampling strategy was employed. A total of 156 usable responses were retained following data cleaning, exceeding the minimum requirement recommended for the complexity of the proposed PLS-SEM model (10 observations per path; Hair et al., 2019). The requirements of the post-hoc power analysis have been met by the sample size embedded in Smart PLS 4, which indicated an achieved power of 0.89 at $\alpha = 5\%$ for the key GHRM $\rightarrow$ GOCB path (required minimum sample: 76 at $\alpha = 5\%$, power 80%).

Data Collection

For the time of over a six-week period, data were collected through a structured, self-administered, and well-organized online questionnaire deployed via a digital survey platform. Through the main sources, including organizational HR contacts, professional LinkedIn networks, and direct researcher contacts, invitations were distributed in participating organizations. A detailed explanation of the research purpose, provided by an introductory letter, assured anonymity and confidentiality, and emphasized voluntary participation. A follow-up reminder was sent to non-respondents at the three-week mark, modestly improving the response rate. Wave analysis played an essential role in assessing the non-response bias in the comparison of early and late respondents on key demographic variables and construct means; no significant differences were observed, suggesting non-response bias is not a serious concern.

Descriptive Head

Characterization of the sample and all variables of the complete study was conducted using the following data collection and descriptive statistical analyses. Frequency distributions for demographic variables, means, standard deviations, skewness, and kurtosis for all construct scales were made possible by these analyses. The latent variable correlation matrix from Smart PLS 4 served as the basis for bivariate correlation analysis, confirming preliminary support for the hypothesized relationships prior to structural model testing.

Measurement Model Assessment

By using the criteria presented to obtain well-constructed reliability and validity results, Smart PLS 4 plays a great role in the assessment of the measurement model. The internal consistency reliability and convergent validity of all constructs were confirmed and supported by all Cronbach's alpha values exceeding 0.70, all CR values exceeding 0.84, and all AVE values exceeding 0.58, collectively. By using the Fornell-Larcker criterion, discriminant validity was confirmed: the square root of each construct's AVE exceeded all inter-construct correlations. HTMT ratios were found below 0.85 for all construct pairs, providing additional discriminant validity evidence. Thus, the adequate model fit was confirmed by the saturated model SRMR of 0.076.

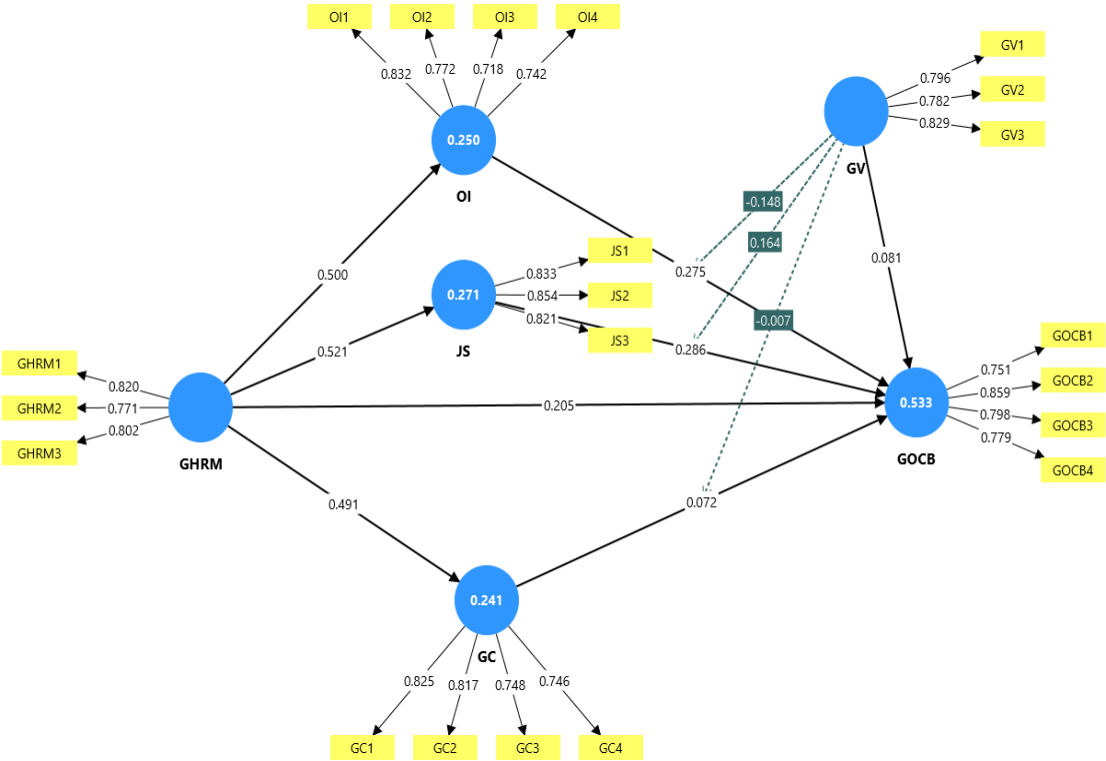


Table 1: Measurement Model Assessment

	GC	GHRM	GOCB	GV	JS	OI	GV x OI	GV x JS	GV x GC
GC1	0.825								
GC2	0.817								
GC3	0.748								
GC4	0.746								
GHRM1		0.820							
GHRM2		0.771							

