sustainability

MDPI

Article

Linking Green Transformational Leadership to Organizational Citizenship Behavior for the Environment: The Mediating Role of Green Human Resource Management Practices in Malaysian Manufacturing Firms

Najah Azila Mohamad Azizie [1], Mohamed Ayyub Hassan [1,*], Nur Naha Abu Mansor [2,*] and Suthan Dalinayodo [3]

[1] School of Human Resource Development and Psychology, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Johor Bahru 81310, Malaysia; najahazila97@gmail.com
[2] College of Business Administration, A'Sharqiyah University, Ibra 400, Oman
[3] Faculty of Business and Management, Southern University College, Skudai 81300, Malaysia; suthanal@sc.edu.my
* Correspondence: ayyub@utm.my (M.A.H.); nur.mansor@asu.edu.om (N.N.A.M.)

Abstract

This study examines the relationships among green transformational leadership (GTL), organizational citizenship behavior for the environment (OCBE), and five green human resource management (GHRM) practices, namely green recruitment and selection (GRS), green training and development (GTD), green rewards and compensation (GRC), green performance management (GPM), and green involvement (GI), in Malaysian manufacturing organizations. Using a quantitative cross-sectional survey of 379 manufacturing organizations, with one managerial-level key informant representing each organization, data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. The findings indicate that GTL has significant positive relationships with OCBE and all five GHRM practices. However, the relationships between individual GHRM practices and OCBE differ across practices. GTD, GRC, and GI show significant positive relationships with OCBE, whereas GRS and GPM are not significantly related to OCBE. The mediation analysis further shows significant indirect effects of GTL on OCBE through GTD, GRC, and GI, while the indirect effects through GRS and GPM are not significant. These findings indicate that the five GHRM practices do not function uniformly as indirect pathways between GTL and OCBE. The study therefore emphasizes the differentiated roles of environmental training, rewards and compensation, and employee involvement within the observed model. SET and the AMO framework are used as complementary interpretive lenses rather than directly tested psychological mechanisms. The study contributes practice-specific evidence on the heterogeneous roles of GHRM practices in the Malaysian manufacturing context.

Keywords: green transformational leadership; green human resource management; green recruitment and selection; green training and development; green reward and compensation; green performance management; green involvement; organizational citizenship behavior for the environment

Check for updates

Academic Editor: Cristina Raluca Gh. Popescu

Received: 24 August 2026
Revised: 8 October 2026
Accepted: 10 October 2026
Published: 29 October 2026

Copyright: © 2026 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license.

1. Introduction

Environmental sustainability has become an urgent priority as industrial activities continue to intensify environmental degradation through excessive resource consumption and greenhouse gas emissions [1]. The manufacturing sector is particularly implicated due to its energy-intensive and carbon-intensive production processes, which amplify ecological pressures [2,3]. Prior studies increasingly acknowledge that technological investments and regulatory compliance alone may be insufficient to achieve organizational sustainability objectives, highlighting the need for internal organizational mechanisms that align leadership practices, human resource systems, and employee behavior [4,5]. In this context, organizations face growing pressure to foster workplace behaviors that directly support environmental objectives, particularly organizational citizenship behavior for the environment (OCBE), which refers to employees' discretionary and voluntary actions that extend beyond formal job requirements [6–8].

In Malaysia, the manufacturing sector is a major contributor to economic activity, accounting for more than 23% of national Gross Domestic Product (GDP) and playing an important role in export performance [9]. At the same time, the sector contributes substantially to environmental pressures, including industrial emissions, resource depletion, and hazardous industrial waste [10,11]. Although the adoption of green technologies has increased, many firms continue to face difficulties in translating environmental policies and technological investments into consistent organizational practices due to limited organizational capabilities, financial constraints, and insufficient employee engagement [5,12]. These challenges highlight the importance of organizational mechanisms that support the integration of environmental priorities into workplace practices. Accordingly, Malaysian manufacturing organizations provide a relevant context for examining the relationships among green transformational leadership (GTL), green human resource management (GHRM), and organizational citizenship behavior for the environment (OCBE).

Within this industrial setting, OCBE represents an important form of discretionary environmental behavior that can support the translation of corporate sustainability objectives into workplace practices [8,13]. OCBE comprises discretionary and extra-role contributions by employees, such as resource conservation, assisting colleagues with green tasks, and suggesting eco-innovative improvements that extend beyond formal job descriptions [8,14]. In manufacturing contexts, however, such voluntary actions may remain unevenly practiced because workforce priorities are often oriented toward routine production targets, potentially leaving environmental responsibility perceived as peripheral [15,16]. Addressing this implementation gap requires attention to internal organizational factors that can support and sustain environmental citizenship behaviors within the organization [4,5]. In this study, OCBE is assessed through managerial-level key informants who evaluate employees' environmental behaviors within their organizational context.

Green transformational leadership (GTL) represents an important organizational factor associated with OCBE. By articulating an inspiring sustainability vision, modeling environmental responsibility, and providing intellectual stimulation, green transformational leaders can encourage employees to align their workplace actions with organizational environmental objectives [17,18]. Empirical studies have consistently reported positive associations between GTL and pro-environmental outcomes, including environmental awareness, confidence, and ecological responsibility among employees [19–22]. Despite growing global interest, empirical research examining the link between GTL and OCBE within the Malaysian manufacturing sector remains limited [23], underscoring the need to investigate how leadership practices relate to environmental citizenship behavior within manufacturing organizations.

Beyond leadership, green human resource management (GHRM) provides an organizational system for embedding environmental considerations into formal human resource policies and practices [24,25]. Adopting the framework established by [24], GHRM comprises five functionally distinct practices: green recruitment and selection (GRS), green training and development (GTD), green rewards and compensation (GRC), green performance management (GPM), and green involvement (GI). Although prior studies have linked GHRM to employee environmental behavior, existing research predominantly examines GHRM as an aggregated construct, which may obscure functional differences across practices such as capability development, motivational reinforcement, and participatory opportunities [26,27]. Furthermore, because GHRM implementation often varies across developing-economy manufacturing settings, individual practices may differ in their relationships with discretionary environmental behavior [5,27]. Examining these five practices separately is therefore important for identifying which practices are statistically associated with OCBE and which indirect pathways between GTL and OCBE are supported.

Despite the growing literature on GTL and GHRM, limited empirical attention has been given to the differentiated relationships between individual GHRM practices and OCBE, particularly within Malaysian manufacturing organizations. Existing studies have provided evidence that GTL is associated with sustainability-oriented HR practices and environmental behavior [26,28,29]. However, because prior work frequently treats GHRM as an aggregated construct, less is known about whether GRS, GTD, GRC, GPM, and GI exhibit different relationships with OCBE and whether these practices represent distinct indirect pathways between GTL and OCBE [28,30]. This gap is important because the five practices address different organizational functions and may therefore show different patterns of association with discretionary environmental behavior. Examining these practices separately in the Malaysian manufacturing context can provide practice-specific evidence on their relationships with OCBE and clarify which indirect pathways between GTL and OCBE are statistically supported.

To address this gap, the present study examines the direct relationships and indirect pathways among GTL, the five distinct GHRM practices, and OCBE within Malaysian manufacturing organizations. Accordingly, the study addresses the following research questions: (1) What are the direct relationships of GTL with the five GHRM practices (GRS, GTD, GRC, GPM, GI) and OCBE? (2) What are the direct relationships of the five GHRM practices with OCBE? and (3) Do the five GHRM practices demonstrate significant indirect pathways between GTL and OCBE? This study contributes to the literature in three primary ways. First, departing from aggregated GHRM models, it examines GHRM as five functionally distinct practices (GRS, GTD, GRC, GPM, GI), providing practice-specific empirical evidence on their direct relationships with OCBE and their respective indirect pathways linking GTL and OCBE. Second, SET and the AMO framework are used as complementary interpretive lenses rather than as directly tested psychological mechanisms [31,32]. SET provides a conceptual perspective for interpreting the reciprocal dynamics that may underlie the observed associations between organizational practices and workplace environmental behavior, while AMO provides a functional framework for distinguishing the roles of the five GHRM practices. Third, the study provides practice-specific evidence from Malaysian manufacturing organizations concerning which GHRM practices demonstrate significant direct relationships with OCBE and significant indirect pathways linking GTL to OCBE.

2. Literature Review and Theoretical Underpinnings

2.1. Green Transformational Leadership

GTL refers to a leadership approach in which leaders inspire, motivate, and guide the workforce toward environmental objectives by articulating an inspiring environmental vision, modelling pro-environmental values, and encouraging performance beyond conventional operational expectations [17,18]. Building on transformational leadership theory [33], GTL applies the core dimensions of idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration specifically to environmental sustainability [18,34]. This explicit environmental orientation distinguishes GTL from conventional leadership approaches that may primarily emphasize economic or operational outcomes, thereby positioning environmental responsibility as a distinct focus of leadership behavior [23,35].

GTL is characterized by the communication of clear environmental expectations, modelling of environmentally responsible behavior, and articulation of a shared environmental vision [36,37]. Through these behaviors, leaders signal the importance of environmental responsibility and provide workforce direction regarding sustainability-oriented goals and practices [21,38]. In particular, intellectual stimulation encourages employees to reconsider established routines and address environmental challenges innovatively, while individualized consideration reflects managerial support for employees in developing and undertaking environmental responsibilities [39,40].

Empirical studies have reported associations between GTL and environmentally related organizational and behavioral outcomes, including environmental commitment, collective environmental responsibility, and workplace pro-environmental actions [20–22]. In manufacturing settings, this leadership orientation is relevant because environmental considerations are closely connected to production processes, energy consumption, and operational workflows [41]. However, GTL represents the leadership construct examined in the present research model and does not by itself specify the formal HR mechanisms through which environmental priorities may be incorporated into work systems. This distinction provides the basis for examining GHRM and its five functionally distinct practices in the subsequent section.

2.2. Green Human Resource Management

G GHRM refers to the integration of environmental considerations into human resource policies and practices to support organizational environmental objectives [24]. The present study conceptualizes GHRM through five functionally distinct practices: green recruitment and selection (GRS), green training and development (GTD), green reward and compensation (GRC), green performance management (GPM), and green involvement (GI). This five-practice structure follows the established view that environmental considerations can be incorporated across different HR functions and stages of the employee lifecycle [24,25]. Examining these practices separately is important because each addresses a different HR function and may therefore exhibit different relationships with OCBE.

Specifically, GRS incorporates environmental considerations into recruitment and selection by communicating environmental expectations and considering candidates' environmental values or capabilities [42,43]. GTD develops employees' environmental knowledge, skills, and competencies required for environmentally responsible work practices [44,45]. GPM incorporates environmental criteria and responsibilities into performance-related processes [42,46], while GRC uses rewards, incentives, or recognition to acknowledge environmental contributions [47,48]. GI provides employees with opportunities to participate in environmental decision-making, contribute ideas, and engage in environmental initiatives [24,49]. Thus, the five practices represent distinct HR mechanisms covering em-

ployee entry, capability development, performance assessment, motivational reinforcement, and participation.

From an AMO perspective, these practices can be theoretically associated with different functional dimensions such as GRS and GTD with employee ability, GRC and GPM with motivation, and GI with opportunity [32]. However, these associations are conceptual rather than direct measurements of employees' underlying AMO states. This distinction is important because the present study examines GHRM practices as separate HR mechanisms and their relationships with OCBE, rather than directly measuring ability, motivation, or opportunity as psychological constructs. Accordingly, the differentiated structure of GHRM provides the basis for examining whether the five practices show distinct relationships with OCBE.

2.3. Organizational Citizenship Behaviour for the Environment

OCBE refers to voluntary, discretionary employee actions that contribute to environmental objectives without being formally prescribed by job descriptions or contractual reward systems [8]. Unlike mandatory in-role environmental duties, OCBE reflects discretionary contributions beyond formal role boundaries, such as conserving resources, suggesting eco-innovative improvements, minimizing operational waste, and assisting colleagues with environmental tasks [27,50]. Conceptualized through the foundational framework of [8], OCBE comprises three distinct yet interrelated dimensions: eco-initiatives, reflecting voluntary proposals for environmental improvement; eco-civic engagement, involving active participation in organizational environmental activities; and eco-helping, capturing assistance extended to colleagues in adopting sustainable workplace practices. In the present study, however, OCBE is operationalized as a single overall construct rather than as separate dimensions, consistent with the measurement approach adopted in the study.

Prior empirical literature associates OCBE with supportive organizational conditions, including pro-environmental leadership, sustainability climates, and supportive human resource practices [37,51,52]. In manufacturing settings, however, such voluntary contributions may vary because workforce priorities are strongly shaped by routine production schedules and operational targets [15,16]. In the present study, manager-rated OCBE represents managerial key-informant perceptions of employees' environmental behavior within each manufacturing organization. Thus, the organization is the unit of analysis, while the OCBE measure captures the key informant's assessment of employee environmental behavior rather than a direct aggregation of individual employee responses.

2.4. Theoretical Background

The relationships among GTL, GHRM, and OCBE are interpreted through Social Exchange Theory (SET) and the Ability–Motivation–Opportunity (AMO) framework as complementary theoretical lenses. SET provides the overarching perspective for understanding why employees may respond to organizational support and sustainability-oriented management practices with discretionary behaviors that support environmental objectives [31,53]. Within this perspective, GTL signals organizational commitment to environmental stewardship, while GHRM practices represent organizational investments directed toward the workforce. These organizational signals and practices can represent valued resources within the employment relationship, providing a basis for reciprocal responses that may include discretionary workplace contributions such as OCBE [54–56].

