

Do Green HRM Practices Translate into Green Behavior? Evidence from Hotels in South Sulawesi, Eastern Indonesia

Djusniati Rasinan^{1*}, Mika Mallisa², Carolus Askikarno Pala'langan³

Universitas Kristen Indonesia Paulus, Makassar, Indonesia^{1,2,3}

djusniatirasinan70@gmail.com^{1*}, mika@ukipaulus.ac.id², carolus@ukipaulus.ac.id³



Article History

Received on 30 December 2025

1st Revision on 16 January 2026

2nd Revision on 19 February 2026

3rd Revision on 23 March 2026

Accepted on 24 March 2026

Abstract

Purpose: This study examines whether Green Human Resource Management (GHRM) practices (green recruitment and selection, green training and development, and green performance appraisal) translate into employee green behavior, and whether green organizational commitment mediates that translation in hotels in South Sulawesi, Eastern Indonesia.

Research Methodology: A cross-sectional survey collected data from 217 employees of three- to five-star hotels in South Sulawesi through purposive sampling. Hypotheses were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4, and indirect effects were assessed through bootstrapping with 5,000 resamples.

Results: Green training and development ($\beta = 0.265$) and green performance appraisal ($\beta = 0.152$) significantly affect employee green behavior, whereas green recruitment and selection does not ($\beta = 0.099$; $p = 0.095$). All three practices significantly influence green organizational commitment, the strongest single predictor of green behavior ($\beta = 0.360$). Commitment shows indirect-only (full) mediation for the recruitment path and complementary (partial) mediation for the training and appraisal paths; the model explains 50.4% of the variance in green behavior.

Conclusions: GHRM promotes green behavior primarily by strengthening employees' commitment to organizational environmental goals rather than merely enforcing compliance.

Limitations: The cross-sectional design, self-reported data, and purposive single-province sample limit causal inference, introduce potential response bias, and constrain generalizability.

Contributions: This study proposes a novel Green Commitment-Mediated HRM Framework, extending AMO and Social Exchange theories by explaining how green organizational commitment mediates the effects of distinct GHRM practices on employee green behavior.

Keywords: AMO Theory, Employee Green Behavior, Green Human Resource Management, Green Organizational Commitment, Hospitality Industry

How to Cite: Rasinan, D., Mallisa, M., & Pala'langan, C. A. (2026). Do Green HRM Practices Translate into Green Behavior? Evidence from Hotels in South Sulawesi, Eastern Indonesia. *Reviu Akuntansi, Manajemen, dan Bisnis*, 6(1), 223-241.

1. Introduction

The hospitality sector occupies an uncomfortable position within the global sustainability agenda. Hotels consume disproportionate volumes of energy, water, and single-use materials relative to their economic footprint, and this burden continues to expand alongside tourism demand ([Wijesundara, Khatibi, Azam, & Tham, 2025](#)). In response, hotel operators have adopted a widening portfolio of environmental initiatives: energy management systems, linen reuse programs, waste segregation, water conservation targets, and sustainability certification schemes. Studies of tourism destinations in Indonesia similarly document a growing adoption of environmentally oriented practices across accommodation and travel businesses ([Apriani, Kamsariaty, Sarinastiti, Yuliastuti, & Sukmayadi, 2024](#); [Supheni, Ivada, Novianti, & Wiwin, 2023](#)). Yet a persistent gap remains between what organizations formally adopt and what employees actually do. Environmental policies are written at the managerial level but executed, or quietly ignored, at the operational level by housekeepers, kitchen staff, front-office attendants, and engineering personnel.

This implementation gap has directed scholarly attention toward Green Human Resource Management (GHRM), understood as the alignment of conventional Human Resources (HR) functions with an organization's environmental objectives ([Renwick, Redman, & Maguire, 2013](#)). GHRM proposes a straightforward logic: if recruitment selects environmentally conscious candidates, if training builds environmental capability, and if appraisal rewards environmental contribution, then employees will display Employee Green Behavior (EGB) the task-related and discretionary actions that advance organizational environmental performance ([Norton, Parker, Zacher, & Ashkanasy, 2015](#); [Ones, & Dilchert, 2012](#)). Recent Indonesian work, much of it in the form of literature reviews, suggests that green HR practices are associated with environmental outcomes across manufacturing, aviation, and higher education settings ([Febrian, 2025](#); [Ichdan, & Maryani, 2024](#); [Marlita, Keke, Suryobuwono, Prakoso, Tohir, & Susanto, 2026](#)). While broader syntheses position GHRM as a strategic instrument for sustainability and Sustainable Development Goal (SDG) attainment ([Nurakhim, Pratikno, Arini, Lestari, & Yuniria, 2025](#); [Rosyafah, Hidayat, & Nitawati, 2025](#)).

Empirical support for the GHRM proposition is substantial but uneven, and three research gaps motivate the present study. First, the mechanism connecting GHRM to green behavior remains underspecified. A considerable number of studies report direct GHRM–EGB associations, yet the psychological pathway linking an organizational HR system to individual discretionary conduct is not self-evident. HR practices are organizational-level signals; green behavior is an individual-level act, frequently unobserved and unrewarded. Prior research has proposed psychological green climate and green values as intervening variables by [Dumont, Shen, and Deng \(2017\)](#), or environmental belief and green organizational identity by [Zhu, Tang, Wang, and Chen \(2021\)](#), and Indonesian evidence increasingly identifies work engagement as a mediating mechanism between green HR practices and performance-related outcomes ([Febrian, & Sani, 2026](#); [Larasandi, & Satrya, 2025](#); [Marlita et al., 2026](#)). The role of green organizational commitment an employee's affective attachment to and identification with the organization's environmental mission has nonetheless received comparatively little attention, despite its close theoretical fit with social exchange reasoning.

Second, GHRM is frequently treated as an undifferentiated composite. Aggregating recruitment, training, and appraisal into a single second-order construct is analytically convenient but managerially unhelpful. Hotel managers operating under tight budgets need to know which practice yields the greatest behavioral return, not whether GHRM in the abstract matters. Existing findings hint at heterogeneity, such as green training consistently emerges as influential, whereas the evidence on green recruitment is more mixed, plausibly because its effect is realized indirectly through the composition and attitudes of the workforce rather than through immediate behavioral change ([Faeni, Pujiati, & Cahaya, 2025](#); [Nurakhim et al., 2025](#)).