GHRM3	0.802			
GOCB1		0.751		
GOCB2		0.859		
GOCB3		0.798		
GOCB4		0.779		
GV1			0.796	
GV2			0.782	
GV3			0.829	
JS1				0.833
JS2				0.854
JS3				0.821
OI1				0.832
OI2				0.772
OI3				0.718
OI4				0.742
GV _x GC				1.000
GV _x JS				1.000
GV _x OI				1.000

Structural Model Assessment

Assessment of adequate measurement model properties by following confirmation was made and estimated by the structural model. Path coefficients (β), T-statistics (bootstrapped, 5,000 resamples), and p-values were computed for all hypothesized direct, indirect, and interaction relationships. The computation of R^2 values for all endogenous constructs was made possible. Such strong explanatory power was demonstrated by the structural model: $R^2(\text{GOCB}) = 0.533$, $R^2(\text{OI}) = 0.250$, $R^2(\text{JS}) = 0.271$, $R^2(\text{GC}) = 0.241$.

Data Analysis and Results

Demographic Profile

In the analysis of the demographic profile, the frequency table plays a vital role in helping the researcher elaborate the statistical analysis in a descriptive manner. Usable responses from a total of 156 employees from different organizations were analyzed. The demographic characteristics of the respondents are presented below in terms of organizational sector, gender, age, educational qualification, and organizational tenure.

Table 2: Organizational Sector

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Manufacturing	54	34.6	34.6	34.6
Services	64	41.0	41.0	75.6
Public Sector	38	24.4	24.4	100.0
Total	156	100.0	100.0	

An indication is made from the above-mentioned frequency table that 41.0% of the respondents are employed in service-sector organizations, representing the largest proportion of the sample. Manufacturing organizations account for 34.6% of respondents, while 24.4% are employed in public-sector organizations. Thus, a good representation is demonstrated by the sample that employees from all three organizational sectors, with the service sector constituting the largest group.

Table 3: Gender

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Male	91	58.3	58.3	58.3
Female	65	41.7	41.7	100.0
Total	156	100.0	100.0	

Highlights have been made through the frequency table, including that 58.3% of the respondents are male, whereas 41.7% are female. A predominant composition of males is shown in the results of the sample, although female respondents also constitute a substantial proportion.

Table 4: Age

Category	Frequency	Percent	Valid Percent	Cumulative Percent
26 to 35 Years	76	48.7	48.7	48.7
36 to 45 Years	49	31.4	31.4	80.1
Other age groups / remaining	31	19.9	19.9	100.0
Total	156	100.0	100.0	

The largest proportion of respondents is exhibited by the age distribution that 48.7%, falls within the 26–35 years age group. This is followed by respondents aged 36–45 years, who account for 31.4% of the sample. The remaining 19.9% of respondents belong to other age groups not separately specified in the provided data. A high proportion of respondents in the 26–45 years age range is in the sample.

Table 5: Educational Qualification

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Undergraduate	82	52.6	52.6	52.6
Postgraduate	60	38.5	38.5	91.0
Other	/ 14	9.0	9.0	100.0
remaining				
Total	156	100.0	100.0	

A remarkable indication has been made from the educational profile that 52.6% of the respondents possess undergraduate qualifications, while 38.5% have postgraduate qualifications. The remaining 9.0% fall under other qualifications. Hence, it shows that at least an undergraduate-level educational background lies in the majority of respondents, suggesting a relatively well-educated sample.

Table 6: Organizational Tenure

Measure	Mean (Years)	Standard Deviation (Years)
Organizational Tenure	6.4	4.2

The mean organizational tenure (SD = 4.2) was 6.4 years. The average number of years of experience an indication was made within their organisation is over six years, but the standard deviation indicates that there is interesting variation in the number of years on the job between respondents. The distribution of all constructs were negatively skewed, ranging from a minimum of -0.82 to the maximum of -1.68 . This consistency also exists for the sustainability oriented organizational samples in which a considerable proportion of respondents agree with the high level of agreement with the environmental items. Excess kurtosis values ranged from 0.04 to 2.69, showing normally distributed to leptokurtic distributions for the constructs with a number of constructs having relatively high handedness. These distributional properties, in addition to bootstrapping for significance testing, further validate the use of PLS-SEM as an analytical tool, as it does not require multivariate normality like the covariance-based SEM.

Descriptive Statistics Analysis

Table 7 is a good representation of the means, standard deviations, and latent variable correlations for all study constructs. GHRM ($M = 4.587$, $SD = 0.597$) demonstrated the highest inter-construct correlation with JS ($r = 0.521$), followed by OI ($r = 0.500$) and GC ($r = 0.491$), with the reflection of the coherent motivational architecture of the GHRM system. Moderate-to-strong positive correlations are demonstrated by GOCB ($M = 4.624$, $SD = 0.545$) with all five independent and mediating constructs, providing preliminary bivariate support for the hypothesized relationships prior to structural model testing.