While SET articulates the reciprocal dynamic underlying these relationships, the AMO framework provides a complementary structural lens for differentiating how the five GHRM practices function in relation to workplace behavior [32]. In the present study, GRS and GTD are theoretically associated with the ability dimension, as they focus on attracting environmentally oriented personnel and developing environmental knowledge and competencies. GRC and GPM are associated with the motivation dimension through recognition, incentives, and environmental performance expectations, whereas GI is associated with the opportunity dimension by providing avenues for employee participation in environmental initiatives [44,57]. Crucially, these mappings reflect conceptual linkages between specific HR practices and functional AMO domains rather than direct empirical measurements of employees' psychological ability, motivation, or opportunity states.

The integration of SET and AMO therefore offers two complementary levels of interpretation. SET provides a relational perspective for understanding how organizational leadership and HR practices may be associated with employees' discretionary environmental behaviors, whereas AMO provides a functional framework for distinguishing among the five GHRM practices. This dual perspective is particularly relevant because GHRM is examined as five distinct organizational practices rather than as an aggregated construct, allowing the study to examine whether different GHRM practices exhibit different relationships with OCBE at the manufacturing organization.

2.5. Hypothesis Development

2.5.1. GTL and OCBE

GTL is expected to be positively associated with OCBE because environmentally oriented leadership provides strategic direction regarding environmental priorities and signals the organizational importance of environmental responsibility [15,36]. Leaders who articulate environmental goals, model environmentally responsible practices, and encourage proactive problem-solving may motivate employees to pursue environmental objectives and create a supportive context for discretionary environmental contributions [51,58].

From the SET perspective, employees' engagement in voluntary behaviors can be understood as a reciprocal response to perceived organizational support and leadership commitment to environmental objectives [31,53]. When leadership visibly demonstrates environmental values, such behaviors may serve as positive organizational signals that encourage employees to reciprocate through discretionary actions extending beyond formal job requirements [21,54]. Prior empirical studies have reported positive associations between environmentally oriented leadership and workplace environmental behaviors [36,38]. In manufacturing environments, where operational routines are closely associated with production targets, such leadership may provide a supportive context for employees' voluntary environmental contributions [15,41]. Therefore, the following hypothesis is proposed:

H1. *GTL is positively associated with OCBE.*

2.5.2. GTL and GHRM

Although GTL articulates a strategic vision for environmental sustainability, the integration of environmental priorities into organizational practices may also be reflected in formal human resource systems. Within this context, environmentally oriented leaders may support the alignment of HR policies and practices with environmental priorities by emphasizing the importance of incorporating environmental considerations into core HR functions [59,60]. Rather than examining GHRM as a uniform bundle, the relationship between GTL and GHRM can therefore be considered across distinct HR functional areas throughout the employee lifecycle [24,25,61].

Specifically, GTL may be associated with GRS by emphasizing environmental values and competencies in attracting and selecting employees [42,62]. Leaders who articulate an environmental vision may signal the importance of considering candidates' environmental awareness, values, and competencies during recruitment and selection [60,63]. Furthermore, GTL can foster GTD, as leaders who emphasize sustainability priorities are more inclined to allocate organizational resources toward enhancing employees' environmental competencies and awareness [61,64].

Furthermore, environmentally oriented leadership may support the incorporation of environmental considerations into formal performance and reward systems. GTL may be associated with GPM through the inclusion of environmental expectations and criteria in performance-related processes [60,61]. Similarly, GRC may reflect leadership emphasis on environmental contributions through monetary and non-monetary recognition of employees' environmental efforts [59,64]. By connecting employee contributions with organizational environmental priorities, leadership-supported reward systems can translate environmental values into formal motivational mechanisms [28,61]. Finally, GTL may be associated with GI by providing opportunities for employees to participate, contribute ideas, and get involved in environmental initiatives and decision-making [65–67].

Prior empirical studies have reported positive associations between GTL and GHRM practices [26,28,60]. In manufacturing organizations, this relationship is particularly relevant because environmental priorities often need to be incorporated into structured organizational and HR practices that guide employees across different work functions. Accordingly, the present study proposes that GTL is positively associated with each of the five GHRM practices examined. Therefore, the following hypotheses are proposed:

H2a. *GTL is positively associated with GRS.*

H2b. *GTL is positively associated with GTD.*

H2c. *GTL is positively associated with GRC.*

H2d. *GTL is positively associated with GPM.*

H2e. *GTL is positively associated with GI.*

2.5.3. GHRM and OCBE

GHRM practices may be associated with OCBE by providing organizational conditions that support employees' discretionary environmental contributions. From the perspective of SET, organizational investment in environmentally oriented HR practices may signal organizational support and commitment to environmental objectives, which may encourage employees to reciprocate through discretionary behaviors that extend beyond formal job requirements [13,68]. The AMO framework provides a complementary perspective by distinguishing the functional roles of the five GHRM practices. As discussed earlier, GRS and GTD are theoretically associated with ability, GRC and GPM with motivation, and GI with opportunity [5,48]. These associations represent conceptual linkages between HR practices and AMO domains rather than direct measurements of employees' psychological states.

GRS may be associated with OCBE by incorporating environmental considerations into recruitment and selection processes and attracting candidates with relevant environmental values or competencies [42,43]. From the SET perspective, the alignment between employees' environmental values and organizational priorities may strengthen employees' positive perceptions of the organization and encourage reciprocal contributions to organizational environmental objectives [5,69]. GTD may also be associated with OCBE by

developing employees' environmental knowledge, skills, and competencies required to address environmental issues in operational workflows [44,45]. By enhancing employees' green competence and self-efficacy, GTD reduces cognitive and practical barriers to taking action, empowering employees to proactively initiate OCBE [24,70,71]. Thus, GTD represents an ability-oriented HR mechanism through which employees may be better prepared to contribute to environmental objectives.

GRC may be associated with OCBE by recognizing environmental contributions and providing motivational reinforcement for employees' environmental efforts [15,72]. In line with SET, when organizations tangibly acknowledge and reward environmental contributions, employees perceive that their extra efforts are valued, which reinforces their motivation to reciprocate through ongoing OCBE [13,73]. Similarly, GPM may be associated with OCBE by incorporating environmental expectations and criteria into performance-related processes, thereby making environmental responsibilities more visible within employees' work roles [24,42]. From the AMO perspective, both practices are theoretically associated with motivation because they provide formal mechanisms for reinforcing environmental expectations and contributions [32]. GI, in contrast, is associated with the opportunity dimension by providing employees with avenues to participate in environmental decision-making, contribute ideas, and engage in organizational environmental initiatives [55,74]. Through participation and collaboration, GI can therefore strengthen employees' involvement in environmental activities and encourage OCBE, including supporting environmental initiatives and assisting colleagues [52,75].

Taken together, the five GHRM practices represent distinct HR practices through which organizations may provide employees with environmental capabilities, motivational reinforcement, and opportunities for participation. Consistent with SET, these organizational investments may also be perceived as support for environmental objectives, potentially encouraging reciprocal discretionary contributions in the form of OCBE. Accordingly, each GHRM practice is expected to exhibit a positive association with OCBE. Therefore, the following hypotheses are proposed:

H3a. *GRS is positively associated with OCBE.*

H3b. *GTD is positively associated with OCBE.*

H3c. *GRC is positively associated with OCBE.*

H3d. *GPM is positively associated with OCBE.*

H3e. *GI is positively associated with OCBE.*

2.5.4. Mediating Role of GHRM

The five GHRM practices may represent indirect pathways through which GTL is associated with OCBE. While GTL communicates environmental priorities, GHRM translates these priorities into formal HR practices related to recruitment, development, performance, rewards, and involvement [28,59]. From the SET perspective, alignment between leadership and HR practices may strengthen perceived organizational support and encourage reciprocal discretionary contributions in the form of OCBE [56,63]. The AMO framework provides a complementary perspective by explaining how the five GHRM practices may function through different mechanisms: GRS and GTD are theoretically associated with ability, GRC and GPM with motivation, and GI with opportunity [57,73].

GRS may represent an entry pathway through which GTL is associated with OCBE by incorporating environmental considerations into recruitment and selection [59,76]. From the AMO perspective, GRS is theoretically associated with ability through the attraction of candidates with relevant environmental values or competencies, while from the SET perspective, alignment between organizational and employee environmental values may contribute to positive perceptions of organizational support [63,77]. GTD may provide a capability-development pathway by connecting environmental leadership priorities with the development of employees' environmental knowledge and competencies. Such organizational investment in employee development may also be perceived as support, potentially encouraging reciprocal contributions through OCBE [28,76]. By connecting GTL's environmental vision with employee capability development, GTD may therefore represent an indirect pathway linking environmental leadership with OCBE.

GRC may provide a motivational pathway by reflecting environmental leadership priorities through recognition and incentives for environmental contributions. Consistent with SET, such organizational recognition may be perceived as a valued resource and may encourage reciprocal discretionary contributions [30,76]. GRC may therefore connect environmentally oriented leadership with formal motivational mechanisms that encourage employees to contribute through OCBE. Similarly, GPM may connect GTL with OCBE by incorporating environmental expectations into performance-related processes, thereby reinforcing the visibility of environmental responsibilities within formal HR systems [60,78]. From the SET perspective, consistent evaluation and feedback may signal that environmental responsibility is valued by the organization, encouraging employees to reciprocate through contributions that support organizational environmental objectives [27,79,80]. GI may provide an opportunity pathway by translating environmental priorities into opportunities for employees to participate, contribute ideas, and exercise voice in environmental initiatives [34,56,61]. From the SET perspective, opportunities for participation may signal organizational trust and support, encouraging employees to reciprocate through contributions that benefit the organization.

Taken together, the five GHRM practices represent distinct indirect pathways through which the environmental orientation associated with GTL may be reflected in OCBE. GRS and GTD are theoretically associated with ability, GRC and GPM with motivation, and GI with opportunity, while SET provides the overarching relational explanation for employees' potential reciprocal responses to organizational leadership and HR support. Because the present study examines GHRM as five distinct practices, the mediating relationships are hypothesized separately for each practice. Therefore, the following hypotheses are proposed:

H4a. *GRS mediates the relationship between GTL and OCBE.*

H4b. *GTD mediates the relationship between GTL and OCBE.*

H4c. *GRC mediates the relationship between GTL and OCBE.*

H4d. *GPM mediates the relationship between GTL and OCBE.*

H4e. *GI mediates the relationship between GTL and OCBE.*

The conceptual framework guiding this study is presented in Figure 1.

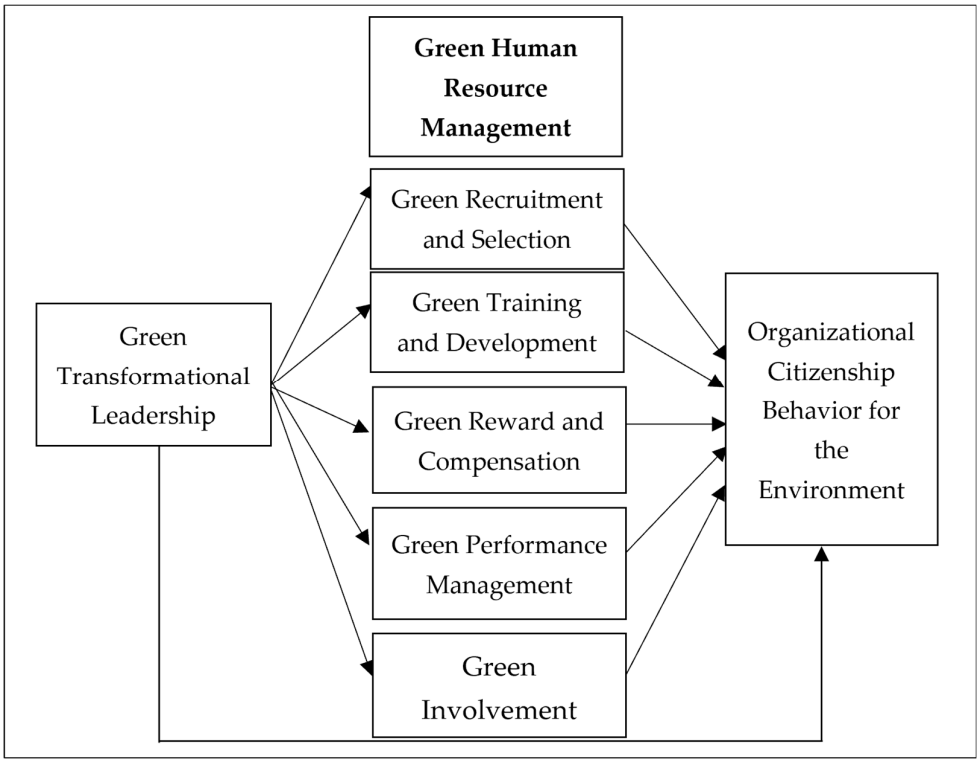


Figure 1. The proposed research model.

3. Methodology

3.1. Research Design

This study adopted a quantitative, cross-sectional survey design grounded in a positivist research philosophy to examine the hypothesized relationships among GTL, the five GHRM practices, and OCBE. A deductive approach was employed to test the conceptual relationships developed from Social Exchange Theory (SET) and the Ability–Motivation–Opportunity (AMO) framework.

The organization was treated as the unit of analysis, with one managerial-level key informant providing organizational-context assessments of GTL and GHRM practices and managerial perceptions of employees' OCBE within the organization. Respondents were primarily HR managers and senior operational managers who were considered knowledgeable about the organization's leadership practices, HRM systems, and employees' environmental behaviors. Accordingly, the study captures key-informant assessments of the organizational context rather than aggregated multi-respondent measures of individual employee behavior.

The use of a single key-informant approach was consistent with the study's focus on organizational leadership and HRM practices and their associations with employee environmental behavior within the organizational setting. Because each organization was represented by a single respondent, the findings are interpreted as relationships among organizational-level key-informant perceptions rather than as evidence derived from aggregated employee-level responses. Data were collected in a non-contrived organizational setting without experimental or managerial manipulation, reflecting the natural organizational context in which GTL, GHRM practices, and OCBE were examined.