Third, the empirical base is geographically skewed. GHRM research has concentrated in Western Europe, North America, China, and, within Southeast Asia, in Malaysia, Vietnam, and Java-centric Indonesian samples ([Yong, Yusliza, & Fawehinmi, 2019](#)). Eastern Indonesia comprising Sulawesi, Maluku, Nusa Tenggara, and Papua remains largely unexamined. This is not merely a matter of adding

another national context. Hotels in South Sulawesi may differ from their counterparts in Jakarta or Bali in the size and formalization of their HR and environmental management functions, in the environmental training that locally recruited staff bring with them, and in the intensity of regulatory enforcement. These differences are plausible rather than documented, and this study does not measure them directly. Whether a GHRM logic developed largely in more institutionally mature settings holds in such a setting is an open empirical question with direct theoretical relevance, and one that parallels calls in the sustainable tourism literature for evidence from peripheral destinations and locally embedded stakeholder configurations ([Afnan, Wijaya, Kartono, & Wibowo, 2024](#); [Mabhanda, 2022](#); [Sulistiowati, Adisa, & Caturiani, 2021](#)).

Accordingly, this study addresses three research questions. First, do green recruitment and selection, green training and development, and green performance appraisal exert distinct direct effects on employee green behavior in star-rated hotels in South Sulawesi? Second, does green organizational commitment mediate these relationships? Third, how do the three practices compare in the magnitude of their direct and indirect effects?

This study distinguishes its theoretical contribution from its contextual one. Theoretically, it integrates the Ability Motivation Opportunity (AMO) framework with Social Exchange Theory to specify green organizational commitment as the conversion mechanism that translates HR practice into discretionary environmental conduct. A mechanism-based explanation that moves beyond the direct-effect models dominating the Indonesian GHRM literature ([Ernawati, Kadir, Badrian, Naimah, & Jahra, 2026](#); [Ichdan and Maryani, 2024](#)). By disaggregating GHRM into its constituent practices rather than modeling it as a single higher-order construct, the study also examines whether the practices differ not only in the strength of their effects but in the type of mediation through which they operate, a theoretical refinement that a composite GHRM construct cannot reveal. Contextually, it extends the evidence base to star-rated hotels in South Sulawesi, a region of Eastern Indonesia that is largely absent from the international GHRM literature. The contextual extension alone would not constitute theoretical novelty; the theoretical contribution rests on whether practice-specific mediation patterns emerge.

2. Literature Review and Hypotheses Development

2.1 Green Human Resource Management

Green Human Resource Management refers to the systematic integration of environmental objectives into the design and delivery of HR functions, including recruitment, selection, training, performance appraisal, compensation, and employee involvement ([Renwick, Redman, & Maguire, 2013](#); [Tang, Chen, Jiang, Paillé, & Jia, 2018](#)). GHRM is distinguished from generic corporate environmental management by its locus of action: it operates through the employment relationship rather than through technology, process redesign, or regulatory compliance. Contemporary treatments position GHRM as an organizational capability that simultaneously builds environmental competence and signals institutional priority ([Ernawati, Kadir, Badrian, Naimah, & Jahra, 2026](#); [Rosyafah, Hidayat, & Nitawati, 2025](#)). Empirical work in Indonesia has documented GHRM adoption across manufacturing by [Ichdan and Maryani \(2024\)](#), aviation and ground handling, and MSME and higher education settings, while syntheses connect GHRM to organizational sustainability and SDG attainment ([Febrian, 2025](#); [Febrian, & Sani, 2026](#); [Faeni, Feani, Pujiati, & Cahaya, 2025](#); [Marlita, Keke, Suryobuwono, Prakoso, Tohir, & Susanto, 2026](#)).

The empirical record is, however, less consistent than this breadth suggests. Methodologically, many studies model GHRM as a single composite, whereas others examine individual practices, so that findings attributed to “GHRM” may reflect the dominant influence of one practice ([Dumont, Shen, & Deng, 2017](#); [Kim, Kim, Choi, & Phetvaroon, 2019](#); [Saeed, Afsar, Hafeez, Khan, Tahir, & Afridi, 2019](#); [Pham, Tučková, & Chiappetta, 2019](#); [Tang et al., 2018](#)). Studies also differ in the outcome they examine, ranging from in-role and extra-role green behavior to organizational citizenship behavior for the environment, and [Dumont et al. \(2017\)](#) show that GHRM may affect in-role green behavior directly while affecting extra-role green behavior only through psychological green climate. Theoretically, the proposed mediating mechanisms draw on different logics: social information

processing psychological green climate by [Dumont et al. \(2017\)](#), social identity green organizational identity by [Zhu, Tang, Wang, & Chen, 2021](#), psychological capital by [Saeed et al. \(2019\)](#), and social exchange green commitment by [Ansari, Farrukh, and Raza \(2021\)](#). These differences make the mechanism, rather than the existence of a GHRM–behavior link, the more contested question, and they are the reason this study models the practices separately and tests a single, theoretically specified mediator.

Of the GHRM practices identified by [Renwick et al. \(2013\)](#) and [Tang et al. \(2018\)](#), this study focuses on green recruitment and selection, green training and development, and green performance appraisal, and excludes green compensation and rewards and green employee involvement. The choice is deliberate. First, the three selected practices follow the employee through the core HR cycle of entry, development, and evaluation, which allows the study to compare practices that act at different stages of the employment relationship. Second, green rewards are usually administered as a consequence of appraisal outcomes, so modeling both separately risks double-counting the same accountability mechanism; in this model, the evaluative and recognition signal is captured within the appraisal construct. Third, green employee involvement, such as participation in green teams and environmental suggestion schemes, overlaps conceptually with the proactive facet of employee green behavior, so including it as a predictor would risk inflating the predictor–outcome relationship. This choice has a theoretical cost. Involvement is the GHRM practice most directly associated with the opportunity dimension of the AMO framework, so the present model captures opportunity only indirectly, through the legitimacy that appraisal gives to environmental tasks. The findings should therefore be read as evidence about ability- and motivation-enhancing practices, and the omission of compensation and involvement is acknowledged as a limitation.

Scholars nonetheless caution that the benefits of GHRM are not automatic. Where green practices are adopted symbolically present on paper but inconsequential in practice they may generate cynicism rather than commitment, and the resulting behavioral return is negligible. This qualification underlines the need to examine the psychological pathways through which GHRM operates rather than to assume a uniformly positive direct effect.

2.2 Employee Green Behavior

Employee green behavior refers to measurable employee actions that contribute to, or detract from, environmental sustainability in the workplace ([Ones & Dilchert, 2012](#)). [Norton, Parker, Zacher, and Ashkanasy \(2015\)](#) distinguish task-related green behavior, performed within prescribed duties a housekeeper following the linen reuse protocol from proactive green behavior, performed at the employee's own initiative, such as reporting a leaking fixture or proposing a waste-reduction routine. In hotel settings the distinction is consequential: a substantial share of environmental performance depends on proactive behavior in unsupervised moments, precisely where formal control is weakest and internalized motivation matters most. The present study treats EGB as a unidimensional reflective construct capturing both facets, consistent with prevailing operationalizations in hospitality research ([Kim, Kim, Choi, & Phetvaroon, 2019](#)). Combining the two facets is justified on three grounds. First, in hotel operations the boundary between required and voluntary environmental actions is blurred: the same action, such as switching off unused lighting in a guest corridor, may be prescribed in one property and discretionary in another. Second, the study's interest lies in the overall behavioral return to GHRM rather than in differences between facets. Third, the measurement results support treating the six items as one construct, with all loadings between 0.767 and 0.854 and an AVE of 0.657 (Table 3). Nevertheless, task-related and proactive green behavior may have different antecedents by [Norton et al. \(2015\)](#), and a single construct may conceal such differences; separating the two facets is recommended for future research.