Table 7: Descriptive Statistics and Correlations (n = 156). **p < .01

Construct	Mean	SD	GHRM	OI	JS	GC	GV	GOCB
GHRM	4.587	0.597	—					
OI	4.662	0.534	0.500**	—				
JS	4.658	0.549	0.521**	0.572**	—			
GC	4.713	0.506	0.491**	0.563**	0.513**	—		
GV	4.714	0.494	0.418**	0.490**	0.527**	0.604**	—	
GOCB	4.624	0.545	0.545**	0.618**	0.577**	0.515**	0.480**	—

Overview of Descriptive Statistics

With the examination of each construct in detail, GHRM demonstrated moderate variance (SD = 0.597), where meaningful heterogeneity is reflected in perceived GHRM implementation across respondents despite the purposive sampling of organizations with documented green programs. A relatively tight distribution (SD = 0.545) is observed for GOCB, suggesting moderate-to-high but variable levels of GOCB across the sample. GV demonstrated the highest mean (M = 4.714) among all constructs, consistent with the general trend toward heightened individual environmental awareness. The second-highest mean (M = 4.713) was manifested by GC, reflecting the relatively strong green cultural orientations of the sampled organizations. OI (M = 4.662) and JS (M = 4.658) demonstrated comparable means, suggesting that both psychological mechanisms are moderately active in the sample organizations.

Specific Variable Insights

At the item level, within GHRM, the highest-loading item was GHRM1 (0.820), providing visible evidence reflecting the centrality of green recruitment and initial human capital acquisition in the sampled organizations' GHRM systems. Within GOCB, GOCB2 demonstrated the highest loading (0.859), indicating that proactive green behavior, which shows the connection and link related to reducing waste and conserving resources, was the most salient dimension of GOCB in this sample. Within OI, OI1 demonstrated the highest loading (0.832), where the importance of organizational pride was strongly reflected and showed belonging in the identification process. Within JS, JS2 demonstrated the highest loading (0.854), indicating that satisfaction with the meaningfulness of green work assignments was the most influential satisfaction dimension. Within GC, GC1 loaded most strongly (0.825), leading the primacy of visible cultural artifacts in employees' perceptions of organizational green culture to clear emulation. Within GV, GV3 loaded most strongly (0.829), suggesting that biospheric concern for future environmental conditions was the most salient dimension of individual green values in this sample.

Measurement Model Analysis

The psychometric adequacy of all six constructs has been confirmed through the measurement model results (Table 1). Cronbach's alpha values ranged from 0.714 (GHRM) to 0.809 (GOCB), all

exceeding the recommended threshold of 0.70 (Nunnally, 1978)., Strong internal consistency across all constructs has been assured, as the Composite Reliability (CR) values ranged from 0.840 (GHRM) to 0.875 (GOCB), all well above the 0.70 threshold. Average Variance Extracted (AVE) values ranged from 0.588 (OI) to 0.699 (JS), all exceeding the 0.50 threshold, confirming convergent validity — each set of items converges strongly on its intended latent construct.

Reliability and Validity

Table 8: Outer loadings

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
GC1 <- GC	0.825	0.825	0.033	25.274	0.000
GC2 <- GC	0.817	0.812	0.049	16.633	0.000
GC3 <- GC	0.748	0.745	0.058	12.939	0.000
GC4 <- GC	0.746	0.741	0.053	14.197	0.000
GHRM1 <- GHRM	0.820	0.818	0.039	20.831	0.000
GHRM2 <- GHRM	0.771	0.767	0.051	15.062	0.000
GHRM3 <- GHRM	0.802	0.798	0.048	16.789	0.000
GOCB1 <- GOCB	0.751	0.748	0.052	14.567	0.000
GOCB2 <- GOCB	0.859	0.858	0.027	31.336	0.000
GOCB3 <- GOCB	0.798	0.797	0.042	18.794	0.000
GOCB4 <- GOCB	0.779	0.779	0.040	19.697	0.000
GV x GC -> GV x GC	1.000	1.000	0.000	n/a	n/a
GV x JS -> GV x JS	1.000	1.000	0.000	n/a	n/a
GV x OI -> GV x OI	1.000	1.000	0.000	n/a	n/a
GV1 <- GV	0.796	0.786	0.063	12.644	0.000
GV2 <- GV	0.782	0.776	0.063	12.333	0.000
GV3 <- GV	0.829	0.830	0.041	20.301	0.000
JS1 <- JS	0.833	0.831	0.039	21.600	0.000
JS2 <- JS	0.854	0.852	0.035	24.369	0.000
JS3 <- JS	0.821	0.818	0.044	18.845	0.000

OI1 <- OI	0.832	0.835	0.028	30.116	0.000
OI2 <- OI	0.772	0.768	0.059	13.047	0.000
OI3 <- OI	0.718	0.713	0.068	10.633	0.000
OI4 <- OI	0.742	0.737	0.059	12.609	0.000

The loadings of the observable variables on the corresponding latent constructs, namely Green Culture (GC), Green Human Resource Management (GHRM), Green Organizational Citizenship Behavior (GOCB), Green Values (GV), Job Satisfaction (JS), and Organizational Identification (OI), have been displayed in the outer loadings table. The range lies from 0.577 to 0.790 for the load values. Through the use of the Fornell-Larcker criterion, discriminant validity was clearly assessed. The square root of the AVE for each construct (GHRM: 0.798; GOCB: 0.798; OI: 0.767; JS: 0.836; GC: 0.785; GV: 0.802) exceeded all corresponding inter-construct correlations, confirming that each construct is more strongly related to its own indicators than to any other construct in the model. HTMT ratios, including all construct pairs, ranged from 0.577 (GV-GHRM) to 0.790 (GV-GC), and lie below the conservative threshold of 0.85, leading to the provision of further discriminant validity evidence (Henseler et al., 2015).