3.2. Participation and Sampling

The target population of this study comprised manufacturing establishments operating across three primary industrialized states in Peninsular Malaysia, namely Selangor,

Johor, and Penang. These states were selected due to their substantial contribution to national manufacturing output, concentration of industrial establishments, and relevance to industrial environmental practices [81]. The Federation of Malaysian Manufacturers (FMM) Directory as of January 2024 served as the sampling frame for the study. Based on the directory, the target population comprised 2597 registered and active manufacturing establishments across the three selected states, consisting of 1492 organizations in Selangor, 616 in Johor, and 489 in Penang.

To ensure adequate representation across all three designated industrial regions, a disproportionate stratified random sampling technique was employed [82,83]. Stratification was established based on geographic location (Selangor, Johor, and Penang). Because the study aimed to obtain sufficient observations from each selected state for adequate regional representation, disproportionate allocations were used rather than proportional allocation. Accordingly, 302 organizations were targeted from Selangor, 234 from Johor, and 214 from Penang, resulting in a total target sample of 750 manufacturing organizations. Within each stratum, individual organizations were selected using a computerized random-number generator applied to the respective FMM membership registries, thereby reducing potential researcher selection bias [83].

The organization served as the unit of analysis and was represented by a single key informant. In organizational-level research, key informants are selected based on their formal roles, relevant knowledge, and organizational-level perspectives regarding company practices and workforce behaviors [84,85]. Accordingly, survey distribution was directed to an authorized organizational representative occupying a managerial position, such as a Chief Executive Officer, Human Resource Manager, Operations Manager, or Senior Sustainability Manager. These informants were expected to possess relevant knowledge of executive leadership priorities, the implementation of HR practices across the employee lifecycle, and environmental behaviors demonstrated by employees within the organization [25]. Importantly, informants reported their perceptions of employees' OCBE within their organizational context; thus, OCBE was assessed as a manager-rated perception of employees' environmental citizenship behavior rather than as the informants' own individual psychological states or discretionary actions [20,38].

The determination of sample-size allocation across the three strata was guided by the sample-size criteria established by [86]. Based on the population identified within each state, the minimum required sample size for each stratum was determined individually: 302 organizations for Selangor ($N = 1492$), 234 organizations for Johor ($N = 616$), and 214 organizations for Penang ($N = 489$). The three population counts sum to 2597 manufacturing establishments, and the three target allocations sum to 750 organizations. The disproportionate allocation was used to secure adequate representation from each selected state rather than to reproduce the population proportions or produce state-level population estimates. Accordingly, sampling weights were not applied in the subsequent analysis.

A total of 750 self-administered questionnaires were distributed via an online survey platform to the sampled organizations. To minimize item nonresponse, the online questionnaire was configured with mandatory response prompts across all measurement items, thereby eliminating missing data at the point of submission. From the distribution, 379 completed, valid, and usable responses were received, representing an effective response rate of 50.53%. An additional sample adequacy assessment was conducted using G*Power 3.1.9.7 to evaluate whether the achieved sample size was sufficient for the specified PLS-SEM assumptions. Using linear multiple regression with six direct predictors, a medium effect size ($f^2 = 0.15$), a significance level of 0.05, and statistical power of 0.95, the minimum required sample size was estimated at 146 organizations. The achieved sample of 379 orga-

nizations exceeded this threshold. This assessment was conducted to evaluate the adequacy of the achieved sample and was not used as an a priori basis for the sampling allocation.

Prior to measurement-model assessment, preliminary data screening was conducted to examine data completeness, extreme values, and potential common method variance (CMV). Given the single managerial key-informant design and the use of a common questionnaire, procedural remedies were implemented to reduce potential method bias. These included assuring respondent anonymity and confidentiality and separating measurement items across questionnaire sections to reduce evaluation apprehension and potential consistency effects. Harman's single-factor test was used as a statistical diagnostic. The results of these assessments are reported in Section 4.

3.3. Measures

Data were collected using a structured questionnaire developed in a bilingual format (Malay and English) to enhance respondent comprehension and ensure semantic equivalence across the measurement items. A forward- and back-translation procedure was conducted following the protocol established by [87]. The translated instrument was subsequently reviewed and verified by two professional linguists from the Language Academy, Universiti Teknologi Malaysia. Prior to the main data collection, the survey draft was reviewed by two academic experts in organizational behavior and one industry practitioner to confirm face validity, content validity, and contextual suitability within industrial operations [88,89].

The questionnaire comprised four main sections. Section A captured organizational profiles and respondent demographic characteristics, while Sections B, C, and D measured GTL, the five distinct GHRM practices, and OCBE, respectively, using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). All measurement items were adapted from validated instruments. A pilot study involving 30 manufacturing establishments was conducted prior to the main data collection. The pilot test yielded satisfactory internal consistency reliability across all scales, with Cronbach's alpha coefficients ranging between 0.858 and 0.959.

To align the measurement referent with the single key-informant design, item wordings were adapted from individual employee-level frames to organizational-context frames [84]. This adaptation preserved the substantive conceptual meaning of each construct while directing informants to evaluate organizational practices, leadership manifestations, and employees' environmental behaviors within their organizational context rather than their personal attitudes or discretionary behaviors. For example, OCBE items assessed key-informant perceptions of employees' voluntary environmental behaviors within the organization, whereas GHRM items captured organizational HR practices. The revised wording was reviewed by academic and industry experts to ensure conceptual fidelity and suitability for managerial informants.

GTL was measured using 12 items adopted from [90]. The scale evaluated the degree to which organizational leadership articulates an inspiring sustainability vision, models environmentally responsible behavior, and motivates employees to pursue environmental objectives. A representative item is: "The leadership acts as role models based on environmental considerations." The complete 12-item instrument is presented in Appendix A.

OCBE was measured using 10 items adopted from [8]. The scale assessed key-informant perceptions of employees' collective voluntary and discretionary environmental behaviors within the organization. A representative item is: "In our organization, employees consider the consequences of their actions before doing something that could harm the environment." The complete 10-item instrument is presented in Appendix A.

GHRM was operationalized as five distinct first-order reflective constructs comprising 26 items adopted from [25,62]. The reflective specification was based on the conceptualization of each GHRM practice as an underlying organizational HR practice that is manifested through its observable indicators. Thus, the indicators within each practice were treated as interchangeable manifestations of the same underlying construct rather than as defining components that collectively form the construct. A change in the underlying implementation of a given HR practice is therefore expected to be reflected across its associated indicators. This specification is also consistent with the measurement development and validation of the five-dimensional GHRM scale by Tang et al. [25], who examined the dimensional structure using exploratory and confirmatory factor analyses and found that individual items loaded on their respective GHRM dimensions. Similarly, Masri and Jaaron [62] operationalized GHRM practices using multiple items for each practice and established their internal consistency. Accordingly, GRS, GTD, GRC, GPM, and GI were specified as five separate first-order reflective constructs rather than as formative components of a higher-order GHRM construct.

GRS assessed the attraction and hiring of candidates who possess environmental awareness and ecological values. It was measured using five items, including: "Our organization tends to recruit prospective employees who are sufficiently sensitive to environmental concepts to fill vacant positions."

GTD assessed formalized training initiatives that develop employees' environmental knowledge, practical eco-skills, and conservation literacy. It was measured using five items, including: "Our organization provides environmentally based training to employees to enhance their environmental awareness."

GRC measured monetary incentives and non-financial recognition programs for workforce contributions toward environmental targets. It was measured using six items, including: "Our organization offers non-financial rewards based on environmental achievements (public recognition, awards, vacation time, gifts, and promotions)."

GPM evaluated the formal integration of environmental targets and criteria into employee appraisal and evaluation systems. It was measured using five items, including: "Our organization uses environmental performance indicators in the performance management system."

GI measured organizational mechanisms that provide employees with opportunities to participate in environmental decision-making, voice green ideas, and join sustainability initiatives. It was measured using five items, including: "In our organization, employees are involved in improving quality and solving problems related to environmental issues." The five practices were examined separately to assess their differentiated direct associations with OCBE and their individual indirect pathways in the relationship between GTL and OCBE. Measurement items are provided in Appendix A.

3.4. Data Collection Procedure

Data collection commenced following formal ethical approval from the Universiti Teknologi Malaysia Research Ethics Committee (Reference Number: UTMREC-2024-91), obtained on 10 November 2024. An online survey was administered via Google Forms to the sampled manufacturing organizations operating across Johor, Penang, and Selangor. The survey link was transmitted via email directly to the selected establishments and was specifically directed to eligible managerial-level key informants, including Chief Executive Officers, Human Resource Managers, Operations Managers, and Senior Managers, who possessed relevant knowledge of organizational leadership priorities, HRM systems, and workforce environmental behaviors.

Each questionnaire was accompanied by an official institutional cover letter detailing the academic nature of the study, the voluntary basis of participation, and the confidentiality of organizational and respondent information. In accordance with established research ethics protocols, respondents were informed that their participation was entirely voluntary and that they could withdraw from the survey at any point without adverse consequences [91]. To reduce evaluation apprehension and potential common method bias at the point of data collection, the completion instructions explicitly assured respondents that there were no right or wrong answers and encouraged objective evaluations based on actual organizational practices rather than socially desirable responses. The survey was administered in a natural, non-contrived organizational setting without experimental manipulation or managerial intervention, allowing managerial key informants to provide contextual assessments of their organization's leadership practices, HR systems, and OCBE.

3.5. Data Analysis

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. PLS-SEM was employed to examine the hypothesized relationships among GTL, the five distinct GHRM practices, and OCBE, including the direct and indirect relationships specified in the research model. The analysis followed a two-stage analytical procedure consisting of measurement model assessment followed by structural model assessment.

The measurement model was evaluated to establish the reliability and validity of the reflective constructs. Indicator reliability was examined through standardized outer loadings, with values exceeding 0.708 considered satisfactory [92]. Internal consistency reliability was assessed using Cronbach's alpha and composite reliability (CR), with values exceeding 0.70 indicating acceptable reliability. Convergent validity was established using the Average Variance Extracted (AVE), with values of 0.50 or higher considered acceptable. Discriminant validity was examined using both the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio of correlations (HTMT), with HTMT values below 0.90 indicating construct distinctiveness [92]. The five GHRM practices, GRS, GTD, GRC, GPM and GI, were specified as five distinct first-order reflective constructs, consistent with their conceptualization as functionally distinct organizational HR practices measured through observable manifestations.

Following satisfactory assessment of the measurement model, the structural model was evaluated by examining collinearity (VIF), path coefficients (β), the coefficient of determination (R^2), effect sizes (f^2), Q^2 predict, and approximate model fit. Inner VIF values below 5.0 were used to assess potential multicollinearity among predictor constructs. The R^2 values were interpreted as the proportion of variance explained in each endogenous construct. Effect sizes (f^2) were interpreted using Cohen's benchmarks, where values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively [93]. Values below 0.02 were interpreted as negligible or below the small-effect threshold.

Predictive performance was assessed using the PLSpredict procedure in SmartPLS 4.0, with 10 folds and 10 repetitions. Q^2 predict values greater than zero were interpreted as indicating predictive relevance for the corresponding endogenous constructs. Overall model fit was examined using the Standardized Root Mean Square Residual (SRMR), which provides an approximate measure of model fit in PLS-SEM [92].

Hypothesis testing was conducted using a non-parametric bootstrapping procedure with 5000 resamples to obtain standard errors, t-values, *p*-values, and 95% confidence intervals for the estimated direct and indirect effects [92,94]. The indirect effects of the five GHRM practices were examined separately to evaluate their specific statistical indirect pathways in the relationship between GTL and OCBE. Given the cross-sectional survey

design, the direct and indirect relationships were interpreted as statistical associations and estimated indirect pathways rather than evidence of causal effects. Descriptive statistics, including means and standard deviations, were examined to summarize the characteristics of the study variables. Common method variance was assessed using procedural remedies and Harman's single-factor test.

4. Results

4.1. Data Screening

Prior to the main data analysis, the dataset was subjected to preliminary data screening to assess its completeness and suitability for subsequent statistical analysis. The screening process included an examination of missing data, potential outliers, and common method variance (CMV). A total of 379 completed responses were retained for analysis after confirming that the dataset contained no missing values and no extreme univariate outliers. Given the cross-sectional survey design and the use of a single managerial-level key informant for each organization, CMV was assessed using procedural remedies and Harman's single-factor test. The results of these screening procedures are presented in the following subsections.

4.1.1. Missing Data

The online questionnaire was administered using Google Forms with a mandatory-response setting configured across all measurement items. Respondents were required to provide responses to all substantive survey items before proceeding to subsequent sections and formally submitting the questionnaire. Consequently, no missing values were identified in the retrieved dataset. Preliminary frequency screening confirmed that all 379 observations contained complete responses across the indicators measuring GTL, the five GHRM practices, and OCBE. Because the final dataset comprised 379 fully completed observations, no missing-value imputation, replacement procedures, or case deletion was required.

4.1.2. Outlier Detection

Standardized z-scores were computed for all individual survey items to evaluate univariate outliers. In accordance with the established screening criterion [95], cases with standardized values falling outside ± 3.00 were flagged for inspection. The analysis revealed no standardized scores exceeding the ± 3.00 threshold. Consequently, all 379 observations were deemed suitable and retained for subsequent analysis.

4.1.3. Common Method Variance

Given that the study employed a cross-sectional survey design and obtained data from a single managerial-level key informant for each organization, the potential for common method variance (CMV) was considered during both the study design and data analysis stages. Procedural remedies were implemented to reduce potential method bias, including assuring respondents of anonymity and confidentiality, providing clear instructions that there were no right or wrong answers, and presenting the measurement scales in separate questionnaire sections to reduce evaluation apprehension and consistency motifs.

Harman's single-factor test was conducted using all 48 measurement items. The first factor accounted for 37.811% of the total variance, which was below the conventional 50% threshold. This result indicates that no single factor accounted for the majority of the variance in the dataset. Taken together, the procedural remedies and Harman's single-factor test provide no indication that a single common factor accounted for the majority

of the variance in the data. Nevertheless, common method variance cannot be completely ruled out.