2.3 Green Organizational Commitment

Green organizational commitment is conceptualized here as the affective attachment an employee forms toward the organization's environmental values, goals, and initiatives a domain-specific extension of affective organizational commitment. An employee high in Green Organizational Commitment (GOC) does not merely comply with environmental rules; they internalize the

organization's environmental purpose as personally meaningful. GOC is distinguished from general organizational commitment by its object: an employee may be strongly committed to their employer while remaining indifferent to its sustainability agenda, and this dissociation is precisely what makes GOC the theoretically appropriate mediator. Indonesian evidence linking organizational commitment, green training, and work engagement to employee outcomes supports the broader proposition that attitudinal states carry the effect of HR systems into behavior ([Febrian & Sani, 2026](#); [Jumawan et al., 2025](#); [Larasandi & Satrya, 2025](#)).

2.4 Theoretical Foundation: AMO Theory and Social Exchange Theory

The Ability Motivation Opportunity (AMO) framework holds that employee performance is a function of three conditions: employees must possess the ability to perform, the motivation to exert effort, and the opportunity to contribute ([Appelbaum et al., 2000](#)). Applied to the environmental domain, GHRM practices map onto these components with reasonable directness. Green recruitment and selection populates the organization with individuals who already hold pro-environmental dispositions, shaping the ability and latent motivation base of the workforce. Green training and development builds the environmental knowledge and skills that constitute ability. Green performance appraisal supplies the evaluative feedback and accountability that sustain motivation and signal that environmental contribution is a legitimate component of the job rather than an optional extra. Opportunity, the latitude and channels through which employees can act, is addressed only indirectly by these three practices, as explained in Section 2.1.

AMO explains capability and incentive but is comparatively silent on why employees would extend effort toward behaviors that are discretionary, difficult to monitor, and frequently unrewarded. Social Exchange Theory (SET) fills this gap. [Blau \(1964\)](#) argues that when an organization invests in its employees, employees reciprocate through attitudes and behaviors that benefit the organization, governed by a norm of reciprocity rather than by contractual specification. GHRM practices function as visible organizational investment: training expenditure, appraisal attention, and selective hiring all signal that the organization takes its environmental commitments seriously and is willing to bear costs for them. Employees reciprocate first through attitudinal attachment to the environmental mission, green organizational commitment, and subsequently through behavior. This sequencing constitutes the theoretical core of the present model: GHRM builds capability and signals investment; commitment converts that signal into willing effort; green behavior is the observable outcome.

2.5 Hypotheses Development

Green recruitment and selection encompasses employer branding that emphasizes environmental values, job advertisements referencing environmental responsibilities, and selection criteria incorporating candidates' environmental awareness and prior pro-environmental conduct ([Tang et al., 2018](#)). Through person–organization fit, such practices raise the baseline environmental disposition of the workforce, and individuals whose personal values align with organizational environmental values are more likely to enact those values behaviorally ([Saeed et al., 2019](#)). Although the empirical record is inconsistent, green screening operates at the point of entry and its behavioral effect may be diluted by subsequent socialization; the theoretically expected relationship is proposed.

H₁: Green recruitment and selection has a positive and significant effect on employee green behavior

Green training and development equips employees with the environmental knowledge, technical skills, and situational awareness required to act sustainably: waste segregation protocols, energy-efficient equipment operation, chemical handling, water conservation techniques, and guest communication regarding environmental programs. In AMO terms, training is the principal instrument for building environmental ability. Beyond skill transfer, training also carries symbolic weight, since allocating paid working hours to environmental instruction communicates organizational priority more credibly than a policy document. Green training is the most consistently supported GHRM practice in the literature, with positive effects documented in hospitality and service settings and in Indonesian

organizational contexts ([Kim et al., 2019](#); [Pham et al., 2019](#); [Faeni et al., 2025](#); [Nurakhim et al., 2025](#)).

H₂: Green training and development has a positive and significant effect on employee green behavior

Green performance appraisal integrates environmental indicators into performance evaluation, provides feedback on environmental contribution, and links environmental outcomes to recognition or reward. It resolves a fundamental attribution problem: absent formal evaluation, employees reasonably infer that environmental effort is unvalued and will not be counted. Appraisal converts an ambiguous expectation into an accountable one and legitimizes the allocation of time to environmental tasks that would otherwise be crowded out by guest-facing service targets ([Febrian, 2025](#); [Tang et al., 2018](#)).

H₃: Green performance appraisal has a positive and significant effect on employee green behavior

Under social exchange logic, each GHRM practice constitutes a form of organizational investment that invites reciprocation. Green recruitment signals that environmental values are a criterion of membership, fostering identification from the outset. Green training represents tangible expenditure on employee capability and communicates that the organization considers the employee worth developing in this domain. Green performance appraisal demonstrates ongoing managerial attention to environmental outcomes, confirming that the environmental agenda is institutionally durable rather than a passing campaign. Each therefore strengthens affective attachment to the organization's environmental mission ([Ernawati et al., 2026](#); [Ichdan & Maryani, 2024](#); [Rosyafah et al., 2025](#)).

H₄: Green recruitment and selection has a positive and significant effect on green organizational commitment

H₅: Green training and development has a positive and significant effect on green organizational commitment

H₆: Green performance appraisal has a positive and significant effect on green organizational commitment

Committed employees exert effort beyond formal requirements because the organization's goals have become personally salient. Since much green behavior in hotels is discretionary, low in visibility, and undertaken under time pressure, its occurrence depends heavily on internalized motivation. An employee who has internalized the environmental mission switches off idle equipment when no supervisor is present; one who has not, does not. Evidence from Indonesian organizational research consistently links commitment and engagement states to individual performance and citizenship outcomes ([Febrian & Sani, 2026](#); [Jumawan et al., 2025](#); [Larasandi & Satrya, 2025](#)).