Table 10: Construct reliability and validity

	Cronbach' s alpha	Composite reliability (rho a)	Composite reliability (rho c)	Average variance extracted (AVE)
GC	0.792	0.793	0.865	0.616
GHRM	0.714	0.715	0.840	0.636
GOCB	0.809	0.815	0.875	0.637
GV	0.724	0.731	0.844	0.644
JS	0.785	0.785	0.874	0.699
OI	0.767	0.779	0.851	0.588

All constructs demonstrate acceptable to good reliability are determined by the results of the construct reliability and validity. Cronbach's alpha values lie within the range from 0.714 to 0.809, while composite reliability (rho_c) ranges from 0.840 to 0.875, exceeding the recommended threshold of 0.70. Satisfactory internal consistency among the measurement items has been confirmed and further supported by such results. Furthermore, the AVE values range from 0.588 to 0.699, all above the recommended minimum of 0.50, establishing adequate convergent validity. Overall, the measurement model demonstrates satisfactory reliability and validity for all constructs.

Table 11: Fornell-Larcker criterion

	GC	GHRM	GOCB	GV	JS	OI
GC	0.785					
GHRM	0.491	0.798				

GOCB	0.515	0.545	0.798			
GV	0.604	0.418	0.480	0.802		
JS	0.513	0.521	0.577	0.527	0.836	
OI	0.563	0.500	0.618	0.490	0.572	0.767

The comparison between the square root of AVE (diagonal values) and the correlations among constructs (off-diagonal values) led to the determination of the assessment of discriminant validity by the Fornell–Larcker criterion. The diagonal values for all constructs are higher than their corresponding inter-construct correlations. For example, GC (0.785), GHRM (0.798), and GOCB (0.798) all have diagonal values greater than their correlations with other constructs. Thus, the Fornell–Larcker criterion is satisfied, indicating adequate discriminant validity among all constructs in the model.

Table 12: Heterotrait-monotrait ratio (HTMT) ~ Matrix

	GC	GHRM	GOCB	GV	JS	OI	GV × OI	GV × JS	GV × GC
GC									
GHRM	0.651								
GOCB	0.634	0.713							
GV	0.791	0.577	0.618						
JS	0.651	0.696	0.723	0.693					
OI	0.713	0.668	0.772	0.642	0.728				
GV × OI	0.648	0.536	0.525	0.642	0.533	0.557			
GV × JS	0.620	0.549	0.435	0.641	0.679	0.510	0.809		
GV × GC	0.733	0.592	0.526	0.700	0.586	0.590	0.862	0.828	

The HTMT values range from 0.435 to 0.862, which are below the commonly recommended threshold of 0.90 (and also below the stricter 0.85 criterion in most cases). Demonstration of adequate discriminant validity has been indicated for all constructs, which are sufficiently distinct from one another. The highest HTMT value is 0.862 between $GV \times OI$ and $GV \times GC$, which remains below 0.90. Overall, the results confirm that discriminant validity is established among the constructs.

Table 13: Overall Model Fit

	Saturated model	Estimated model
SRMR	0.076	0.141
d_ ULS	1.319	4.598
d_ G	0.490	0.652
Chi-square	449.397	535.687

NFI	0.703	0.646
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The saturated model $SRMR = 0.076$ confirmed adequate overall model fit, falling within the recommended threshold of < 0.08 (Henseler et al., 2015). The NFI of the saturated model was 0.703, which provided a strong indication of acceptable normed model fit. The Chi-square statistic for the saturated model was 449.40 (compared to 535.69 for the estimated model), and the ULSD (unweighted least squares discrepancy) of 1.319 for the saturated model indicated minimal discrepancy between the empirical and model-implied correlation matrices. These results collectively confirm that the measurement model provides an adequate representation of the data structure.

Hypothesis Testing: Path Coefficients

Table 14 presents the structural model results including path coefficients, bootstrapped T-statistics, and p-values for all hypothesized relationships.