4.2. Demographic Analysis

The study comprised 379 respondents representing manufacturing organizations across three Malaysian states. Selangor accounted for the largest proportion of respondents (44.1%, $n = 167$), followed by Johor (31.4%, $n = 119$) and Penang (24.5%, $n = 93$). In terms of manufacturing subsectors, the largest proportions were from chemicals and petroleum (12.4%, $n = 47$), plastics (11.9%, $n = 45$), and electrical and electronics (11.6%, $n = 44$). The respondents also represented different managerial positions, with HR Managers constituting the largest group (38.0%, $n = 144$), followed by Managers (25.6%, $n = 97$). The predominance of managerial-level informants is consistent with the organizational key-informant approach adopted in this study, as these respondents were positioned to provide information regarding GTL, GHRM practices, and OCBE.

Regarding environmental certification, 62.3% ($n = 236$) of the represented organizations possessed ISO 14001 certification [96], whereas 37.7% ($n = 143$) did not. In terms of organizational age, 43.8% ($n = 166$) of the organizations had been operating for more than 20 years. The sample also included organizations of different sizes, with medium-sized organizations representing the largest group (47.0%, $n = 178$), followed by large (28.5%, $n = 108$) and small firms (24.5%, $n = 93$). Overall, the profile demonstrates variation in geographical location, subsector, managerial representation, environmental certification status, organizational age, and organizational size.

4.3. Descriptive Statistics

Descriptive statistics were examined for the study constructs based on 379 valid managerial-level key-informant responses representing 379 manufacturing organizations. As presented in Table 1, the mean scores ranged from 3.079 to 3.722, while the standard deviations ranged from 0.814 to 1.005. GTL recorded the highest mean score (M = 3.722, SD = 0.814), followed by OCBE (M = 3.640, SD = 0.876).

Table 1. Descriptive statistics of the study construct.

Construct	Mean	SD
GTL	3.72	0.814
GRS	3.41	0.930
GTD	3.64	0.881
GRC	3.08	1.005
GPM	3.33	0.925
GI	3.57	0.934
OCBE	3.64	0.875

Among the five distinct GHRM practices, GTD recorded the highest mean score (M = 3.639, SD = 0.881), followed by GI (M = 3.565, SD = 0.934), GRS (M = 3.407, SD = 0.930), and GPM (M = 3.331, SD = 0.925). GRC recorded the lowest mean score among the five GHRM practices (M = 3.079, SD = 1.005), indicating comparatively lower reported implementation of environmental reward and compensation practices across the represented organizations.

In terms of variability, GRC demonstrated the largest standard deviation (SD = 1.005), suggesting greater variation in the reported implementation of environmental reward

and compensation practices across the organizations. In contrast, GTL demonstrated the smallest standard deviation (SD = 0.814), indicating relatively less variation in respondents' assessments of environmentally oriented leadership practices. Overall, the descriptive statistics provide an overview of the central tendency and variability of GTL, the five distinct GHRM practices, and OCBE prior to the assessment of the measurement and structural models.

4.4. Measurement Model Assessment (Reliability and Validity)

The reflective measurement model was evaluated following the systematic criteria recommended for PLS-SEM [92,97]. The assessment examined indicator reliability, internal consistency reliability, convergent validity, and discriminant validity across the seven reflective constructs: GTL, the five distinct GHRM practices (GRS, GTD, GRC, GPM, and GI), and OCBE.

Indicator reliability was assessed using standardized outer loadings. As presented in Table 2, the standardized outer loadings ranged from 0.707 to 0.861. All indicators met or exceeded the recommended threshold of 0.708, with the exception of one indicator within GTD displaying a loading of 0.707. Given that this loading closely approximates the recommended threshold and the construct-level AVE remained above 0.50, the indicator was retained in accordance with recommendations for established measurement scales [92]. Internal consistency reliability was assessed using Cronbach's alpha (α) and Composite Reliability (CR). Cronbach's alpha values ranged from 0.803 to 0.935, while CR values ranged from 0.861 to 0.937, exceeding the recommended threshold of 0.70 [92]. Convergent validity was assessed using the Average Variance Extracted (AVE). As shown in Table 2, the AVE values ranged from 0.555 to 0.713, with all values exceeding the minimum threshold of 0.50. Thus, the results provide evidence of satisfactory indicator reliability, internal consistency reliability, and convergent validity across all reflective constructs.

Table 2. Measurement model assessment.

Construct	Items	Outer Loading Range	AVE	CR	Cronbach's Alpha
GTL	B1–B12	0.736–0.806	0.584	0.936	0.935
GRS	C1–C5	0.737–0.836	0.656	0.905	0.869
GTD	C6–C10	0.707–0.823	0.607	0.885	0.837
GRC	C11–C16	0.782–0.849	0.687	0.929	0.909
GPM	C17–C21	0.708–0.765	0.555	0.861	0.803
GI	C22–C26	0.814–0.861	0.713	0.926	0.899
OCBE	D1–D10	0.716–0.817	0.599	0.937	0.926

Discriminant validity was examined using two complementary approaches: the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio of correlations. Under the Fornell–Larcker criterion, the square root of the AVE for each construct should exceed its correlations with the other constructs. As presented in Table 3, the square root of the AVE values ranged from 0.745 to 0.844, and each diagonal value exceeded the corresponding off-diagonal inter-construct correlations. These findings support discriminant validity according to the Fornell–Larcker criterion.

Table 3. Fornell–Larcker criterion.

Construct	GRC	GTL	GTD	GI	GRS	GPM	OCBE
GRC	**0.829**						
GTL	0.339	**0.764**					
GTD	0.404	0.748	**0.779**				
GI	0.230	0.682	0.657	**0.844**			
GRS	0.386	0.615	0.598	0.492	**0.810**		
GPM	0.347	0.463	0.496	0.633	0.556	**0.745**	
OCBE	0.442	0.741	0.713	0.592	0.537	0.418	**0.774**

To further assess discriminant validity, the HTMT criterion was examined. As shown in Table 4, all HTMT values were below 0.90, with the highest value being 0.845 between GTL and GTD. This value also remained below the more conservative threshold of 0.85. Overall, the results provide evidence that the seven constructs are empirically distinct and demonstrate adequate discriminant validity prior to structural model evaluation.

Table 4. HTMT ratio.

Construct	GRC	GTL	GTD	GI	GRS	GPM	OCBE
GRC	—						
GTL	0.366	—					
GTD	0.457	0.845	—				
GI	0.252	0.741	0.759	—			
GRS	0.438	0.668	0.698	0.551	—		
GPM	0.389	0.508	0.577	0.727	0.668	—	
OCBE	0.480	0.783	0.795	0.635	0.576	0.443	—

4.5. Structural Model Assessment (Hypothesis Testing)

Following the establishment of the measurement model, the structural model was assessed using SmartPLS 4.0 to examine collinearity, explanatory power, effect sizes, predictive relevance, model fit, and the hypothesized relationships among the constructs [92,97]. Given the cross-sectional design of the study, the estimated relationships are interpreted as statistical associations rather than causal effects.

Collinearity was first assessed using variance inflation factor (VIF) values. The VIF values ranged from 1.298 to 2.933, which were below the recommended threshold of 5.0, indicating that collinearity among the constructs was not a concern in the structural model. Specifically, the VIF values were 2.933 for GTL 2.019 for GRS, 2.769 for GTD, 1.298 for GRC, 2.023 for GPM, and 2.684 for GI.

The explanatory power of the structural model was assessed using the coefficient of determination (R^2). As presented in Figure 2, the model explained 11.5% of the variance in GRC, 56.0% in GTD, 46.4% in GI, 37.9% in GRS, 21.5% in GPM, and 63.4% in OCBE. These values indicate that the model accounted for varying proportions of variance across the endogenous constructs, with the highest explanatory power observed for OCBE ($R^2 = 0.634$).

Predictive performance was assessed using the PLSpredict procedure in SmartPLS 4.0. The Q^2 predict values were 0.460 for GI, 0.205 for GPM, 0.108 for GRC, 0.373 for GRS, 0.556 for GTD, and 0.543 for OCBE. All Q^2 predict values were greater than zero, indicating

predictive relevance for the corresponding endogenous constructs. In particular, the Q^2 predict value of 0.543 for OCBE indicates that the model demonstrated predictive relevance in predicting OCBE.

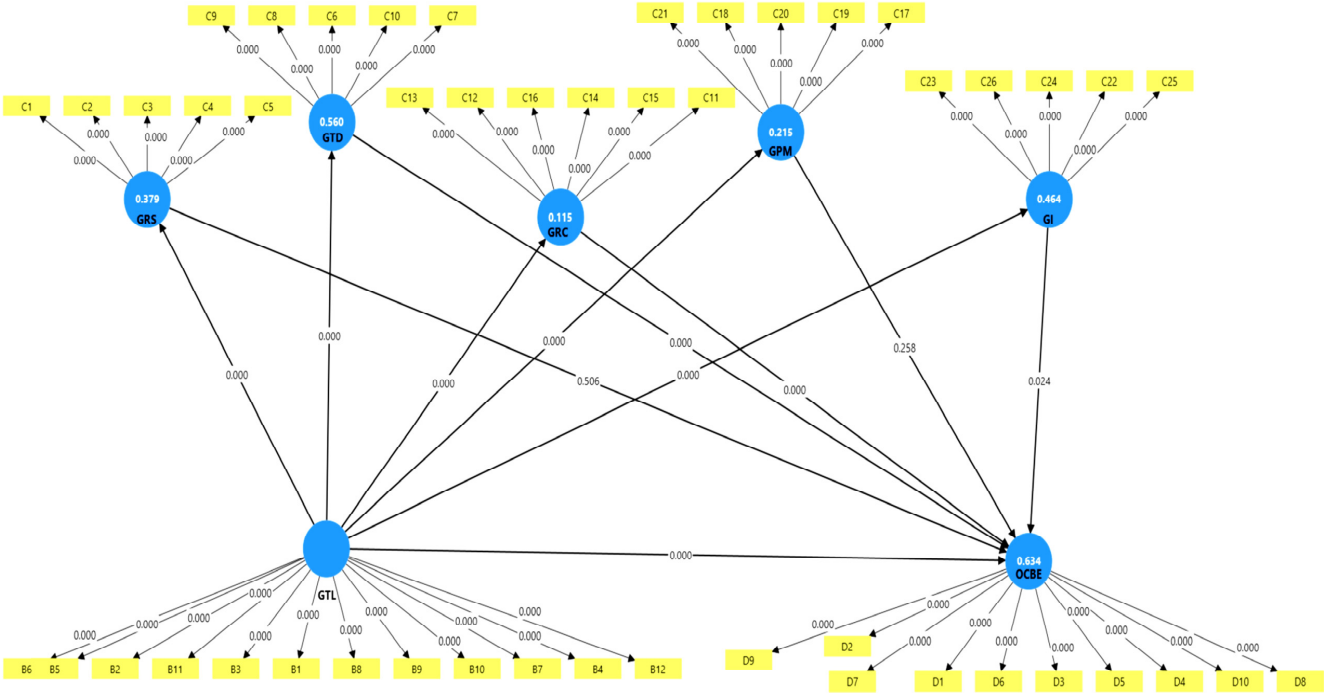


Figure 2. Structural model.

Effect sizes (f^2) were examined to assess the substantive contribution of each exogenous construct to its corresponding endogenous construct. Following [93] guidelines, f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively. GTL demonstrated large effect sizes on GRS ($f^2 = 0.610$), GTD ($f^2 = 1.271$), and GI ($f^2 = 0.867$), while its effects on GRC ($f^2 = 0.130$) and GPM ($f^2 = 0.273$) were small and medium, respectively. For OCBE, GTL demonstrated a medium effect size ($f^2 = 0.153$). The effects of GTD ($f^2 = 0.072$) and GRC ($f^2 = 0.065$) on OCBE were small, whereas the effects of GRS ($f^2 = 0.001$), GPM ($f^2 = 0.004$), and GI ($f^2 = 0.014$) were negligible or below the small-effect threshold.

Figure 2 presents the structural model, illustrating the estimated relationships among the study constructs and the explained variance of the endogenous constructs.

Model fit was assessed using the Standardized Root Mean Square Residual (SRMR), an approximate fit measure commonly reported in the PLS-SEM framework [92,98]. The SRMR values were 0.057 for the saturated model and 0.079 for the estimated model. The estimated-model SRMR was below the conventional 0.080 reference value, indicating acceptable approximate model fit; however, SRMR alone does not establish overall model validity.

The hypothesized relationships were evaluated using standardized path coefficients (β), t-values, and *p*-values obtained through bootstrapping. The bootstrapping procedure used 5000 resamples, and the corresponding bias-corrected 95% confidence intervals are reported in Table 5. As presented in Table 5, GTL demonstrated a positive and statistically significant association with manager-rated OCBE ($\beta = 0.405$, $t = 6.509$, $p < 0.001$), supporting H1.

GTL also demonstrated positive and statistically significant associations with all five GHRM practices. Specifically, GTL was positively associated with GRS ($\beta = 0.615$, $t = 15.336$, $p < 0.001$), GTD ($\beta = 0.748$, $t = 25.572$, $p < 0.001$), GRC ($\beta = 0.339$, $t = 6.935$, $p < 0.001$),

GPM (β = 0.463, t = 11.329, $p < 0.001$), and GI (β = 0.682, t = 19.297, $p < 0.001$). Accordingly, H2a, H2b, H2c, H2d, and H2e were supported.