H₇: Green organizational commitment has a positive and significant effect on employee green behavior

Combining the AMO and SET arguments yields an integrated mediation logic. GHRM practices supply Ability Motivation Opportunity (AMO) and simultaneously function as reciprocity-inducing investment by Social Exchange Theory (SET). The reciprocal response is attitudinal in the first instance—commitment to the environmental mission—and behavioral in the second. Commitment is thus positioned as the conversion mechanism transforming HR system inputs into discretionary environmental conduct. Because green training and green performance appraisal may also act directly through skill acquisition and accountability, their effects may be transmitted only partly through commitment, whereas the effect of green recruitment and selection, which shapes who employees are rather than what they are immediately equipped or required to do, may operate mainly through commitment. These expectations guide interpretation but are not formally hypothesized; the type of mediation is determined empirically.

- H_8 : Green organizational commitment mediates the relationship between green recruitment and selection and employee green behavior
- H_9 : Green organizational commitment mediates the relationship between green training and development and employee green behavior
- H_{10} : Green organizational commitment mediates the relationship between green performance appraisal and employee green behavior

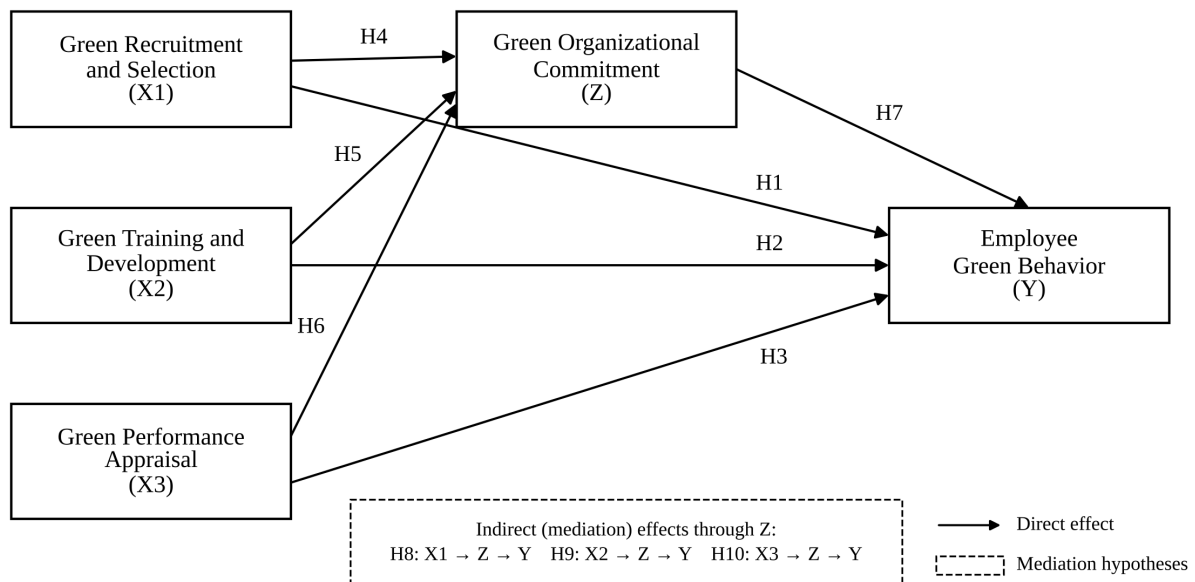


Figure 1. Conceptual Framework

The conceptual framework summarizing these ten hypotheses is presented in Figure 1. Green recruitment and selection (X_1), green training and development (X_2), and green performance appraisal (X_3) are modeled as exogenous constructs influencing employee green behavior (Y) both directly and indirectly through green organizational commitment (Z).

3. Research Methodology

3.1 Research Design and Context

This study employed a quantitative research design with a cross-sectional survey approach to examine the relationships among green Human Resource Management (HRM) practices, green organizational commitment, and employee green behavior. A quantitative approach was considered appropriate because the study aims to test theoretically grounded hypotheses and assess relationships among latent variables using empirical data (Hair et al., 2019). The study was conducted in South Sulawesi Province, Indonesia, a major economic and tourism gateway in Eastern Indonesia where hotel development has expanded and where formal environmental management systems may be less uniformly institutionalized than in Indonesia main tourism hubs, a configuration comparable to that described in studies of peripheral and emerging destinations (Mabhandu, 2022; Sulistiowati et al., 2021; Wijesundara et al., 2025).

3.2 Population and Sampling

The study population comprised employees of three-, four-, and five-star hotels operating in South Sulawesi, concentrated in Makassar and secondary destinations including Toraja and Bulukumba (Bira). Star-rated properties were selected because they are the most likely to maintain formalized HR functions and documented environmental programs, without which the GHRM constructs would lack an empirical referent. A purposive sampling technique was applied with three inclusion criteria: a minimum tenure of six months at the current property, ensuring exposure to at least one training and

appraisal cycle; employment in operational departments where environmental behavior is observable, namely housekeeping, food and beverage, front office, and engineering; and permanent or contract employment status, excluding daily workers and interns.

Following the inverse square root method and the ten-times rule for PLS-SEM, the maximum number of arrows pointing at any single construct in the model is four, indicating a minimum of 40 observations under conventional significance criteria (Hair et al., 2019). To ensure stability of estimates and adequate statistical power for a model containing mediation and multiple constructs, a target of at least 200 respondents was set. An a priori power analysis for multiple regression (fixed model, R^2 deviation from zero) with the four predictors of employee green behavior, $\alpha = 0.05$, power = 0.80, and a medium effect size ($f^2 = 0.15$) indicated a minimum of 85 respondents (Cohen, 1988); the achieved sample of 217 provides power above 0.99 for this criterion. Detecting a small effect of a single path ($f^2 = 0.02$) would, however, require about 395 respondents, and the achieved power for such an effect is approximately 0.55, which should be borne in mind when interpreting small non-significant paths. A total of 260 questionnaires were distributed, 231 were returned, and 217 usable responses were retained after removing incomplete and patterned responses, representing an effective response rate of 83.5%. Questionnaires were administered through hotel HR departments following formal permission, using a combination of printed forms distributed during shift briefings and an online form. Participation was voluntary and anonymous, and respondents were informed that data would be reported only in aggregate. Because respondents are nested within hotels, responses from the same property may not be fully independent. The PLS-SEM estimation does not model this nesting, which may lead standard errors to be understated; this is acknowledged as a limitation.