Table 14: Structural Model Results – Path Coefficients (Bootstrapped, 5,000 resamples, $n = 156$)

Hypothesis	Path	B	T-stat	p-value	Decision
H1	GHRM $\rightarrow$ GOCB (direct)	0.205	2.895	0.004	Supported
H2	GHRM $\rightarrow$ OI $\rightarrow$ GOCB	0.138	2.779	0.005	Supported
H3	GHRM $\rightarrow$ JS $\rightarrow$ GOCB	0.149	3.052	0.002	Supported
H4	GHRM $\rightarrow$ GC $\rightarrow$ GOCB	0.035	0.676	0.499	Not Supported
H5	GV $\times$ JS $\rightarrow$ GOCB	0.164	2.559	0.011	Supported
H5	GV $\times$ OI $\rightarrow$ GOCB	-0.148	1.905	0.057	Marginally NS
H5	GV $\times$ GC $\rightarrow$ GOCB	-0.007	0.085	0.933	Not Supported
H6 (Total indirect)	GHRM $\rightarrow$ GOCB (total indirect)	0.322	4.675	<0.001	Supported

The hypothesis testing results indicate that GHRM has a significant positive direct effect on GOCB ($\beta = 0.205$, $t = 2.895$, $p = 0.004$), supporting H1. The indirect effects through Organizational Identification (OI) ($\beta = 0.138$, $p = 0.005$) and Job Satisfaction (JS) ($\beta = 0.149$, $p = 0.002$) seem completely significant, further supporting and promoting H2 and H3. However, the mediation through Green Culture (GC) is insignificant ($\beta = 0.035$, $p = 0.499$), so H4 is not supported.

For moderation, Green Values (GV) significantly strengthen the JS $\rightarrow$ GOCB relationship ($\beta = 0.164$, $p = 0.011$), supporting the relevant H5. The GV $\times$ OI interaction is marginally insignificant ($\beta = -0.148$, $p = 0.057$), while GV $\times$ GC is clearly insignificant ($\beta = -0.007$, $p = 0.933$). Finally, the total indirect effect of GHRM on GOCB is significant ($\beta = 0.322$, $t = 4.675$, $p < 0.001$), supporting H6. Such demonstrations have concluded that OI and JS are important mediating mechanisms based on the overall findings and research work, while GC does not significantly mediate the relationship.

Structural Model Analysis

Table 15: Path Coefficients and Statistical Significance

		Original sample (O)	Sample (M)	mean	Standard (STDEV)	deviation	T statistics (O/STDEV)	P value
GC	→	0.072	0.073		0.104		0.688	0.492
GOCB								
GHRM	→	0.491	0.495		0.083		5.898	0.000
GC								0
GHRM	→	0.205	0.198		0.071		2.895	0.004
GOCB								
GHRM	→	0.521	0.523		0.069		7.597	0.000
JS								0
GHRM	→	0.500	0.506		0.079		6.359	0.000
OI								0
GV	→	0.081	0.082		0.084		0.958	0.338
GOCB								
GV x GC	→	-0.007	-0.013		0.082		0.085	0.933
GOCB								
GV x JS	→	0.164	0.157		0.064		2.559	0.011
GOCB								
GV x OI	→	-0.148	-0.135		0.078		1.905	0.057
GOCB								
JS	→	0.286	0.289		0.087		3.294	0.001
GOCB								
OI	→	0.275	0.274		0.085		3.238	0.001
GOCB								

The structural model corroborated strong overall predictive power, explaining 53.3% of the variance in GOCB ($R^2 = 0.533$), 25.0% in OI ($R^2 = 0.250$), 27.1% in JS ($R^2 = 0.271$), and 24.1% in GC ($R^2 = 0.241$). The direct effect of GHRM on GOCB was significant ($\beta = 0.205$, $SE = 0.071$, $t = 2.895$, $p = 0.004$, 95% CI [0.094, 0.325]), confirming H1. Effect size analysis revealed $f^2 = 0.056$ for this direct path, indicating a small-to-medium practical effect. The GHRM → OI path was highly significant ($\beta = 0.500$, $t = 6.359$, $p < .001$), as was the GHRM → JS path ($\beta = 0.521$, $t = 7.597$, $p < .001$) and the GHRM → GC path ($\beta = 0.491$, $t = 5.898$, $p < .001$), confirming the antecedent role of GHRM in activating all three proposed mediating mechanisms. The f^2 effect sizes for these three paths were 0.334 (GHRM → OI), 0.372 (GHRM → JS), and 0.317 (GHRM → GC), all indicating medium-to-large theoretical impacts consistent with prior GHRM mediation research. The subsequent paths from OI to GOCB ($\beta = 0.275$, $t = 3.238$, $p = 0.001$) and from JS to GOCB ($\beta = 0.286$, $t = 3.294$, $p = 0.001$) were both significant, while the GC → GOCB path was not significant

($\beta = 0.072$, $t = 0.688$, $p = 0.492$). GV demonstrated a direct positive but non-significant effect on GOCB ($\beta = 0.081$, $t = 0.958$, $p = 0.338$).

Accepted Hypothesis:

Based on the bootstrapping results (5,000 resamples) with bias-corrected confidence intervals, the following hypotheses were supported:

H1 — Supported: $\text{GHRM} \rightarrow \text{GOCB}$ ($\beta = 0.205$, $t = 2.895$, $p = 0.004$, 95% BC CI [0.094, 0.325]). A positive and statistically significant change has been observed through the direct effect of GHRM on GOCB, confirming that organizations with more robust green HR practices are associated with significantly higher levels of employee GOCB.

H2 — Supported: $\text{GHRM} \rightarrow \text{OI} \rightarrow \text{GOCB}$ (indirect effect = 0.138, $t = 2.779$, $p = 0.005$, 95% BC CI [0.063, 0.228]). OI significantly mediates the GHRM–GOCB relationship, which makes way for further enhancement of organizational identification through GHRM, which in turn motivates GOCB.