The effects of the five GHRM practices on manager-rated OCBE differed across practices. GRS did not demonstrate a statistically significant association with manager-rated OCBE (β = 0.031, t = 0.694, $p = 0.506$), and therefore H3a was not supported. In contrast, GTD demonstrated a positive and statistically significant association with manager-rated OCBE (β = 0.271, t = 4.208, $p < 0.001$), supporting H3b. GRC also demonstrated a positive and statistically significant association with manager-rated OCBE (β = 0.176, t = 4.619, $p < 0.001$), supporting H3c. GPM did not demonstrate a statistically significant association with manager-rated OCBE (β = −0.057, t = 1.200, $p = 0.258$), and therefore H3d was not supported. Finally, GI demonstrated a positive and statistically significant association with manager-rated OCBE (β = 0.119, t = 2.253, $p = 0.024$), supporting H3e.

Table 5. Significance of the proposed paths and hypothesis testing.

Hypothesis	Path	Beta (β)	*p*-Value	Bias-Corrected 95% CI	f^2 Values	Result
H1	GTL → OCBE	0.405	<0.001	[0.285, 0.522]	0.153	Supported
H2a	GTL → GRS	0.615	<0.001	[0.530, 0.687]	0.610	Supported
H2b	GTL → GTD	0.748	<0.001	[0.688, 0.794]	1.271	Supported
H2c	GTL → GRC	0.339	<0.001	[0.235, 0.432]	0.130	Supported
H2d	GTL → GPM	0.463	<0.001	[0.371, 0.536]	0.273	Supported
H2e	GTL → GI	0.682	<0.001	[0.602, 0.749]	0.867	Supported
H3a	GRS → OCBE	0.031	0.506	[−0.059, 0.126]	0.001	Not Supported
H3b	GTD → OCBE	0.271	<0.001	[0.147, 0.396]	0.072	Supported
H3c	GRC → OCBE	0.176	<0.001	[0.106, 0.251]	0.065	Supported
H3d	GPM → OCBE	−0.057	0.258	[−0.161, 0.039]	0.004	Not Supported
H3e	GI → OCBE	0.119	0.024	[0.019, 0.226]	0.014	Supported

4.6. Mediating Effect of GHRM

The mediating effects of the five distinct GHRM practices in the relationship between GTL and OCBE were assessed using bootstrapping in SmartPLS 4.0. The analysis employed 5000 bootstrap resamples, and the significance of the indirect effects was evaluated using bias-corrected 95% confidence intervals (CIs). An indirect effect was considered statistically significant when its 95% CI did not include zero. Because the study is cross-sectional, these results are interpreted as statistical indirect pathways rather than evidence of causal mediation.

As presented in Table 6, the indirect effect of GTL on OCBE through GRS was not statistically significant (β = 0.019, $p = 0.513$, 95% CI [−0.035, 0.080]). Because the confidence interval included zero, H4a was not supported. This finding indicates that the indirect pathway involving GRS was not statistically distinguishable from zero.

In contrast, GTD demonstrated a statistically significant indirect effect in the relationship between GTL and OCBE (β = 0.202, $p < 0.001$, 95% CI [0.111, 0.298]). The confidence interval did not include zero, providing evidence of a significant indirect pathway through GTD and supporting H4b. Similarly, GRC demonstrated a statistically significant positive indirect effect (β = 0.060, $p < 0.001$, 95% CI [0.032, 0.096]). As the 95% confidence interval excluded zero, H4c was supported. This result indicates that GRC represents another statisti-

cally significant indirect pathway linking GTL and OCBE. GTD had the numerically largest estimated indirect effect among the significant pathways; however, no formal pairwise comparison of the indirect effects was conducted. Therefore, the results do not establish that GTD is statistically superior to GRC or GI.

The indirect effect through GPM was not statistically significant ($\beta = -0.027$, $p = 0.271$, 95% CI [−0.077, 0.018]). Because the confidence interval included zero, H4d was not supported. Although the estimated indirect effect was negative, the result does not provide statistical evidence of a significant indirect pathway through GPM. Finally, GI demonstrated a statistically significant positive indirect effect ($\beta = 0.081$, $p = 0.030$, 95% CI [0.018, 0.160]). The confidence interval did not include zero, supporting H4e. Thus, the results provide evidence of a significant indirect pathway involving GI.

Overall, the mediation results indicate that the indirect relationships between GTL and OCBE varied across the five GHRM practices. Significant indirect effects were observed through GTD, GRC, and GI, whereas the indirect effects through GRS and GPM were not statistically significant. These findings indicate that the five GHRM practices did not function uniformly as statistical indirect pathways between GTL and OCBE in the present sample.

Table 6. The mediating effect of GHRM and hypothesis testing.

Hypothesis	Indirect Path	Indirect Effect (β)	*p*-Value	Bias-Corrected 95% CI	Decision
H4a	GTL → GRS → OCBE	0.019	0.513	[−0.035, 0.080]	Not Supported
H4b	GTL → GTD → OCBE	0.202	<0.001	[0.111, 0.298]	Supported
H4c	GTL → GRC → OCBE	0.060	<0.001	[0.032, 0.096]	Supported
H4d	GTL → GPM → OCBE	−0.027	0.271	[−0.077, 0.018]	Not Supported
H4e	GTL → GI → OCBE	0.081	0.030	[0.018, 0.160]	Supported

5. Discussion

The findings indicate that GTL has a significant positive relationship with OCBE, supporting H1. This finding highlights the relevance of environmentally oriented leadership in encouraging organizational members to contribute to environmental objectives through OCBE. Leaders who consistently communicate environmental priorities, demonstrate environmentally responsible behavior, and support environmental initiatives may strengthen employees' perceptions that environmental responsibility represents a genuine organizational priority [18,38,99]. Within the Malaysian manufacturing context, this finding suggests that leadership commitment is associated with the extent to which environmental priorities are reflected in OCBE.

From the perspective of SET, the positive relationship between GTL and OCBE can be interpreted through the principle of reciprocity. When leaders demonstrate commitment to environmental objectives and provide support for environmental initiatives, employees may perceive these behaviors as signals that environmental contributions are valued by the organization and may respond through positive contributions to organizational environmental objectives [21,36,53]. GTL may therefore provide a social context in which environmentally oriented contributions are encouraged. This interpretation is consistent with previous research suggesting that supportive leadership and environmentally oriented leadership can shape organizational values, shared environmental vision, and employee engagement with environmental objectives [3,65,100]. In this regard, SET serves as an overarching theoretical lens to contextualize the reciprocal nature of these observed relationships, rather than an empirically tested psychological process.

The results further demonstrate significant positive relationships between GTL and all five GHRM practices, namely GRS, GTD, GRC, GPM and GI. These findings suggest that GTL is associated not only with OCBE but also with the incorporation of environmental considerations across different HR functions. Consistent with previous research, leadership style can provide strategic direction for integrating environmental considerations into recruitment and selection, training and development, rewards and compensation, performance management, and employee involvement [34,64,77]. The significant relationship between GTL and GRS suggests that environmentally oriented leadership is associated with the incorporation of environmental values and considerations into recruitment and selection processes, whereas the relationship between GTL and GTD indicates an association with organizational investment in environmental knowledge, skills, and competencies [59,60]. Similarly, the significant relationships between GTL and GRC, GPM, and GI indicate that environmental priorities are associated with reward and recognition systems, environmental performance-related processes, and employee participation mechanisms [52,59,79]. Taken together, these findings indicate that GTL is associated with the incorporation of environmental priorities across the five GHRM practices.

However, the five GHRM practices demonstrated different relationships with OCBE, supporting the importance of examining them as distinct practices rather than as a uniform GHRM construct. GTD, GRC, and GI showed significant positive relationships with OCBE, whereas GRS and GPM did not show significant relationships with OCBE. This practice-specific pattern is consistent with previous research suggesting that GHRM practices may differ in their relationships with employee environmental behavior [5,80,101]. The findings therefore indicate that the relationship between GHRM and OCBE may depend on the particular HR practice through which environmental considerations are incorporated.

The significant positive relationship between GTD and OCBE highlights the relevance of environmental knowledge, skills, and competency development. From the AMO perspective, GTD can be interpreted primarily as an ability-oriented practice because it equips employees with the knowledge and competencies required to understand environmental issues and respond to sustainability-related challenges [19,27]. Employees who receive appropriate environmental training may be better positioned to identify environmental problems, develop environmentally oriented solutions, and contribute to environmental initiatives through OCBE [73,102]. From a SET perspective, organizational investment in employees' environmental development may also be interpreted as a form of organizational support that can encourage reciprocal environmental contributions [48,73]. Thus, the significant relationship between GTD and OCBE is consistent with an interpretation in which capability development and perceived organizational support provide relevant conditions for OCBE.

The significant positive relationship between GRC and OCBE highlights the relevance of motivational reinforcement for environmental citizenship behavior. From the AMO perspective, GRC represents a motivation-oriented practice because it links environmental contributions with organizational recognition, rewards, and compensation [57,80]. Such reinforcement may signal that environmental contributions are valued by the organization and may encourage continued participation in OCBE. From the perspective of SET, employees may interpret recognition and rewards for environmental contributions as valued organizational support, which may encourage reciprocal contributions [48,55]. The significant relationship between GRC and OCBE therefore indicates that reward and recognition practices are associated with the motivational conditions relevant to OCBE.

The significant positive relationship between GI and OCBE highlights the importance of providing employees with opportunities to participate in environmental initiatives. From the AMO perspective, GI represents the opportunity component by creating organizational

mechanisms through which employees can express environmental ideas, participate in environmental problem-solving, and contribute to sustainability-related activities [5,73]. Such opportunities provide employees with channels to apply their environmental knowledge and exercise discretion in addressing environmental issues. From a SET perspective, meaningful opportunities for participation may also signal organizational trust and support, which may encourage reciprocal environmental contributions [38,48]. The significant relationship between GI and OCBE therefore suggests that participatory mechanisms are relevant to the extent to which organizational members engage in OCBE.

In contrast, GRS and GPM did not demonstrate significant relationships with OCBE. The non-significant relationship between GRS and OCBE may indicate that environmental considerations incorporated at the recruitment and selection stage are not, by themselves, sufficient to be associated with continuing OCBE. Although GRS can help organizations attract and select employees with environmental awareness and values, environmental alignment established at organizational entry may require complementary post-entry practices to support continuing environmental contributions [101,103]. From an AMO perspective, GRS may establish an initial environmental orientation but does not necessarily provide the continuing training, motivational reinforcement, or participation opportunities associated with OCBE. In the Malaysian organizational context, this suggests that initial environmental value alignment may benefit from complementary developmental and operational practices [104]. However, this explanation was not directly tested in the present study and should therefore be regarded as a possible interpretation rather than an established mechanism.

Similarly, GPM did not demonstrate a significant relationship with OCBE. GPM may formalize environmental expectations through performance evaluation and monitoring; however, OCBE concerns discretionary environmental contributions that extend beyond formally prescribed job requirements [46,105]. One possible explanation is that formal performance-management mechanisms may operate differently from practices that provide employees with continuing development, recognition, or opportunities for participation. From the perspective of AMO, GPM may communicate environmental expectations, but the presence of formal expectations alone may not provide the full set of conditions associated with OCBE. Nevertheless, the present study did not directly examine compliance orientation, intrinsic motivation, or employees' perceptions of performance-management systems. Therefore, this explanation should be interpreted cautiously and examined further in future research.

The mediation analysis further shows that the indirect effects of GTL on OCBE differ across the five GHRM practices. GTD, GRC, and GI demonstrated significant indirect effects, whereas GRS and GPM did not. This practice-specific pattern indicates that GHRM practices do not function uniformly as indirect pathways between GTL and OCBE. From the AMO perspective, GTD, GRC, and GI can be interpreted as practices associated primarily with ability, motivation, and opportunity, respectively. SET provides a complementary perspective by suggesting that organizational investment and support may be associated with employees' reciprocal environmental contributions. However, because the psychological mechanisms underlying AMO and SET were not directly measured, these theories are used as interpretive lenses rather than directly tested mechanisms.

Among the significant mediating pathways, GTD showed the numerically largest estimated indirect coefficient. However, because no formal pairwise comparison of the indirect effects was conducted, this numerical difference should not be interpreted as evidence that GTD is statistically stronger than GRC or GI. This finding indicates that GTD represents a statistically significant indirect pathway linking GTL with OCBE and had the largest estimated indirect coefficient among the three significant pathways. From

the AMO perspective, GTD primarily represents the ability component by developing employees' environmental knowledge, skills, and competencies. From the perspective of SET, organizational investment in employees' environmental development may be interpreted as organizational support that can encourage reciprocal contributions through OCBE [60,106]. The finding nevertheless identifies environmental training and development as a statistically significant indirect pathway linking GTL with OCBE. Nevertheless, the result should be interpreted as a significant indirect association rather than evidence that GTL causally produces OCBE through GTD.

GRC also demonstrated a significant indirect effect between GTL and OCBE. This finding indicates that GRC represents a statistically significant indirect pathway linking environmentally oriented leadership with OCBE. From the AMO perspective, GRC primarily corresponds to the motivation component because environmental rewards and recognition may reinforce employees' willingness to contribute to environmental objectives [26,107]. From the SET perspective, recognition of environmental contributions may signal that such contributions are valued by the organization and may therefore be associated with reciprocal environmental contributions. The finding suggests that reward and recognition practices represent a significant indirect pathway between GTL and OCBE. However, because perceived organizational support, felt obligation, and reciprocity were not directly measured, the SET interpretation should not be understood as evidence of a directly tested exchange mechanism.

Similarly, GI yielded a significant indirect effect linking GTL with OCBE. This finding indicates that employee involvement represents another statistically significant indirect pathway between environmentally oriented leadership and OCBE. From the AMO perspective, GI corresponds primarily to the opportunity component because it provides organizational channels for employee participation, voice, environmental problem-solving, and involvement in sustainability-related activities [79,108]. Such mechanisms may provide employees with opportunities to apply environmental knowledge and contribute beyond formal job requirements. From a SET perspective, opportunities for meaningful participation may also be interpreted as signals of organizational trust and inclusion that can encourage reciprocal environmental contributions. Therefore, the significant indirect effect through GI indicates that employee involvement is an important statistical pathway linking GTL with OCBE.