3.3 Measurement of Constructs

Table 1. Operationalization of constructs

Variable	Code	Indicator	Items	Source
Green Recruitment & Selection	X_1 (GRS)	Environmental criteria in job specifications; environmental awareness assessed during selection	4	(Tang et al., 2018)
Green Training & Development	X_2 (GTD)	Regular environmental training; environmental issues included in orientation	5	(Pham et al., 2019; Tang et al., 2018)
Green Performance Appraisal	X_3 (GPA)	Environmental targets in performance evaluation; feedback on environmental performance	4	(Tang et al., 2018)
Green Organizational Commitment	Z (GOC)	Emotional attachment to the hotel's environmental mission; identification with environmental values	5	Adapted affective commitment scale
Employee Green Behavior	Y (EGB)	Energy and water saving; waste reduction; proactive environmental initiative	6	(Dumont et al., 2017; Kim et al., 2019)

All constructs were measured reflectively using multi-item scales adapted from validated instruments and translated into Bahasa Indonesia through a back-translation procedure to maintain conceptual equivalence (Brislin, 1980). Two academic experts in human resource management and one hotel HR manager reviewed the translated instrument for content validity and contextual appropriateness prior to a pilot test with 30 respondents. Responses were recorded on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The operationalization of constructs is summarized in Table 1.

3.4 Data Analysis Technique

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. This technique was selected primarily because the study's objective is predictive as

well as explanatory: it seeks to explain and predict variance in employee green behavior from a set of HR practices and a mediating attitude, which corresponds to the causal–predictive orientation for which PLS-SEM is designed ([Shmueli et al., 2019](#)). The multi-path structure with a mediating construct is a further reason, and the method's relaxed distributional assumptions are a secondary consideration ([Hair et al., 2019](#)). The analysis followed a two-stage procedure. First, the measurement model was assessed through indicator reliability (outer loadings), internal consistency reliability (Cronbach's alpha and composite reliability), convergent validity (average variance extracted, $AVE \geq 0.50$; [Fornell & Larcker, 1981](#)), and discriminant validity using the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT ≤ 0.90 ; [Henseler et al., 2015](#)). Second, the structural model was evaluated through collinearity diagnostics ($VIF < 5$), coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2 via blindfolding with an omission distance of 7), and path coefficient significance obtained through bootstrapping with 5,000 subsamples.

Mediation was tested using bootstrapped confidence intervals for indirect effects ([Preacher & Hayes, 2008](#)). An indirect effect was considered significant where the 95% bias-corrected confidence interval excluded zero. The type of mediation was classified following [Zhao et al. \(2010\)](#) and [Nitzl et al. \(2016\)](#). Where the indirect effect was significant and the direct effect was not, the mediation was classified as indirect-only (full) mediation; where both effects were significant and had the same sign, it was classified as complementary (partial) mediation. The Variance Accounted For (VAF) was not used to classify mediation, because the share of the total effect that is indirect is not meaningful when the direct effect is non-significant.

3.5 Common Method Bias Assessment

Because all variables were obtained from a single source at a single point in time, procedural and statistical remedies for common method bias were applied ([Podsakoff, MacKenzie, Lee, & Podsakoff, 2003](#)). Procedurally, respondent anonymity was guaranteed, predictor and criterion items were separated in the questionnaire layout, and item wording was pretested for ambiguity. Anonymity and the assurance that responses would be reported only in aggregate were also intended to reduce social desirability pressure on self-reported green behavior. Statistically, the full collinearity assessment recommended for PLS-SEM was applied by [Kock \(2015\)](#), all full collinearity VIF values fell below the 3.3 criterion. Harman single-factor test, in which the first unrotated factor accounted for 41.10% of total variance, is reported for completeness only, because it is widely regarded as an insensitive diagnostic ([Podsakoff et al., 2003](#)). Because all constructs were reported by the same employees, these remedies reduce but cannot eliminate the possibility of common method variance, and the results are interpreted with this caveat.

4. Results and Discussions

4.1 Respondent Characteristics

Table 2. Respondent characteristics (n = 217)

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	118	54.4
	Female	99	45.6
Age	≤ 25 years	61	28.1
	26–35 years	92	42.4
	36–45 years	46	21.2
	> 45 years	18	8.3
Education	High school / vocational	84	38.7
	Diploma	79	36.4
	Bachelor degree or above	54	24.9
Department	Housekeeping	71	32.7
	Food & Beverage	63	29.0
	Front Office	52	24.0

Characteristics	Category	Frequency	Percentage (%)
Department	Engineering	31	14.3
Tenure	6 months – 2 years	88	40.6
	3–5 years	79	36.4
	> 5 years	50	23.0
Hotel class	Three-star	96	44.2
	Four-star	87	40.1
	Five-star	34	15.7

A total of 217 valid questionnaires were collected from employees of star-rated hotels in South Sulawesi, Indonesia. Respondents represented the four operational departments targeted by the sampling design, and all had a minimum tenure of six months at their current property, ensuring exposure to at least one full training and appraisal cycle. The sample is dominated by employees aged 26 to 35 years (42.4%) with vocational or diploma-level education (75.1% combined), a profile consistent with the frontline composition of the regional hotel workforce. The demographic profile of respondents is presented in Table 2.

4.2 Measurement Model Assessment

The measurement model was evaluated to establish the reliability and validity of the constructs before testing the structural relationships. All 24 indicators produced outer loadings between 0.766 and 0.854, comfortably exceeding the 0.70 threshold, so no indicator was removed. Cronbach's alpha values range from 0.816 to 0.895 and composite reliability values from 0.879 to 0.920, both above the recommended minimum of 0.70, confirming internal consistency reliability. Average variance extracted values range from 0.644 to 0.671, exceeding the 0.50 criterion and establishing convergent validity (Fornell & Larcker, 1981). Construct means cluster between 3.67 and 3.73 on the five-point scale, indicating that respondents perceive green HR practices in their properties as moderately rather than strongly implemented. Results are summarized in Table 3.

Table 3. Construct reliability and convergent validity

Construct	Items	Loading Range	Mean	SD	Cronbach Alpha	CR	AVE
Green Recruitment & Selection (X_1)	4	0.801 – 0.811	3.699	0.772	0.820	0.881	0.650
Green Training & Development (X_2)	5	0.770 – 0.850	3.686	0.812	0.877	0.911	0.671
Green Performance Appraisal (X_3)	4	0.782 – 0.823	3.726	0.773	0.816	0.879	0.644
Green Organizational Commitment (Z)	5	0.766 – 0.837	3.674	0.801	0.873	0.908	0.663
Employee Green Behavior (Y)	6	0.767 – 0.854	3.696	0.782	0.895	0.920	0.657

Discriminant validity was assessed using the Fornell–Larcker criterion, which requires that the square root of the AVE for each construct exceed its correlations with all other constructs. As shown in Table 4, the diagonal values (0.803 to 0.819) exceed all corresponding off-diagonal correlations, the highest of which is 0.630 between green organizational commitment and employee green behavior. Discriminant validity is therefore established.

Table 4. Discriminant validity (Fornell–Larcker criterion)

Construct	X_1	X_2	X_3	Z	Y
Green Recruitment & Selection (X_1)	0.806				
Green Training & Development (X_2)	0.462	0.819			
Green Performance Appraisal (X_3)	0.407	0.507	0.803		
Green Organizational Commitment (Z)	0.497	0.538	0.514	0.814	
Employee Green Behavior (Y)	0.462	0.581	0.511	0.630	0.811

Note: Diagonal values in bold represent the square root of AVE; off-diagonal values are construct correlations.