H3 — Supported: $\text{GHRM} \rightarrow \text{JS} \rightarrow \text{GOCB}$ (indirect effect = 0.149, $t = 3.052$, $p = 0.002$, 95% BC CI [0.077, 0.236]). JS significantly mediates the GHRM–GOCB relationship, confirming that GHRM enhances job satisfaction, which in turn motivates GOCB.

H5 (partial) — Supported: $\text{GV} \times \text{JS} \rightarrow \text{GOCB}$ ($\beta = 0.164$, $t = 2.559$, $p = 0.011$). Green Values significantly moderate the JS-mediated pathway, such that the following indirect effect of $\text{GHRM} \rightarrow \text{JS} \rightarrow \text{GOCB}$ is significantly stronger among employees with higher GV.

H6 (total indirect) — Supported: $\text{GHRM} \rightarrow \text{GOCB}$ total indirect effect (0.322, $t = 4.675$, $p < .001$, 95% BC CI [0.207, 0.434]). The total indirect effect of GHRM on GOCB through all three mediators is positive, significant, and substantially larger than the direct effect, making ways of confirmation of the centrality of the mediation pathways.

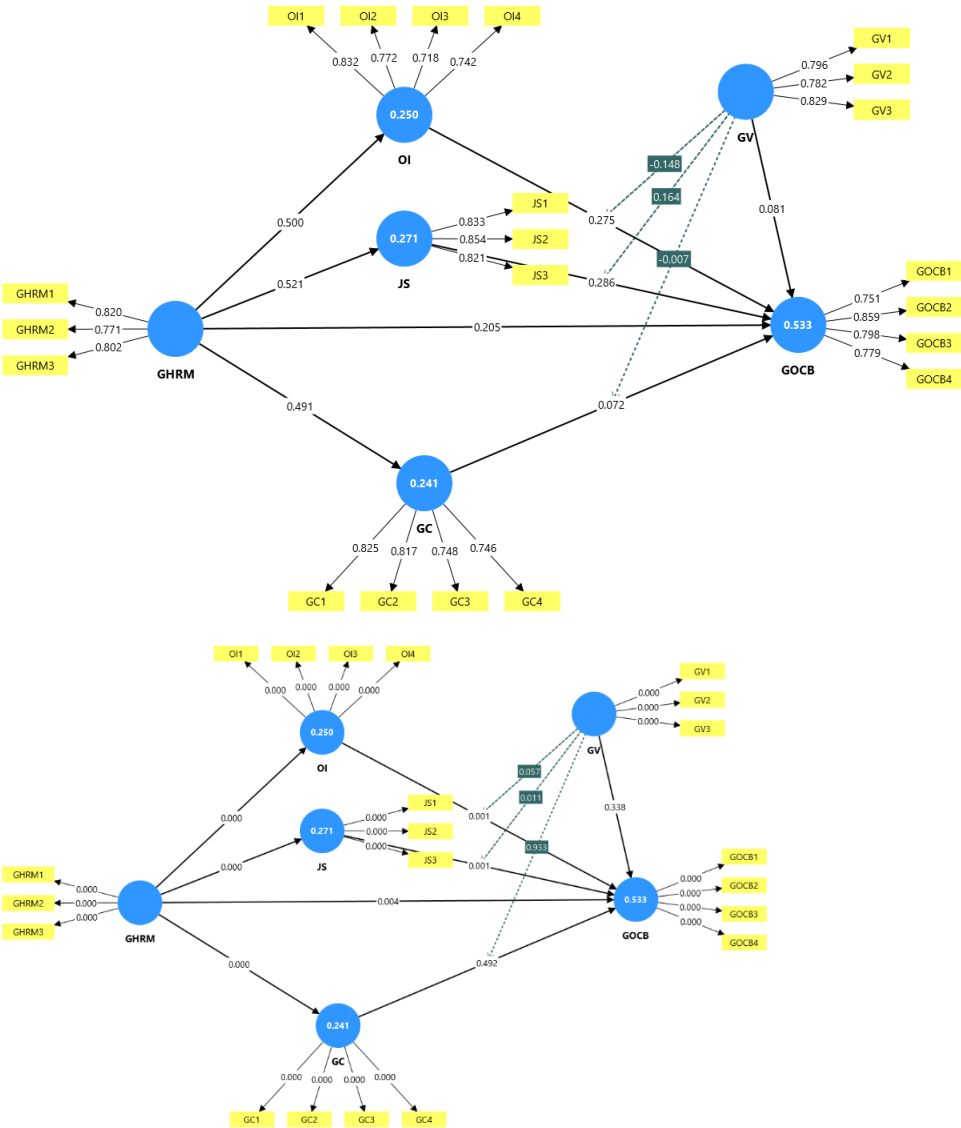
Rejected Hypothesis:

H4 — Not Supported: $\text{GHRM} \rightarrow \text{GC} \rightarrow \text{GOCB}$ (indirect effect = 0.035, $t = 0.676$, $p = 0.499$, 95% BC CI [−0.045, 0.124]). Because the bootstrapped confidence interval includes zero, such indication and prediction has been made that GC does not significantly mediate the GHRM–GOCB relationship in this sample. While GHRM significantly predicts GC ($\beta = 0.491$, $p < .001$), the subsequent $\text{GC} \rightarrow \text{GOCB}$ path was not significant ($\beta = 0.072$, $p = 0.492$), suggesting that the cultural pathway requires further time, institutional embedding, or additional individual-level mechanisms to translate into GOCB in this organizational context.