In contrast, GRS and GPM did not demonstrate significant indirect effects between GTL and OCBE. Although GTL was significantly related to both practices, these relationships did not translate into significant indirect associations with OCBE. One possible explanation is that GRS primarily operates at the employee entry stage, while GPM may emphasize formal environmental expectations, which may not by themselves provide the continuing developmental, motivational, or participatory conditions associated with OCBE [46,101,103,105]. However, these explanations were not directly tested and should therefore be interpreted cautiously. Overall, the findings indicate that the five GHRM practices do not function uniformly as indirect pathways between GTL and OCBE, with significant pathways observed through GTD, GRC, and GI but not GRS and GPM. Consistent with the AMO framework, the significant pathways reflect practices related to ability, motivation, and opportunity, while SET provides a complementary perspective for understanding the role of organizational support and reciprocal environmental contributions.

5.1. Theoretical Implications

First, this study advances the GHRM literature by demonstrating that the relationship between GTL and OCBE is not adequately captured by treating GHRM as a uniform, aggregated construct. By examining five distinct GHRM practices, the findings show that while GTL is significantly associated with all five practices, only GTD, GRC, and GI

demonstrate significant direct relationships with OCBE and significant indirect pathways linking GTL to OCBE. This practice-specific pattern extends existing research by showing that individual GHRM practices play functionally heterogeneous roles in relation to OCBE rather than operating as equivalent mechanisms [24,105,109].

Second, the findings provide a more differentiated application of the AMO framework within green organizational research. GTD, GRC, and GI conceptually correspond to practices associated with ability development, motivational reinforcement, and opportunity provision, respectively [5,24,73]. The significant relationships involving these practices highlight the relevance of capability development, recognition, and employee participation within the observed GTL and OCBE model. However, these findings do not imply that the three AMO dimensions must coexist or operate as a unified configuration, as interaction or configurational effects were not formally examined.

Third, this study contributes to the application of SET by using it as a complementary interpretive framework rather than as a directly tested psychological mechanism. The findings are consistent with the reciprocity perspective of SET, suggesting that environmentally oriented leadership and HR practices may signal organizational support for environmental contributions, which is reflected in the observed relationships with OCBE [13,31,48]. In this regard, SET provides a complementary perspective for understanding how organizational support and environmental-oriented practices are associated with employees' environmental contributions.

Finally, the study extends empirical evidence on GTL, GHRM, and OCBE within the Malaysian manufacturing sector. By decomposing GHRM into five distinct practices, the findings demonstrate that the relationship between GTL and OCBE involves selective, practice-specific pathways. This provides a nuanced foundation for future research examining how specific GHRM practices relate to environmental citizenship across diverse industrial and organizational contexts.

5.2. Practical Implications

The findings provide several practical implications for manufacturing organizations seeking to support OCBE through leadership and HRM practices. First, manufacturing organizations should cultivate green transformational leadership by embedding environmental priorities into formal managerial development and operational routines. Rather than limiting environmental messaging to high-level policy declarations, plant managers and shop-floor supervisors can communicate actionable environmental priorities during daily operational huddles and shift handovers [7,65]. Leaders can also model environmental commitment by adhering to resource conservation protocols, encouraging environmental problem-solving, and providing positive reinforcement when employees identify potential resource leakages or process inefficiencies.

Second, the significant mediating effects of GTD, GRC and GI provide more specific guidance for HR practice. Given that GTD, GRC, and GI demonstrated statistically significant indirect pathways, manufacturing organizations may strengthen these three GHRM practices, with particular attention to continuous and job-relevant environmental training rather than relying solely on general environmental awareness programs. HR departments can work with environmental, health, and safety (EHS) personnel to provide training related to areas such as waste reduction, resource conservation, pollution prevention, and environmentally responsible production practices. Such training can equip employees with the knowledge and skills required to identify and respond to environmental issues within their work activities. This targeted development aligns with the view that combining entrepreneurial strategies with firm-specific human capital, including specialized technical and environmental capabilities, is crucial for transforming general workforce knowledge

into long-term strategic advantages [110]. For GRC, organizations can incorporate monetary and non-monetary recognition for environmental contributions, such as departmental green awards, public acknowledgment, or other forms of recognition for employees or teams contributing as these mechanisms may reinforce the value placed on employees' environmental contributions and support continued participation in OCBE. For GI, organizations can establish platforms that facilitate employee participation, including cross-functional green teams, digital suggestion systems, and worker–management committees for evaluating environmental ideas and initiatives.

Third, the non-significant relationships involving GRS and GPM indicate that these practices should not be assumed to have the same relationship with OCBE as GTD, GRC, and GI. Rather than treating GRS and GPM as standalone mechanisms for supporting OCBE, organizations may integrate environmental considerations in recruitment and performance management with complementary training, recognition, and participation practices. For example, environmental criteria can be incorporated into recruitment processes, while environmental performance expectations can be incorporated into performance management alongside opportunities for employees to develop relevant capabilities and participate in environmental initiatives.

Finally, the findings highlight the importance of alignment between supervisory leadership and HR systems. Environmental priorities communicated by leaders can be reinforced through HR practices that provide opportunities for capability development, recognition, and employee participation. Aligning GTL with GTD, GRC, and GI may therefore provide manufacturing organizations with a more targeted approach to supporting OCBE than treating GHRM as a single, undifferentiated set of practices.

5.3. Limitations and Future Research Directions

Despite its contributions, this study has several limitations that should be considered when interpreting the findings. First, the cross-sectional survey design limits the ability to establish causal relationships among GTL, GHRM practices, and OCBE. Although the PLS-SEM results provide evidence of statistically significant direct and indirect relationships, temporal ordering and causal processes cannot be definitively established from single-wave data. The findings should therefore be interpreted as statistical associations rather than verified causal mechanisms. Future research could employ longitudinal, time-lagged, or experimental designs to examine how environmentally oriented leadership, specific GHRM practices, and OCBE develop over time.

Second, the study relied on a single managerial-level key informant per organization to assess GTL, GHRM practices, and OCBE. Although respondents were selected based on their managerial roles and knowledge of organizational practices, a single informant may not fully capture variations in perceptions and environmental behaviors across the wider workforce. This consideration is particularly relevant to OCBE, which concerns discretionary employee behavior. Future research could employ multi-source and multilevel designs, with management assessing leadership and HR practices and employees or supervisors providing assessments of OCBE. Where organizational-level aggregation is intended, appropriate aggregation diagnostics could also be incorporated.

Third, the use of a common survey instrument and single respondents for all constructs create the possibility of common method variance (CMV). Although procedural remedies were implemented and Harman's single-factor test was used to assess this concern, common method variance cannot be completely ruled out. Future research could strengthen methodological robustness through temporal separation, multiple data sources, or objective organizational indicators such as environmental audit records, waste-reduction measures, and energy-efficiency indicators.

Fourth, although SET and the AMO framework provide useful interpretive perspectives, the psychological mechanisms underlying these perspectives were not directly measured. Future research could incorporate constructs such as perceived organizational support, felt obligation, and intrinsic motivation to examine these mechanisms more directly. In addition, the present structural model examined separate additive relationships and therefore did not test interaction, complementarity, or configurational effects among the GHRM practices. Future studies could investigate such relationships using interaction or configurational approaches.

Finally, the study focused exclusively on manufacturing organizations in Selangor, Johor, and Penang. Therefore, the findings may not be directly generalizable to other industries. The practice-specific relationships identified in this study may vary according to industry characteristics, organizational size, and institutional or regulatory conditions. Future research could replicate the model across other industries, regions, and national contexts to examine whether the selective mediating roles of GTD, GRC, and GI remain consistent.

6. Conclusions

This study provides a more differentiated understanding of the relationships among GTL, five distinct GHRM practices, and OCBE within the Malaysian manufacturing sector. The findings indicate that GTL demonstrates significant positive associations with OCBE and all five GHRM practices. However, the relationships between individual GHRM practices and OCBE are selective rather than uniform. Specifically, GTD, GRC, and GI show significant positive associations with OCBE and demonstrate significant indirect pathways linking GTL to OCBE. In contrast, GRS and GPM do not exhibit significant direct or indirect relationships with OCBE in this empirical model.

These findings highlight the conceptual value of decomposing GHRM into functionally distinct practices rather than treating it as a monolithic construct. Interpreted through the AMO framework, GTD, GRC, and GI correspond to organizational mechanisms associated with ability development, motivational reinforcement, and opportunity provision, respectively. SET provides a complementary perspective for understanding how environmentally oriented leadership and supportive HR practices may be associated with employees' environmental contributions. Together, these perspectives provide useful theoretical lenses for interpreting the observed relationships among GTL, GHRM, and OCBE.

Overall, this research contributes to the GHRM and green leadership literature by identifying the heterogeneous roles of individual GHRM practices within the Malaysian manufacturing context. By showing that GHRM practices do not function uniformly as indirect pathways between GTL and OCBE, the study offers a more targeted, practice-specific foundation for future research examining how distinct HR practices relate to environmental citizenship across varied organizational and institutional settings.

Author Contributions: Writing—original draft preparation, N.A.M.A.; supervision, M.A.H.; writing—review and editing, funding acquisition, N.N.A.M.; funding acquisition, conceptualization, writing—review and editing, methodology, S.D. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the UTM Research Ethics Committee (UTM REC), Universiti Teknologi Malaysia (protocol code UTMREC-2024-91; date of approval: 10 November 2024).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are not publicly available due to privacy and ethical restrictions. The data may be available from the corresponding author upon reasonable request and subject to appropriate ethical and confidentiality requirements.

Acknowledgments: During the preparation of this manuscript, the authors acknowledge the use of Consensus (Consensus Web, Version 2.0) for literature search and retrieval, and ChatGPT (OpenAI GPT-6) and Gemini 1.5 Flash solely for translation, grammar checking, and language refinement of author-generated text. The authors have reviewed and edited the output and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Green Transformational Leadership

1. Leader acts as role models based on environmental considerations.
2. Leader demonstrates a commitment to improve the organization's environmental performance.
3. Organizational leader shows that (s)he values the environment.
4. Leader encourages employees to think about environmental issues in different ways.
5. Leader is open to ideas from employees on ways to improve the organization's environmental performance.
6. Leader encourages employees to think creatively to enhance the organization's environmental performance.
7. Leader motivates employees to work in an environmentally friendly manner.
8. Leader is enthusiastic about improving the future state of the organization's natural environment.
9. Leader is optimistic about the future of the organization's environmental performance.
10. Leader recognizes the ability of employees to improve the organization's environmental performance.
11. Leader pays attention to individual employee contributions to the organization's environmental performance.
12. Leader takes the time to develop employees' skills so that they can contribute to the organization's environmental performance.

Green Recruitment and Selection

1. Our organization provides job descriptions and specifications that include environmental concerns.
2. Our organization uses environmental branding to attract environmentally-friendly employees.
3. Our organization tends to recruit prospective employees who are sufficiently sensitive to environmental concepts to fill vacant positions.
4. Our organization includes behavioral criteria to the environment in its employee recruitment messages.
5. Our organization creates job positions that exclusively focus on aspects of environmental management.

Green Training and Development

6. Our organization provides environmentally-based training to employees to enhance their environmental awareness.
7. Our organization considers environmental needs and issues when analyzing training requirements.
8. Our organization integrates training programs to create emotional engagement among employees in environmental management.

9. Our organization provides online training materials to each employee to reduce paper usage costs.
10. Our organization prioritizes environmentally-based training over other types of training such as programs on energy conservation, waste reduction and opportunities to address environmental issues.

Green Pay and Reward

11. Our organization provides environmentally-based benefits (transportation/travel) instead of offering prepaid cards for purchasing eco-friendly products.
12. In our organization, there are financial incentives for eco-friendly actions (electric bike loans, using eco-friendly cars).
13. In our organization, there are tax incentives for eco-friendly actions (electric bike loans, using eco-friendly cars).
14. Our organization offers non-financial rewards based on environmental achievements (public recognition, awards, vacation time, gifts, and promotions).
15. Our organization offers financial rewards based on environmental achievements (paid vacations, bonuses, cash).
16. Our organization links employee suggestions to the reward system by providing rewards based on environmental performance.

Green Performance Management

17. Our organization uses environmental performance indicators in the performance management system.
18. Our organization sets environmental targets, goals, and responsibilities for all levels of employees.
19. In our organization, managers set objectives for environmental-based achievements in performance evaluations.
20. In our organization, there are penalties in the performance management system for those who do not comply with or fail to achieve environmental management goals.
21. Our organization provides regular feedback to employees to improve environmental performance.

Green Involvement

22. Our organization has a clear developmental vision to guide the employee actions in environment management.
23. In our organization, there is a collaborative learning environment among employees to create environmental behavior and awareness
24. In our organization, there are multiple formal and informal communication channels to spread the organization's environmental culture.
25. In our organization, employees are involved in improving quality and solving problems related to environmental issues.
26. Our organization provides opportunities for employees to participate in environmental management such as writing summaries, suggestion boxes, problem-solving groups, low-carbon champions, and green action teams.

Organizational Citizenship Behavior for The Environment

1. In our organization, employees will consider the consequences of their actions before doing something that could harm the environment.
2. In our organization, employees voluntarily implement environmental actions in their daily work activities.
3. In our organization, employees suggest ways to protect the environment more effectively, even if it is not their direct responsibility.
4. In our organization, employees actively participate in environmental events organized by the organization.

5. In our organization, employees are always informed about the organization's environmental initiatives.
6. Our organization implements environmental actions that positively contribute to the organization's image.
7. In our organization, employees voluntarily participate in projects, initiatives, or events that address environmental issues.
8. In our organization, employees spontaneously spend their time helping each other in all workplace-related activity while considering environmental aspects.
9. Our organization encourages employees to adopt behaviors that are more sensitive to the environment.
10. Our organization encourages employees to voice out their ideas and opinions related to the environmental issues.