Discriminant validity was further confirmed using the heterotrait–monotrait ratio of correlations. As reported in Table 5, all Heterotrait–Monotrait Ratio of Correlations (HTMT) values fall between 0.497 and 0.712, well below the conservative threshold of 0.90 recommended by [Henseler et al. \(2015\)](#), providing additional assurance that the five constructs are empirically distinct.

Table 5. Discriminant validity (Heterotrait–Monotrait Ratio)

Construct	X_1	X_2	X_3	Z
Green Training & Development (X_2)	0.545			
Green Performance Appraisal (X_3)	0.497	0.600		
Green Organizational Commitment (Z)	0.588	0.615	0.609	
Employee Green Behavior (Y)	0.539	0.656	0.598	0.712

4.3 Structural Model Assessment

Collinearity diagnostics were examined before evaluating the structural paths. Inner VIF values range from 1.340 to 1.716, far below the threshold of 5, indicating that multicollinearity does not compromise the interpretation of path coefficients. Bootstrapping with 5,000 subsamples was applied to obtain robust estimates of standard errors and significance levels. Results for the seven direct paths are reported in Table 6.

Table 6. Structural model results (direct effects)

Hypotheses	Path	β	SE	t-value	p-value	f^2	Result
H_1	$X_1 \rightarrow Y$	0.099	0.059	1.672	0.095	0.014	Not supported
H_2	$X_2 \rightarrow Y$	0.265	0.061	4.328	0.000	0.086	Supported
H_3	$X_3 \rightarrow Y$	0.152	0.065	2.337	0.020	0.030	Supported
H_4	$X_1 \rightarrow Z$	0.259	0.061	4.265	0.000	0.086	Supported
H_5	$X_2 \rightarrow Z$	0.284	0.066	4.304	0.000	0.092	Supported
H_6	$X_3 \rightarrow Z$	0.264	0.057	4.666	0.000	0.084	Supported
H_7	$Z \rightarrow Y$	0.360	0.064	5.595	0.000	0.152	Supported

Note: Significance based on a two-tailed test at $\alpha = 0.05$; f^2 values of 0.02, 0.15, and 0.35 denote small, medium, and large effects respectively.

Six of the seven direct hypotheses are supported. Green organizational commitment emerges as the strongest single predictor of employee green behavior ($\beta = 0.360$; $t = 5.595$; $p < 0.001$), with the largest effect size in the model ($f^2 = 0.152$, approaching a medium effect). Among the three GHRM practices, green training and development has the largest direct path coefficient on green behavior ($\beta = 0.265$; $t = 4.328$; $p < 0.001$), followed by green performance appraisal ($\beta = 0.152$; $t = 2.337$; $p = 0.020$); the differences between these coefficients were not formally tested. The direct effect of green recruitment and selection on green behavior is positive but statistically non-significant ($\beta = 0.099$; $t = 1.672$; $p = 0.095$), so H_1 is not supported. All three GHRM practices exert significant and comparably sized effects on green organizational commitment ($\beta = 0.259$ to 0.284 ; all $p < 0.001$), supporting H_4 , H_5 , and H_6 .

Table 7. Coefficient of determination and predictive relevance

Endogenous Construct	R^2	R^2 Adjusted	Q^2	Interpretation
Green Organizational Commitment (Z)	0.417	0.409	0.402	Moderate
Employee Green Behavior (Y)	0.504	0.495	0.483	Moderate to substantial

The explanatory and predictive power of the model was assessed using the coefficient of determination and cross-validated redundancy. As reported in Table 7, the three GHRM practices jointly explain 41.7% of the variance in green organizational commitment, while the full model explains 50.4% of the variance in employee green behavior both moderate to substantial by

conventional benchmarks. Q^2 values of 0.402 and 0.483 are well above zero, confirming that the model possesses predictive relevance for both endogenous constructs.

The mediating role of green organizational commitment was examined using bootstrapped confidence intervals for the indirect effects and classified following [Zhao et al. \(2010\)](#) and [Nitzl et al. \(2016\)](#). Results are presented in Table 8. All three indirect effects are positive and statistically significant, with 95% confidence intervals excluding zero, supporting H_8 , H_9 , and H_{10} .

Table 8. Mediation analysis results

Hyp.	Path	Indirect β	SE	t	p	95% CI	Direct effect	Total effect	Direct p	Mediation
H_8	$X_1 \rightarrow Z \rightarrow Y$	0.093	0.029	3.249	0.001	[0.042; 0.153]	0.099 (n.s.)	0.192	0.095	Full
H_9	$X_2 \rightarrow Z \rightarrow Y$	0.102	0.030	3.458	0.001	[0.049; 0.163]	0.265 (sig.)	0.367	0.000	Partial
H_{10}	$X_3 \rightarrow Z \rightarrow Y$	0.095	0.026	3.704	0.000	[0.049; 0.149]	0.152 (sig.)	0.247	0.020	Partial

Note: n.s. = not significant; sig. = significant. Direct p = p-value of the corresponding direct effect (Table 6). Mediation type follows [Zhao et al. \(2010\)](#) and [Nitzl et al. \(2016\)](#): full = indirect-only mediation (indirect effect significant, direct effect not significant); partial = complementary mediation (both effects significant with the same sign).

Table 9. Summary of hypotheses testing

Hypotheses	Statement	Result
H_1	Green recruitment and selection $\rightarrow$ employee green behavior	Not supported
H_2	Green training and development $\rightarrow$ employee green behavior	Supported
H_3	Green performance appraisal $\rightarrow$ employee green behavior	Supported
H_4	Green recruitment and selection $\rightarrow$ green organizational commitment	Supported
H_5	Green training and development $\rightarrow$ green organizational commitment	Supported
H_6	Green performance appraisal $\rightarrow$ green organizational commitment	Supported
H_7	Green organizational commitment $\rightarrow$ employee green behavior	Supported
H_8	GOC mediates green recruitment $\rightarrow$ employee green behavior	Supported (full mediation)
H_9	GOC mediates green training $\rightarrow$ employee green behavior	Supported (partial mediation)
H_{10}	GOC mediates green appraisal $\rightarrow$ employee green behavior	Supported (partial mediation)

The mediation pattern is theoretically informative. For green recruitment and selection, the indirect effect through commitment is significant ($\beta = 0.093$; $p = 0.001$) while the direct effect is not, indicating indirect-only (full) mediation: within this model, the association between green recruitment and green behavior is transmitted through the commitment it fosters. For green training and green performance appraisal, both direct and indirect effects are significant, indicating complementary (partial) mediation: these practices shape behavior both through the capability and accountability they create and through the commitment they generate. A summary of all ten hypotheses is presented in Table 9.