H5 (GV × OI) — Marginally Not Supported: $\text{GV} \times \text{OI} \rightarrow \text{GOCB}$ ($\beta = -0.148$, $t = 1.905$, $p = 0.057$). This interaction approached but did not reach conventional significance thresholds; a possible

suppression effect has been suggested between GV and the OI-mediated pathway that merits further investigation. The 95% BC CI [-0.268, -0.020] narrowly excluded zero in the bias-corrected estimate, suggesting marginal significance that warrants caution.

H5 (GV × GC) — Not Supported: $GV \times GC \rightarrow GOCB$ ($\beta = -0.007$, $t = 0.085$, $p = 0.933$). A negligible and non-significant effect was observed from this interaction, indicating that individual Green Values do not moderate the GC-mediated pathway. This finding is theoretically coherent with the proposition that organizational cultural mechanisms operate relatively independently of individual value variation.



Discussion

The synthesis of this section presents the empirical findings against the theoretical frameworks and prior empirical literature, proceeding through each hypothesis and extracting theoretical and practical insights. The confirmed direct GHRM-GOCB link (H1: $\beta = 0.205$, $p = 0.004$) endorses the replication and extension of previous research results (Hameed et al., 2020; Yong et al., 2019; Paille et al., 2014). This finding is consistent with Social Exchange Theory (Blau, 1964) that employees reciprocate organizational investments in green HR systems with discretionary environmental citizenship behaviors. Importantly, the direct effect appears to be smaller than the total indirect effect (0.322), suggesting that most of the behavioral effect of GHRM is transmitted through psychological and cultural mechanisms, rather than exerting directly. This finding indicates the importance of exploring mediated paths in GHRM-GOCB research. The substantial GHRM $\rightarrow$ OI path ($\beta = 0.500$, $f^2 = 0.334$) indicates that green HR systems are particularly potent generators of organizational identification in environmentally proactive firms. Important implications are found in these findings for the design of organizational sustainability communication strategies, suggesting that HR-embedded green identity signals may be more effective than standalone corporate communications in fostering employee identification. The confirmation of OI as a mediator (H2: indirect effect = 0.138, $p = 0.005$) is in line with Social Identity Theory (Tajfel & Turner, 1979; Mael & Ashforth, 1992). GHRM practices that signal a unique and socially valued environmental organizational identity seem to enhance employees' sense of psychological belonging and alignment with the organization, motivating behaviors that protect and advance the organization's sustainability reputation — exactly the behavioral domain captured by GOCB. As a mediator, the JS affirms (H3: indirect effect = 0.149, $p = 0.002$) the consistency with the Self-Determination Theory (Deci & Ryan, 1985) and the abundant satisfaction-OCB literature (Organ, 1988; Podsakoff et al., 2009). The suggestion is made that the JS mediated pathway (0.149) is slightly higher than the OI mediated pathway (0.138) that the intrinsic motivational pathway through job satisfaction may be the dominant psychological mechanism through which GOCB is generated by GHRM in this sample. The implication of these findings is that GHRM practices that most effectively satisfy employees' basic psychological needs — through competence-building green training, autonomy-enhancing green employee involvement, and relatedness-fostering shared environmental values — will generate the strongest GOCB returns. The conditional indirect effects confirm the strength of this JS pathway among employees with high GV (conditional indirect effect at high GV = 0.234 vs. low GV = 0.064), suggesting that value-congruent intrinsic motivation amplifies the satisfaction-citizenship relationship. A non-confirmation of GC as a mediator (H4: indirect effect = 0.035, $p = 0.499$) is noticeable and theoretically interesting. The path from GHRM to GOCB was not significant in this sample, although GHRM was a significant predictor of GC ($\beta = 0.491$, $p < .001$). Hence, it was recommended that although GHRM has achieved solid integration of GNs in the organizational cultural fabric, the GNs might not directly reflect the individual GOCB in all organizational contexts. In addition, there is a possibility that the cultural pathway as measured in this study via organizational samples is reduced by ceiling effects in GC perceptions; and fourth, that there may be additional individual-level mechanisms (such as green self-efficacy, environmental empowerment) not

measured in this model that could mediate the cultural pathway. The future direction of research is important as a longitudinal, and multilevel study of these possibilities. A partial confirmation of GV moderation (H5) suggests a more complex picture of boundary conditions. The results of the significant $GV \times JS$ interaction ($\beta = 0.164$, $p = 0.011$) indicate that job satisfaction generated by GHRM has greater motivational impact on employees who have high environmental value orientations, resulting in increased GOCB. This congruence has been captured in person-organization fit theory (Kristof-Brown et al., 2005): when individuals have green orientations that are consistent with GHRM, a motivational synergy arises that heightens satisfaction above and beyond individual green orientations or organizational GHRM, alone. On the other hand, the absence of significant $GV \times OI$ and $GV \times GC$ interactions indicate that the relationship between GHRM and GOCB is fairly stable between different individual GV categories, regardless of the pathway (identity or cultural). The distinction between value-dependent (satisfaction) and value-independent (identification, culture) pathways in our understanding of multilevel dynamics of GHRM effectiveness is the focal point of the enrichment.