References

1. Zahoor, Z.; Latif, M.I.; Khan, I.; Hou, F. Abundance of natural resources and environmental sustainability: The roles of manufacturing value-added, urbanization, and permanent cropland. *Environ. Sci. Pollut. Res.* **2022**, *29*, 82365–82378. [CrossRef] [PubMed]
2. Isachi, S.E. The impact of industry on climate change. *J. Rom. Lit. Stud.* **2025**, *40*, 1290–1300.
3. Alwheshi, A.; Alzubi, A.; Iyiola, K. Linking responsible leadership to organizational citizenship behavior for the environment: Examining the role of employees harmonious environmental passion and environmental transformational leadership. *Sage Open* **2024**, *14*, 21582440241271177. [CrossRef]
4. Asghar, M.M.; Zaidi, S.A.H.; Ahmed, Z.; Khalid, S.; Murshed, M.; Mahmood, H.; Abbas, S. The role of environmental transformational leadership in employees' influencing organizational citizenship behavior for environment well-being: A survey data analysis. *Environ. Sci. Pollut. Res.* **2022**, *29*, 58773–58790. [CrossRef] [PubMed]
5. Gilal, F.G.; Nawaz, A.; Riaz, A.; Channa, K.A.; Jahanzeb, A. Achieving sustainability through green human resource management practices and environmental orientation fit: A multilevel modeling. *Evid.-Based HRM* **2024**, *13*, 299–318. [CrossRef]
6. Mani, A.; Budd, T.; Maine, E. Emissions-intensive and trade-exposed industries: Technological innovation and climate policy solutions to achieve net-zero emissions by 2050. *RSC Sustain.* **2024**, *2*, 903–927. [CrossRef]
7. Ma, Y.; Ma, Q. Influence mechanism of environmentally transformational leadership on organizational citizenship behavior for the environment: A moderated mediation model. *Curr. Psychol.* **2024**, *43*, 9540–9552. [CrossRef]
8. Boiral, O.; Paillé, P. Organizational Citizenship Behaviour for the Environment: Measurement and Validation. *J. Bus. Ethics* **2012**, *109*, 431–445. [CrossRef]
9. Malaysian Investment Development Authority, MIDA. *Malaysia's Green Technology (2022/2023)*; MIDA: Kuala Lumpur, Malaysia, 2023. Available online: https://www.mida.gov.my/wp-content/uploads/2024/07/Green-Technology-2022-2023.pdf (accessed on 17 August 2026).
10. Sustainable Development Solutions Network, SDSN. *Sustainable Development Report 2021*; SDSN: New York, NY, USA, 2021.
11. Department of Environment, DOE. *Environmental Quality Report 2023*; Department of Environment: Kuala Lumpur, Malaysia, 2023. Available online: https://storage.data.gov.my/environment/eqr_2023.pdf (accessed on 17 August 2026).
12. Burlea-Schiopoiu, A.; Shoukat, M.H.; Shah, S.A.; Ahmad, M.S.; Mazilu, M. The sustainability of the tobacco industry in the framework of green human resources management. *Sustainability* **2022**, *14*, 5671. [CrossRef]
13. Yue, G.; Wei, H.; Khan, N.U.; Saufi, R.A.; Yaziz, M.F.A.; Bazkiaei, H.A. Does the environmental management system predict TBL performance of manufacturers? The role of green HRM practices and OCBE as serial mediators. *Sustainability* **2023**, *15*, 2436. [CrossRef]
14. Khan, N.U.; Wei, H.; Yue, G.; Nazir, N.; Zainol, N.R. Exploring themes of sustainable practices in manufacturing industry: Using thematic networks approach. *Sustainability* **2021**, *13*, 10288. [CrossRef]
15. Khan, N.U.; Wu, W.; Saufi, R.B.A.; Sabri, N.A.A.; Shah, A.A. Antecedents of sustainable performance in manufacturing organizations: A structural equation modeling approach. *Sustainability* **2021**, *13*, 897. [CrossRef]
16. Nureen, N.; Liu, D.; Irfan, M.; Sroufe, R. Greening the manufacturing firms: Do green supply chain management and organizational citizenship behavior influence firm performance? *Environ. Sci. Pollut. Res.* **2023**, *30*, 77246–77261. [CrossRef] [PubMed]
17. Chen, Y.S.; Chang, C.H. The determinants of green product development performance: Green dynamic capabilities, green transformational leadership, and green creativity. *J. Bus. Ethics* **2013**, *116*, 107–119. [CrossRef]
18. Robertson, J.L.; Barling, J. Greening organizations through leaders' influence on employees' pro-environmental behaviors. *J. Organ. Behav.* **2013**, *34*, 176–194. [CrossRef]

19. Ahmed, Z.; Khosa, M.; Nguyen, N.T.; Fahmi Omar Faqera, A.; Kayode Ibikunle, A.; Raza, S. Double-edged sword effects of green HRM on employee organizational citizenship behavior for the environment: Interactive effects and mediation mechanisms. *Bus. Process Manag. J.* **2024**, *30*, 1369–1398. [CrossRef]
20. Althnayan, S.; Alarifi, A.; Bajaba, S.; Alsabban, A. Linking environmental transformational leadership, environmental organizational citizenship behavior, and organizational sustainability performance: A moderated mediation model. *Sustainability* **2022**, *14*, 8779. [CrossRef]
21. Priyadarshini, C.; Chatterjee, N.; Srivastava, N.K.; Dubey, R.K. Achieving organizational environmental citizenship behavior through green transformational leadership: A moderated mediation study. *J. Asia Bus. Stud.* **2023**, *17*, 1088–1109. [CrossRef]
22. Schäpers, P.; Guntermann, T.; Heinemann, H.; Mönke, F.W. Are good leaders also green leaders? Differentiating established and environmental leadership styles, their antecedents, and predictive validity for corporate environmental responsiveness. *Bus. Ethics Environ. Responsib.* **2025**, *34*, 2034–2047. [CrossRef]
23. Jamian, N.F.; Mohamad Jidi, M.; Bashirun, S.N.; Mohd Razali, M. A bibliometric review on green transformational leadership. *Glob. Bus. Manag. Res. Int. J.* **2024**, *16*, 622–637.
24. Renwick, D.W.S.; Redman, T.; Maguire, S. Green human resource management: A review and research agenda. *Int. J. Manag. Rev.* **2013**, *15*, 1–14. [CrossRef]
25. Tang, G.; Chen, Y.; Jiang, Y.; Paillé, P.; Jia, J. Green human resource management practices: Scale development and validity. *Asia Pac. J. Hum. Resour.* **2018**, *56*, 31–55. [CrossRef]
26. Masih, S.; Punchanathan, U.E.; Osigwe, L.K. Influence of green transformational leadership on environmental citizenship behaviors via green HRM practices. Application of resource-based view theory in the Tourism Industry of Pakistan. *Int. J. Bus. Econ. Aff.* **2024**, *9*, 1–15. [CrossRef]
27. Iqbal, R.; Shahzad, K.; Chaudhary, R. Green human resource management practices as a strategic choice for enhancing employees' environmental outcomes: An affective events theory perspective. *Int. J. Manpow.* **2024**, *45*, 801–819. [CrossRef]
28. Farrukh, M.; Ansari, N.; Raza, A.; Wu, Y.; Wang, H. Fostering employee's pro-environmental behavior through green transformational leadership, green human resource management and environmental knowledge. *Technol. Forecast. Soc. Change* **2022**, *179*, 121643. [CrossRef]
29. Omarova, L.; Jo, S.J. Employee pro-environmental behavior: The impact of environmental transformational leadership and GHRM. *Sustainability* **2022**, *14*, 2046. [CrossRef]
30. Sachdeva, C.; Singh, T. Green transformational leadership and pro-environmental behaviour: Unravelling the underlying mechanism in the context of hotel industry. *Int. J. Organ. Anal.* **2024**, *32*, 255–271. [CrossRef]
31. Cropanzano, R.; Mitchell, M.S. Social exchange theory: An interdisciplinary review. *J. Manag.* **2005**, *31*, 874–900. [CrossRef]
32. Marin-Garcia, J.A.; Tomas, J.M. Deconstructing AMO framework: A systematic review. *Intang. Cap.* **2016**, *12*, 1040–1087. [CrossRef]
33. Bass, B.M. Leadership: Good, better, best. *Organ. Dyn.* **1985**, *13*, 26–40. [CrossRef]
34. Al-Hakimi, M.A.; Zaid, M.A.; Khan, M.F.; Saleh, M.H.; Sharma, D.; Verma, R.; Hasan, M.B. How and when does green transformational leadership affect environmental performance? *Int. J. Bus. Environ.* **2024**, *15*, 170–192. [CrossRef]
35. Federico, L.; Roletto, A.; Catania, D.; Zanoni, S.; Durante, S. Leading radiography managers into a greener future: A systematic review of green transformational leadership and sustainable practices. *Radiography* **2025**, *31*, 102996. [CrossRef] [PubMed]
36. Fatoki, O. Employee organisational citizenship behaviour for the environment in hospitality firms: The role of environmental responsibility, leadership and empathy. *Humanit. Soc. Sci. Lett.* **2025**, *13*, 251–269. [CrossRef]
37. Iqbal, R.; Shahzad, K.; Donia, M.B. Environmentally specific transformational leadership and employee green attitude and behavior: An affective events theory perspective. *J. Environ. Psychol.* **2023**, *92*, 102181. [CrossRef]
38. Khan, N.U.; Irshad Aur, R.; Ahmad Saufi, R.; Ahmed, A. Antecedents of organizational citizenship behavior towards the environment in manufacturing organizations: Using a structural equation modeling approach. *Bus. Process Manag. J.* **2021**, *27*, 1054–1087. [CrossRef]
39. Robertson, J.L.; Barling, J. Contrasting the nature and effects of environmentally specific and general transformational leadership. *Leadersh. Organ. Dev. J.* **2017**, *38*, 22–41. [CrossRef]
40. Awan, F.H.; Dunnan, L.; Jamil, K.; Gul, R.F. Stimulating environmental performance via green human resource management, green transformational leadership, and green innovation: A mediation-moderation model. *Environ. Sci. Pollut. Res.* **2023**, *30*, 2958–2976. [CrossRef] [PubMed]
41. Liu, X.; Yu, X. Green transformational leadership and employee organizational citizenship behavior for the environ-ment in the manufacturing industry: A social information processing perspective. *Front. Psychol.* **2023**, *13*, 1097655. [CrossRef] [PubMed]
42. Faisal, S. Green human resource management—A synthesis. *Sustainability* **2023**, *15*, 2259. [CrossRef]
43. Shahrulnizam, N.A.A.; Saidi, M.I.; Hassan, M.A.; Rahim, N.S.A.; Ying, Z.; Azizie, N.A.M. Green recruitment: A systematic review of attracting and retaining green talent. *PaperASIA* **2026**, *42*, 195–207. [CrossRef]