4.4 Discussion

This study set out to examine whether green HRM practices translate into employee green behavior in star-rated hotels in South Sulawesi, Eastern Indonesia, and whether green organizational commitment

functions as the mechanism through which that translation occurs. Nine of the ten hypotheses were supported. The discussion below interprets each set of findings in relation to the theoretical framework and prior evidence.

4.4.1 Green Recruitment and Selection and Employee Green Behavior

Contrary to H_1 , green recruitment and selection does not exert a significant direct effect on employee green behavior ($\beta = 0.099$; $p = 0.095$), although its indirect effect through green organizational commitment is significant ($\beta = 0.093$; $p = 0.001$). This pattern of indirect-only mediation departs from studies reporting direct effects of green recruitment on pro-environmental behavior ([Saeed et al., 2019](#)) but is consistent with the theoretical expectation advanced in this study.

Two possible explanations merit consideration; neither was measured directly in this study, so both should be treated as propositions for future testing. First, hiring decisions in the sampled hotels may be shaped more by service competence, language ability, and local availability than by environmental criteria, which may function as a secondary consideration. Even where environmental screening occurs, its behavioral signal at the point of entry is weak relative to subsequent socialization, and the relatively modest mean score on this construct (3.699) suggests that green recruitment is only partially institutionalized in the sampled properties. Second, and more importantly, the mechanism of green recruitment is intrinsically attitudinal: it determines the environmental disposition of the workforce, which requires organizational reinforcement before it becomes behaviorally expressed. Selecting environmentally minded employees produces green behavior only if the organization subsequently converts that disposition into commitment. In addition, the study had limited power to detect a direct effect of this size ($f^2 = 0.014$; see Section 3.2), so the non-significant direct path should not be read as evidence that no direct effect exists.

The theoretical implication is that green recruitment should be modeled as a distal antecedent operating through attitudinal channels rather than as a proximal behavioral driver, a reading consistent with Indonesian evidence positioning green recruitment as one element of a broader system whose effects materialize through engagement and commitment states ([Ichdan & Maryani, 2024](#); [Marlita et al., 2026](#)). Studies that model GHRM as a single composite would obscure this distinction entirely, which underscores the analytical value of disaggregation.

4.4.2 Green Training and Development and Employee Green Behavior

Green training and development has the largest direct path coefficient on green behavior among the three practices ($\beta = 0.265$; $p < 0.001$) and the largest total effect (0.367), although the differences between coefficients were not formally tested. This corroborates results from hospitality settings elsewhere in Southeast Asia ([Kim et al., 2019](#); [Pham et al., 2019](#)) as well as Indonesian reviews and studies identifying green training as a principal driver of environmental and performance outcomes ([Faeni et al., 2025](#); [Febrian, 2025](#); [Nurakhim et al., 2025](#)).

Interpreted through AMO theory, training addresses the ability constraint most directly, and in a workforce in which 38.7% of respondents hold high school or vocational qualifications, the marginal return on ability-building may be relatively high, although prior environmental education was not measured. The dual function of training also merits emphasis. Beyond skill transfer, allocating paid working hours to environmental instruction constitutes a costly and therefore credible signal of organizational priority. Under social exchange logic, costly signals elicit stronger reciprocation than costless declarations, which helps explain why training influences behavior both directly ($\beta = 0.265$) and indirectly through commitment ($\beta = 0.102$). The indirect effect is a comparatively small part of the total effect for this path (0.102 of 0.367), suggesting that much of green training's influence operates through the direct, capability-based route rather than through the attitudinal route, which is consistent with its theorized role as an ability-building rather than a purely motivational practice.

4.4.3 Green Performance Appraisal and Employee Green Behavior

Green performance appraisal exerts a significant but comparatively modest direct effect on green behavior ($\beta = 0.152$; $p = 0.020$; $f^2 = 0.030$). This supports the accountability argument, such as formal

evaluation resolves the ambiguity surrounding discretionary environmental effort by confirming that such effort is observed and valued. In hotel operations, where employees face continuous pressure to prioritize guest-facing service targets, appraisal legitimizes the allocation of time and attention to environmental tasks that would otherwise be crowded out.

The modest magnitude of the effect nonetheless invites interpretation. A plausible reading, which this study did not test directly, concerns the credibility rather than the presence of environmental appraisal in the sampled properties. Where environmental indicators appear on evaluation forms but rarely influence promotion, bonus, or recognition outcomes, employees reasonably discount them, and the resulting behavioral effect is attenuated. Notably, green appraisal's effect on commitment ($\beta = 0.264$) is considerably stronger than its direct effect on behavior ($\beta = 0.152$), and its indirect effect (0.095) is a substantial part of its total effect (0.247). This suggests that appraisal functions in this context more as a signal of institutional seriousness than as an immediate behavioral incentive; a proposition future research should test directly by measuring perceived appraisal credibility as a distinct construct.

4.4.4 Green Organizational Commitment and the Mediation Mechanism

Green organizational commitment is the strongest single predictor of employee green behavior in the model ($\beta = 0.360$; $f^2 = 0.152$), and it significantly mediates the effects of all three GHRM practices. This finding is consistent with the study's central theoretical claim, such as GHRM practices influence green behavior substantially through the commitment they generate. The mechanism positions green organizational commitment as the conversion point between an organizational-level HR system and individual-level discretionary conduct, extending prior mediation research that has emphasized psychological green climate or green organizational identity by demonstrating that domain-specific affective attachment performs a comparable and arguably more parsimonious function. The result is also consistent with [Ansari et al. \(2021\)](#), who found that green commitment mediates the relationship between GHRM and employees' pro-environmental behaviors.

The finding also converges with a growing body of Indonesian evidence in which attitudinal stateswork engagement and organizational commitment carry the effect of HR systems into employee outcomes ([Febrian & Sani, 2026](#); [Larasandi & Satrya, 2025](#); [Marlita et al., 2026](#)). The comparable magnitudes of the three practices' effects on commitment (0.259, 0.284, and 0.264) suggest that commitment responds to the GHRM system as a coherent signal of organizational sincerity rather than to any single practice in isolation. This is theoretically important: employees appear to read the ensemble of green HR practices as evidence of whether the organization means what it says about the environment, and it is that reading, rather than any individual policy, that they reciprocate. The practical reading follows directly. GHRM does not operate mechanically. A hotel may implement every recommended green HR practice and still fail to generate green behavior if those practices are perceived as compliance theater rather than genuine organizational commitment. What employees reciprocate is not the practice itself but the sincerity it conveys.