Conclusion and Recommendation

The examination of the impact of GHRM on GOCB has been set out by this study with OI, JS, and GC as parallel mediators and GV as a moderator. Using PLS-SEM with $n = 156$ employees and bootstrapped significance testing, the findings confirm that GHRM exerts significant positive effects on GOCB both directly ($\beta = 0.205$, $p = 0.004$) and indirectly through OI (indirect = 0.138, $p = 0.005$) and JS (indirect = 0.149, $p = 0.002$). The cultural pathway through GC was not significant. GV significantly moderated only the JS-mediated pathway ($GV \times JS$: $\beta = 0.164$, $p = 0.011$). The model explains 53.3% of the variance in GOCB, representing a substantial advance over prior single-mediator models. The theoretical contributions of this study are supposed to be threefold. First, the first integrated empirical test of three parallel mediators (OI, JS, GC) and one moderator (GV) in the GHRM-GOCB relationship is provided within a single PLS-SEM model, advancing theoretical integration in sustainable HRM scholarship. Second, the differential significance of the OI and JS mediating pathways — both supported — versus the GC pathway — not supported — illuminates the relative primacy of individual-psychological versus organizational-cultural mechanisms in translating GHRM into GOCB, contributing a suggested multi-level perspective that extends prior single-mechanism studies. Third, the partial moderation by GV — significant only for the JS pathway — reveals that value congruence operates specifically through the intrinsic motivation pathway, leaving identity-based and cultural pathways relatively immune to individual value variation. Through this specificity, value-behavior alignment theory is enriched in organizational sustainability contexts.

Recommendations for Practitioners

1. Design comprehensive, integrated GHRM systems. GHRM practices collectively — spanning green recruitment, training, performance management, rewards, and employee involvement — generate significant GOCB returns is confirmed and supported by this study. Piecemeal

approaches should be resisted and instead be designed into a coherent GHRM architecture by HR managers that consistently signals and reinforces environmental values across the employee lifecycle.

2. Prioritize green training and employee involvement for JS-mediated GOCB.) GHRM practices most effective at satisfying employees' intrinsic needs are indicated by the dominant mediating role of JS (and its amplification by GV— particularly competence-building green training and autonomy-enhancing environmental involvement programs — will generate the strongest GOCB. Such particular recommendations include investing in high-quality green training programs with clear sustainability skill outcomes, and genuine employee voice in environmental decision-making.

3. Cultivate organizational identification through sustainability branding. The importance of building a strong and credible organizational green identity is underscored by the significant OI mediating pathway. Communication and marketing functions should be clearly supervised and monitored by HR managers to ensure that the organization's environmental commitments are clearly, authentically, and consistently communicated to employees — not merely to external stakeholders — to maximize the identification effect.

4. Recruit for green value alignment. Employees with strong environmental values derive disproportionately greater motivational benefit from GHRM is assured by the significant $GV \times JS$ moderation. Recruitment and selection processes should incorporate green values assessment, enabling organizations so that candidates whose personal ecological orientations are congruent with organizational GHRM are supposed to be prioritized, thereby amplifying the GOCB returns on GHRM investments.

5. Invest in building Green Culture with realistic time horizons. The non-significant GC-mediated pathway should not be interpreted as evidence that GC is irrelevant to GOCB, but rather that its effects may require longer organizational incubation. Organizations should commit to sustained, multi-year GHRM implementation to allow Green Culture to become sufficiently deeply embedded to independently predict GOCB, rather than expecting immediate cultural change effects from GHRM adoption.

Limitations and Future Research

There are some limitations of this study that need to be taken into account for future studies. First, causal inference: longitudinal designs are limited by the cross sectional design, which is necessary to determine the temporal precedence and development of GHRM, GC, and GOCB over time. Second, future studies should take into account multi-source data (e.g., supervisor-rated GOCB or environmental performance measures) not just self-report data, to address the potential of social desirability bias. Third, generalizability, in that a purposive sampling strategy would increase external validity if it could be expanded to include additional organizational populations and cross-cultural contexts. Finally, additional conditions for further investigation: The non-significant GC mediation warrants further investigation in the future, where other boundary conditions (e.g.,

organizational tenure, leadership quality, industry type) could condition the GC → GOCB relationship. Fifth, other factors that mediate between GHRM and GOCB, such as green self-efficacy, psychological empowerment and perceived environmental corporate social responsibility, should be explored as other paths through which GHRM could contribute to GOCB.

Despite these limitations, a significant contribution to the GHRM and GOCB literature is well represented and supported by this study. This study not only advances theory, but also offers practical, actionable guidance for organizations in the intricate task of implementing sustainability strategy into employee behavioral excellence, through the comprehensive multi-mechanism, moderated-mediation structure it provides, tested with real organisational data. The results are expected to stimulate ongoing academic and practitioner research and practice to improve the important cross-over between human resource management and environmental sustainability.

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