44. Benevene, P.; Buonomo, I. Green human resource management: An evidence-based systematic literature review. *Sustainability* **2020**, *12*, 5974. [CrossRef]
45. Azizie, N.A.M.; Hassan, M.A.; Shahrulnizam, N.A.A.; Alqahtani, S.M.H.; Rahim, N.S.A.; Yusof, J. The Role of Green Training and Development in Enhancing Organizational Citizenship Behaviour for the Environment: A Systematic Literature Review. *PaperASIA* **2025**, *41*, 392–410. [CrossRef]
46. Mughal, Y.H. Modeling role of green human resource management practices on organizational citizenship behaviour towards environment. *Psychol. Educ.* **2021**, *58*, 5381–5387.
47. Jabbour, C.J.C.; de Sousa Jabbour, A.B.L.; Govindan, K.; Teixeira, A.A.; de Souza Freitas, W.R. Environmental management and operational performance in automotive companies in Brazil: The role of human resource management and lean manufacturing. *J. Clean. Prod.* **2013**, *47*, 129–140. [CrossRef]
48. Kakar, A.S.; Khan, M. Exploring the impact of green HRM practices on pro-environmental behavior via interplay of organization citizenship behavior. *Green Finance* **2022**, *4*, 274–294. [CrossRef]
49. Zihan, W.; Makhbul, Z.K.M.; Alam, S.S. Green human resource management in practice: Assessing the impact of readiness and corporate social responsibility on organizational change. *Sustainability* **2024**, *16*, 1153. [CrossRef]
50. Wengang, Z.; Fenglian, W.; Feng, X. Motivating servant process for employee organizational citizenship behavior towards the environment: A goal setting perspective of integrating person-organization fit model. *J. Clean. Prod.* **2023**, *387*, 135932. [CrossRef]
51. Chen, C.; Rasheed, A.; Ayub, A. Does green mindfulness promote green organizational citizenship behavior: A moderated mediation model. *Sustainability* **2023**, *15*, 5012. [CrossRef]
52. Aboramadan, M.; Karatepe, O.M. Green human resource management, perceived green organizational support and their effects on hotel employees' behavioral outcomes. *Int. J. Contemp. Hosp. Manag.* **2021**, *33*, 3199–3222. [CrossRef]
53. Blau, P.M. Justice in social exchange. *Sociol. Inq.* **1964**, *34*, 193. [CrossRef]
54. Lin, M.; Effendi, A.A.; Iqbal, Q. The mechanism underlying the sustainable performance of transformational leader-ship: Organizational identification as moderator. *Sustainability* **2022**, *14*, 15568. [CrossRef]
55. Rehan, M.; Abbass, K.; Hussain, Y.; Usman, M.; Makhdum, M.S.A. Green human resource management in Pakistan tourism industry: Moderating role of environmental knowledge and individual green values. *Int. J. Environ. Sci. Technol.* **2024**, *21*, 2505–2516. [CrossRef]
56. Moin, M.F.; Omar, M.K.; Wei, F.; Rasheed, M.I.; Hameed, Z. Green HRM and psychological safety: How transformational leadership drives follower's job satisfaction. *Curr. Issues Tour.* **2021**, *24*, 2269–2277. [CrossRef]
57. Agarwal, P.; Upadhyay, R.K.; Anuj Ahalawat, K.; Kukreti, R.; Akhtar, A. Environmental performance in higher education and green HRM: The mediating role of organisational citizenship behaviour. *Int. J. Manag. Pract.* **2024**, *17*, 713–734. [CrossRef]
58. Elshaer, I.A.; Abdelrahman, M.A.; Azazz, A.M.; Alrawad, M.; Fayyad, S. Environmental transformational leadership and green innovation in the hotel industry: Two moderated mediation analyses. *Int. J. Environ. Res. Public Health* **2022**, *19*, 16800. [CrossRef] [PubMed]
59. Cahyadi, A.; Natalisa, D.; Poór, J.; Perizade, B.; Szabó, K. Predicting the relationship between green transformational leadership, green human resource management practices, and employees' green behavior. *Adm. Sci.* **2022**, *13*, 5. [CrossRef]
60. Dahinine, B.; Laghouag, A.; Bensahel, W.; Alsolami, M.; Guendouz, T. Modelling the combined effect of green leadership and human resource management in moving to green supply chain performance enhancement in Saudi Arabia. *Sustainability* **2024**, *16*, 3953. [CrossRef]
61. Singh, S.K.; Del Giudice, M.; Chierici, R.; Graziano, D. Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technol. Forecast. Soc. Change* **2020**, *150*, 119762. [CrossRef]
62. Masri, H.A.; Jaaron, A.A.M. Assessing green human resources management practices in Palestinian manufacturing context: An empirical study. *J. Clean. Prod.* **2017**, *143*, 474–489. [CrossRef]
63. Kaur, S.; Arora, M.; Mittal, A. Nurturing green employee behaviour: Exploring the role of leadership, human resource management practices and individual values. *Manag. Decis.* **2025**, *63*, 3843–3866. [CrossRef]
64. Sopiah, S.; Sangadji, E.M.; Islami, M.I. Effect of Green transformational leadership on organizational environmental performance: The role of green human resource management practices (Study on SMEs in The Embroidery Sector). *Int. J. Econ. Manag.* **2024**, *18*, 53–72. [CrossRef]
65. Elshaer, I.A.; Azazz, A.M.; Semlali, Y.; Mansour, M.A.; Elziny, M.N.; Fayyad, S. The nexus between green trans-formational leadership, employee behavior, and organizational support in the hospitality industry. *Adm. Sci.* **2024**, *14*, 107. [CrossRef]
66. Sidney, M.T.; Wang, N.; Nazir, M.; Ferasso, M.; Saeed, A. Continuous effects of green transformational leadership and green employee creativity: A moderating and mediating prospective. *Front. Psychol.* **2022**, *13*, 840019. [CrossRef] [PubMed]
67. Alwali, J.; Alwali, W. Transformational leadership and moral norms: Green human resource management and behaviour. *Manag. Decis.* **2025**, *63*, 1417–1442. [CrossRef]
68. Pham, N.T.; Chiappetta Jabbour, C.J.; Vo-Thanh, T.; Huynh, T.L.D.; Santos, C. Greening hotels: Does motivating hotel employees promote in-role green performance? The role of culture. *J. Sustain. Tour.* **2023**, *31*, 951–970. [CrossRef]

69. Malik, S.Y.; Mughal, Y.H.; Azam, T.; Cao, Y.; Wan, Z.; Zhu, H.; Thurasamy, R. Corporate social responsibility, green human resources management, and sustainable performance: Is organizational citizenship behavior towards environment the missing link? *Sustainability* **2021**, *13*, 1044. [CrossRef]
70. Japir Bataineh, M.A.; Ghasemi, M.; Ghadiri Nejad, M. The role of green training in the ministry of education's corporate environmental performance: A mediation analysis of organizational citizenship behavior towards the environment and moderation role of perceived organizational support. *Sustainability* **2023**, *15*, 8398. [CrossRef]
71. Sheikh, A.A.; Shan, A.; Hassan, N.M.; Khan, S.N.; AbdAlatti, A. Impact of green human resource management practices on hotels environmental performance: A mediation and moderation analysis. *Sustain. Futures* **2024**, *8*, 100409. [CrossRef]
72. Saputro, A.; Nawangsari, L.C. The effect of green human resource management on organization citizenship behaviour for environment (OCBE) and its implications on employee performance at Pt Andalan Bakti Niaga. *Eur. J. Bus. Manag. Res.* **2021**, *6*, 174–181. [CrossRef]
73. Mishra, S.; Rath, N. Impact of green human resource management practices on environmental performance of Indian Banking Sector: An Empirical Study. *Int. J. Sustain. Dev. Plan.* **2024**, *19*, 1457–1469. [CrossRef]
74. Rehman, A.; Ara, A.; Singh, H.P. How green HRM practices, organisational citizenship behaviour towards environment, technological competence and resistance to change influence the environmental performance of Saudi universities. *Future Bus. J.* **2025**, *11*, 224. [CrossRef]
75. Javed, U.; Wain, A.M.; Ashraf, A.A.; Bashir, I. Impacts of green HRM on organizational citizenship behavior towards environment: Mediating role of workplace spirituality and organizational engagement. *Int. Trans. J. Eng. Manag. Appl. Sci. Technol.* **2022**, *13*, 1–11. [CrossRef]
76. Priatna, D.K.; Farooq, K.; Yusliza, M.Y.; Muhammad, Z.; Alkaf, A.R.; Siswanti, I. Employee ecological behavior through green transformational leadership: The mediating role of green HRM practices and green organizational cli-mate. *J. Manag. Dev.* **2025**, *44*, 348–373. [CrossRef]
77. Hoang, H.T.; Ho, N.T.T.; Pham, N.T. Green transformational leadership, green human resource management, big five personality traits, and hotel employees' green behavior in Vietnam. In *Green Human Resource Management: A View from Global South Countries*; Springer Nature: Singapore, 2024; pp. 197–211. [CrossRef] [PubMed]
78. Mousa, S.K.; Fernandez-Crehuet, J.M.; Thaher, Y.A.Y. Advancing sustainable performance in healthcare: Mediating roles of green HRM and green innovation under green transformational leadership. *Bus. Strategy Environ.* **2025**, *34*, 5260–5282. [CrossRef]
79. Huelgas, M.S.; Arellano, A.V. Green transformational leadership, green human resource management and green innovation: Key to environmental performance of selected port management offices of Philippine ports authority. *Int. Multidiscip. Res. J.* **2021**, *3*, 44–58. [CrossRef]
80. Saeed, J.; Mehmood, N.; Aftab, S.; Irum, S.; Muhammad, A. Unlocking sustainability: The dynamic nexus of organizational support, identification, and green HRM practices in cultivating pro-environmental excellence. *Foresight* **2024**, *26*, 902–920. [CrossRef]
81. Rehman, H.M.; Yong, H.N.A.; Choong, Y.O. Impact of management practices on organisational innovation in the digital age: A study of the manufacturing industry in Malaysia. *Int. J. Manag. Stud.* **2021**, *28*, 73–101. [CrossRef]
82. Sekaran, U.; Bougie, R. *Research Methods for Business: A Skill Building Approach*, 5th ed.; John Wiley Sons: Hoboken, NJ, USA, 2010.
83. Kumar, R. *Research Methodology: A Step-by-Step Guide for Beginners*; SAGE: London, UK, 2019.
84. Kumar, S. Understanding Different Issues of Unit of Analysis in a Business Research. *J. Gen. Manag. Res.* **2018**, *5*, 7–82.
85. Boiral, O.; Raineri, N.; Talbot, D. Managers' citizenship behaviors for the environment: A developmental perspective. *J. Bus. Ethics* **2018**, *149*, 395–409. [CrossRef]
86. Krejcie, R.V.; Morgan, D.W. Determining sample size for research activities. *Educ. Psychol. Meas.* **1970**, *30*, 607–610. [CrossRef]
87. Brislin, R.W. Back-translation for cross-cultural research. *J. Cross-Cult. Psychol.* **1970**, *1*, 185–216. [CrossRef]
88. DeVellis, R.F. *Scale Development: Theory and Applications, Applied Social Research Methods*, 4th ed.; Sage Publications: London, UK, 2016.
89. Clark, L.A.; Watson, D. Constructing validity: Basic issues in objective scale development. *Psychol. Assess.* **1995**, *7*, 309–319. [CrossRef]
90. Robertson, J.L. The nature, measurement and nomological network of environmentally specific transformational leadership. *J. Bus. Ethics* **2018**, *151*, 961–975. [CrossRef]
91. Pillay, J. Ethical considerations in educational research involving children: Implications for educational researchers in South Africa. *South Afr. J. Child. Educ.* **2014**, *4*, 194–212. [CrossRef]
92. Hair, J.F.; Hult, G.T.; Ringle, C.; Sarstedt, M. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 2nd ed.; Sage: Los Angeles, CA, USA, 2017.
93. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed.; Hillsdale: Hillsdale, MI, USA, 1988.
94. Preacher, K.J.; Hayes, A.F. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav. Res. Methods* **2008**, *40*, 879–891. [CrossRef] [PubMed]

95. Leys, C.; Ley, C.; Klein, O.; Bernard, P.; Licata, L. Detecting outliers: Do not use standard deviation around the mean, use absolute deviation around the median. *J. Exp. Soc. Psychol.* **2013**, *49*, 764–766. [CrossRef]
96. *ISO 14001:2015*; Environmental Management Systems—Requirements with Guidance for Use. International Organization for Standardization: Geneva, Switzerland, 2015. Available online: https://www.iso.org/standard/60857.html (accessed on 1 August 2024).
97. Ramayah, T.; Cheah, J.; Chuah, F.; Ting, H.; Memon, M.A. *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using SmartPLS 3.0: An Updated and Practical Guide to Statistical Analysis*, 2nd ed.; Pearson Malaysia: Kuala Lumpur, Malaysia, 2018.
98. Henseler, J.; Ringle, C.M.; Sarstedt, M. Testing measurement invariance of composites using partial least squares. *Int. Mark. Rev.* **2016**, *33*, 405–431. [CrossRef]
99. Ahmed, A. The influence of green transformational leadership on green employee performance: The mediating effect of green organizational citizenship behavior and employee green behavior. *Int. J. Bus. Strategy Horiz.* **2024**, *1*, 111–139.
100. Alias, M.; Rahim, N.S.A.; Hassan, M.A.; Kassim, R.; Salleh, F.I.M.; Jie, S.W. Leadership roles towards coaching culture: A review of 1st line managers at higher educational institution. *J. Crit. Rev.* **2020**, *7*, 22–34. [CrossRef]
101. Satrianto, A.; Gusti, M.A.; Candrianto; Nurtati. The role of Islamic work ethics and organizational citizenship behavior in green human resource practices and environmental performance of Indonesian Food SMEs. *Int. J. Sustain. Dev. Plan.* **2023**, *18*, 2393–2401. [CrossRef]
102. Memon, S.B.; Rasli, A.; Dahri, A.S.; Hermilinda Abas, I. Importance of top management commitment to organizational citizenship behaviour towards the environment, green training and environmental performance in Pakistani industries. *Sustainability* **2022**, *14*, 11059. [CrossRef]
103. Sharmin, S.; Rahman, A.; Karim, D.N. Green human resource management practices and organizational citizenship behaviour towards the environment in the Banking Sector in Bangladesh. *Bangladesh J. Public Adm.* **2022**, *30*, 29–48. [CrossRef]
104. Rahman, R.H.A.; Yusof, H.M.; Norazman, I.; Hassan, M.A.; Fakhruddin, F.M. Attracting and Retaining Gen Z Talent in Malaysia SMEs. In *Leveraging Human Capital in Entrepreneurial Strategies*; IGI Global Scientific Publishing: Hershey, PA, USA, 2025. [CrossRef]
105. Pham, N.T.; Thanh, T.V.; Tučková, Z.; Thuy, V.T.N. The role of green human resource management in driving hotel's environmental performance: Interaction and mediation analysis. *Int. J. Hosp. Manag.* **2020**, *88*, 102392. [CrossRef]
106. Saleem, F.; Mateou, S.; Malik, M.I. How green transformational leaders trigger environmental performance? Un-leashing the missing links through green self-efficacy, green empowerment, and green training of employees. *Sustainability* **2024**, *16*, 9982. [CrossRef]
107. Eltobgy, A.; Elmoaty, Y.A.; Erfan Eltobgy, A.; Abd, Y.; Attia, E. The effect of green transformational leadership on employees' green behaviors: Mediating role of green human resources management and moderating role of employees' green values. *Int. J. Tour. Hosp. Stud.* **2024**, *6*, 269–286. [CrossRef]
108. Umair, S.; Waqas, U.; Mrugalska, B.; Bystrov, I. Linking transformational leadership to green human resource management (GHRM) and employee engagement in green initiatives. *Int. J. Sustain. Eng.* **2024**, *17*, 1083–1095. Correction in *Int. J. Sustain. Eng.* **2024**, *17*, 1139. [CrossRef]
109. Dumont, J.; Shen, J.; Deng, X. Effects of green HRM practices on employee workplace green behavior: The role of psychological green climate and employee green values. *Hum. Resour. Manag.* **2017**, *56*, 613–627. Correction in *Hum. Resour. Manag.* **2023**, *63*, 159. [CrossRef]
110. Hassan, M.A.; Rahim, N.S.A.; Kelana, B.W.Y.; Saidi, M.I.; Baker, R. *Combining Entrepreneurial Strategies with Human Capital: A Conceptual Analysis. Leveraging Human Capital in Entrepreneurial Strategies*; IGI Global Scientific Publishing: Hershey, PA, USA, 2025. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.