4.4.5 Theoretical and Practical Implications

Theoretically, the study makes three contributions. First, it demonstrates the analytical value of disaggregating GHRM, such as the three practices differ meaningfully in both magnitude and mechanism: green training appears to operate predominantly through capability, green appraisal through signalling, and green recruitment only indirectly through commitment. These differences in mediation type (indirect-only versus complementary) constitute the study's principal theoretical refinement, a heterogeneity entirely obscured when GHRM is modeled as a composite construct, as remains common in the Indonesian literature ([Ernawati et al., 2026](#); [Rosyafah et al., 2025](#)). Second, it advances an integrated AMO–SET account in which AMO explains the capability and incentive structure while SET explains the motivational conversion, with green organizational commitment serving as the theoretical bridge. Third, it extends the test of the model to a setting outside Indonesia's main tourism hubs; because the institutional characteristics of that setting were not measured, the study suggests rather than establishes boundary conditions, contributing to the wider concern in sustainable tourism research with how sustainability outcomes are produced in peripheral and resource-constrained destinations ([Afnan et al., 2024](#); [Mabhandha, 2022](#); [Wijesundara et al., 2025](#)).

Practically, four recommendations follow for hotel operators in South Sulawesi and comparable emerging-economy settings. First, green training and development shows the largest total effect in this sample (0.367, compared with 0.192 for green recruitment); although the differences were not formally tested, training appears to be a sensible first priority where resources permit investment in only one practice; training should be recurrent rather than confined to orientation, and job-specific rather than generic, since housekeeping staff require different environmental competencies from engineering staff. Second, green appraisal must be made consequential: including environmental indicators on evaluation forms achieves little unless those indicators demonstrably affect recognition and reward, and managers should ensure at least one visible, well-communicated instance in which environmental contribution influenced a promotion or award decision. Third, green recruitment should be treated as a long-horizon investment whose value lies in raising the environmental disposition of the workforce; because its effect in this sample operated only through commitment, screening for environmental values without subsequent reinforcement may yield little behavioral return. Fourth, because commitment mediates every GHRM–behavior relationship in the model, managers should attend to how environmental initiatives are framed and communicated; explaining the reasoning behind environmental targets, sharing environmental performance results with staff, and involving employees in designing environmental routines are low-cost mechanisms for strengthening the attitudinal channel through which GHRM operates.

5. Conclusions

5.1 Conclusion

This study examined whether green human resource management practices translate into employee green behavior in star-rated hotels in South Sulawesi, Eastern Indonesia, and whether green organizational commitment explains that translation. Drawing on the Ability–Motivation–Opportunity framework and Social Exchange Theory, and analyzing data from 217 hotel employees in South Sulawesi using PLS-SEM, the study found that green training and development and green performance appraisal are significantly and directly associated with employee green behavior, whereas green recruitment and selection is not. All three practices are positively associated with green organizational commitment, which in turn is the strongest single predictor of green behavior. Commitment shows indirect-only (full) mediation for green recruitment and complementary (partial) mediation for green training and green appraisal. The model explains 41.7% of the variance in commitment and 50.4% in green behavior, with predictive relevance confirmed for both.

The central conclusion is that green HRM practices do not translate into green behavior automatically. Within the limits of a cross-sectional design, the results suggest that they do so largely to the extent that they foster commitment to the organization's environmental mission. For hotels operating under resource and institutional constraints, this reframes the managerial question: the issue is not how many green HR practices to adopt, but whether the practices adopted are credible enough for employees to reciprocate.

5.2 Research Limitations

Several limitations qualify these findings. First, the cross-sectional design precludes strong causal inference; although the hypothesized relationships are grounded in theory, the temporal ordering of commitment and behavior cannot be established from a single measurement occasion. Second, the study relied on self-reported measures for all constructs, including employee green behavior, which may be subject to common method bias and social desirability effects despite the procedural and statistical remedies applied. Third, the sample was drawn by purposive, non-probability sampling from star-rated hotels in a single province, so the findings cannot be generalized statistically to the hotel industry of South Sulawesi, let alone Eastern Indonesia, and may not extend to budget accommodation, homestays, other regions of Eastern Indonesia, or more institutionally mature hospitality markets. Fourth, the model examined only one mediating mechanism and included no moderating variables, although environmental awareness, green transformational leadership, and perceived organizational support are plausible boundary conditions. Fifth, the effect sizes observed for the individual GHRM practices are small by conventional benchmarks (f^2 between 0.014 and 0.092), suggesting that additional determinants of employee green behavior remain unmodeled. Sixth,

respondents were nested within hotels, and this clustering was not modeled, which may understate standard errors. Seventh, the model excluded green compensation and rewards and green employee involvement, so the opportunity dimension of the AMO framework was captured only indirectly. Finally, employee green behavior was treated as a single construct, which may conceal differences in the antecedents of task-related and proactive green behavior.

5.3 Suggestions and Directions for Future Research

Building on these limitations, several avenues for future research are suggested. First, longitudinal or multi-wave designs would clarify the temporal dynamics linking green HR practices, commitment, and behavior, particularly across the phases of an environmental program's implementation. Second, future studies should incorporate multi-source data supervisor ratings of green behavior, or objective departmental indicators such as energy consumption, water usage, and waste volume to reduce common method bias and strengthen the validity of the outcome measure. Third, given the non-significant direct effect of green recruitment observed here, future research should measure the perceived credibility and actual enforcement of green HR practices separately from their formal presence, since the gap between the two appears consequential. Fourth, comparative designs across regions of differing institutional maturity, for instance Bali against South Sulawesi, would test directly whether institutional context conditions the GHRM–behavior relationship. Fifth, future research could incorporate moderating variables such as green transformational leadership, perceived organizational support, or environmental awareness, in order to specify the conditions under which GHRM practices are most effective. Finally, extending the model to other segments of the tourism value chain restaurants, tour operators, and community-based tourism enterprises would broaden understanding of how green HR practices operate across the sustainable tourism sector. Future studies could also test formally whether the effects of the individual practices differ, include green compensation and green employee involvement to capture the opportunity dimension of the AMO framework, model the nesting of employees within hotels through multilevel designs, separate task-related from proactive green behavior, and assess out-of-sample predictive power using PLS predict (Shmueli et al., 2019).

Acknowledgement

The authors would like to express their sincere gratitude to the management and employees of the participating hotels in South Sulawesi who generously contributed their time and insights to this study. The authors also acknowledge the constructive feedback provided by colleagues during the development of the research instrument and the manuscript. No specific grant from any funding agency in the public, commercial, or not-for-profit sectors was received for this research.

Author Contributions

DR contributed to the research conceptualization, methodology development, data collection, formal analysis, and original manuscript preparation. MM contributed to the theoretical framework, research methodology, data interpretation, and manuscript review and editing. CAP contributed to research supervision, validation of findings, critical review, and manuscript refinement. All authors participated in reviewing and approving the final version of the manuscript.

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