



The Impact of Green Training and Development on Sustainable Organizational Performance in Higher Education Institutions: The Mediating Role of Employees Green Behavior

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ABSTRACT

Higher Education Institutions (HEIs) are incorporating "Green Human Resource Management" (GHRM) techniques into their organizational strategies in response to growing concerns about environmental sustainability. Among these strategies, "Green Training and Development" (GTD) is regarded as a crucial tool for developing employees' capacity for sustainability and environmental consciousness. The purpose of this study is to investigate how "green training and development" affects sustainable organizational performance in HEIs and how employees' "green behavior" mediates this relationship.

A structured questionnaire was used to gather data from HEI academic members and administrative staff utilizing a quantitative research design. "Structural Equation Modeling" (SEM) was used to test the suggested conceptual framework and evaluate the direct and indirect correlations between the research variables.

The results show that "Green Training and Development" significantly improves sustainable organizational performance. Additionally, it was discovered that employees' "green behavior" significantly mediated this relationship; this implies that workers who receive environmental training are more likely to act sustainably at work, which improves the institution's sustainability results. The results highlight the importance of behavioral mechanisms in translating 'green training' initiatives into organizational performance benefits.

The study concludes that HEIs can strengthen their sustainability performance by investing in effective 'green training' programs that encourage environmentally responsible employee behavior. These findings contribute to the growing literature on GHRM and provide practical insights for policymakers and institutional leaders seeking to promote sustainability through human resource development initiatives.....

1. INTRODUCTION

For contemporary organizations, maintaining environmental sustainability has grown to be a significant concern. The demand on companies to implement sustainable business practices has increased due to growing worries about climate change, environmental degradation, biodiversity loss, and the depletion of natural resources. Driven by the rising expectations of governments, regulatory bodies, investors, customers, and society at large, organizations are now expected to demonstrate environmental stewardship and social responsibility alongside achieving economic goals. Consequently, sustainable organizational performance has emerged as a crucial strategy; it reflects an organization's capacity to achieve economic success while simultaneously delivering positive outcomes for the environment and society.

In response to these evolving expectations, sustainability has now become a core component of organizational strategy, rather than a peripheral concern. While technological upgrades and environmental management dimensions have contributed significantly to sustainability efforts, increasing attention is now being paid to the role of human personnel (employees) in achieving long-term environmental goals. Employees are increasingly viewed as key drivers of organizational change, as their knowledge, attitudes, and behaviors influence the successful implementation of sustainability-related initiatives. "Green Human Resource Management" (GHRM), an organizational strategy that incorporates environmental factors into human resource practices and policies to promote organizational sustainability, is the result of this viewpoint.

Green Human Resource Management encompasses a range of practices aimed at fostering environmentally responsible employee behaviors and aligning employee capabilities with sustainability goals. Among these practices, 'Green Training and Development' (GTD) has gained prominence for its potential to enhance employees' environmental awareness, competencies, and commitment. Green training programs give staff members the information and abilities they need to comprehend environmental challenges, embrace sustainable work practices, and take an active role in company sustainability activities. Such initiatives go beyond traditional training objectives to cultivate environmental consciousness and encourage employees to integrate sustainability into their professional responsibilities.

Consequently, Green Training and Development is increasingly recognized as a strategic approach to supporting organizational environmental goals and building a workforce capable of driving sustainability. In Higher Education Institutions (HEIs), the importance of Green Training and Development is especially noticeable. Universities and colleges hold a unique position in society as centers of knowledge creation, dissemination, and human capital development. Through their teaching, research, and community engagement activities, higher education institutions play a pivotal role in shaping societal attitudes towards sustainability and preparing individuals to tackle complex environmental challenges. In recent years, these institutions have increasingly integrated principles of sustainability into their academic curricula, research endeavors, operational practices, and environmental regulations. The expectation that higher education should play a critical role in promoting sustainable development and ecologically responsible conduct has been further reinforced by international initiatives like the United Nations Sustainable Development Goals (SDGs).

Even though sustainability is becoming more and more important in academic research, many universities still find it difficult to translate sustainability goals into practical, robust implementation. Significant investments have been made in environmental awareness campaigns, sustainability programs, and staff development initiatives; however, the consistency and integration of these initiatives have often been uneven. A primary reason for this shortfall is that training alone does not guarantee a change in behavior. While environmental knowledge and awareness can be acquired through training programs, such learning may fail to influence actual practices unless individuals are motivated to apply that knowledge in their daily work. This challenge highlights the need for initiatives that actively support 'Green Training and Research.'

In this regard, "Employee Green Behavior" (EGB) has become a crucial concept in research regarding sustainability and workplace conduct. Employee Green Behavior encompasses significant, established actions aimed at environmental conservation and sustainability. These actions may include energy conservation, active participation in environmental initiatives, recycling, and the responsible execution of work duties. Since employees directly influence environmentally focused initiatives and innovative programs, fostering sustainability skills within their roles can lead to substantial improvements. Thus, Employee Green Behavior serves as a mechanism through which the benefits of 'Green Training' can be realized.

Evidence suggests that 'Green Human Resource Management' practices positively influence environmental performance. Nevertheless, significant gaps in this area remain. First, most empirical research on 'green human resource management' has focused on the private sector, with relatively little attention paid to Higher Education Institutions (HEIs). Given the unique mission, governance structures, stakeholder dynamics, and social objectives of HEIs, findings from the corporate sector cannot be directly applied to this context.

Second, prior studies have mostly examined the direct correlation between "green human resource management" techniques and results, providing little understanding of the underlying mechanisms. While "employee green behavior" is acknowledged as an important component of sustainability, its mediation function in the connection between "green training" and sustainable performance—especially in higher education—has not been sufficiently investigated. To understand this behavioral mechanism, it is essential to examine how environmental training translates into tangible



sustainability outcomes.

Third, a large portion of current research has been carried out in wealthy nations characterized by robust sustainability frameworks, strong environmental support systems, and high levels of environmental awareness. There have been comparatively fewer studies on these relationships in developing countries, where resource constraints, challenges in policy implementation, and competing priorities can significantly influence sustainability initiatives. This limitation restricts the generalizability of findings and underscores the need for context-specific investigation.

Addressing these gaps, this study looks at how "Green Training and Development" affects sustainable organizational practices within higher education institutions, while also investigating the mediating role of employees' 'green behavior.'

The study is grounded in the 'Resource-Based View' (RBV)—emphasizing the value of employees as a key environmental resource—and 'Social Learning Theory,' which explains how individuals adopt behaviors and gain insights through learning experiences and social interactions. The study provides a thorough framework by including these viewpoints for understanding how environmental training contributes to sustainable organizational practices, primarily through behavioral change.

This study's theoretical, empirical, and practical contributions are what make it significant. In theory, it advances the 'Green Human Resource Management' (GHRM) literature by elucidating the behavioral mechanisms linking 'Green Training and Development' with 'sustainable organizational practices.' Empirically, it expands the existing body of knowledge by focusing on higher education institutions—a context that has received limited attention in sustainability and GHRM research. In practical terms, the findings are expected to assist university administrators, policymakers, and human resource professionals in formulating evidence-based sustainability strategies that foster environmentally responsible employee behavior and strengthen environmental sustainability.

In conclusion, in higher education institutions, achieving sustainability goals requires more than just establishing environmental policies and sustainability commitments. It necessitates the active participation of employees, whose day-to-day actions determine the success of sustainability initiatives. By examining the interrelationships among 'green training and development', 'employee green behavior', and 'sustainable organizational performance', this study aims to offer insightful information into how higher education institutions can leverage human resource development as a strategic tool to achieve long-term sustainability goals.

2. Literature Review

2.1 Theoretical Basis

The current investigation is based on two complementary theoretical perspectives: the “ Resource-Based View (RBV) and Social Learning Theory (SLT)” . Together, these frameworks provide a comprehensive explanation of how 'green training and development' (GTD) contributes to 'sustainable organizational performance' (SOP) through changes in employee behavior.

According to the "Resource-Based View," which was first put forth by Jay Barney, companies can gain a sustained competitive edge by creating resources that are rare, valuable, hard to replicate, and non-replaceable. In the context of sustainability, employee capabilities have emerged as critical strategic assets, as sustainability initiatives increasingly require specialized knowledge, adaptability, and innovation-oriented thinking. From this perspective, 'green training and development' can be viewed as an investment in human capital that strengthens the institution's capacity to implement sustainability initiatives. Employees with advanced environmental knowledge and sustainability-related competencies are better equipped to identify opportunities for resource optimization, implement environmentally responsible practices, and support environmental sustainability initiatives. Consequently, green competencies become multifaceted resources that contribute to long-term sustainability.

Although RBV explains why environmental competencies are multifaceted resources, it offers limited insight into the behavioral mechanisms through which these competencies influence multifaceted outcomes. Social Learning Theory (SLT) addresses this gap by emphasizing the role of learning, observation, and social interaction in shaping individual behavior. According to SLT, employees during training hours do not just acquire technical knowledge; they also internalize the organization's values, norms, and behavioral expectations. Green training initiatives create a learning environment in which employees observe sustainability-related practices, attend to environmental issues, and better understand their role in achieving the organization's sustainability goals. Repeated exposure to environmental learning experiences increases the likelihood of fostering and sustaining environmentally responsible employee behaviors.

The integration of the “Resource-Based View (RBV)” and “Social Learning Theory (SLT)” provides a solid theoretical structure for the proposal presented in this study. RBV suggests that green training and development build capacity, while SLT explains how these capabilities are translated into employee green behavior. In this context, employee green behavior acts as the behavioral mechanism through which organizational sustainability outcomes are realized. The combined application of these theories is particularly relevant to higher education, where sustainability performance depends not only on institutional commitment but also on the willingness of employees to incorporate sustainable practices into their daily work.

Therefore, the study’s theoretical foundation supports the proposition that sustainability goals are achieved both directly—through the promotion of green training and development—and indirectly—by fostering employee green behavior. This provides a robust basis for examining the mediating role of green behavior.

2.2 Green Training and Development

“Green Training and Development (GTD)” is one of the most comprehensive dimensions of Green Human Resource Management, focusing on the development of employees’ practical knowledge, skills, attitudes, and learning capabilities. Unlike traditional training programs that primarily emphasize job-specific competencies, green training aims to incorporate sustainability principles and decision-making approaches into the individual’s mindset. As sustainability becomes a key organizational objective, organizations are realizing the necessity of providing workers with the skills they need to support sustainability initiatives.

Academic literature indicates that “green training and development” contribute to sustainability by enhancing employees’ comprehension of environmental concerns and strengthening their ability to implement environmentally responsible practices. These initiatives encompass aspects such as energy efficiency, waste reduction, resource conservation, and eco-friendly product development, thereby fostering greater environmental awareness and promoting sustainable practices. However, Workways argues that the value of green training lies elsewhere. The training program influences employees’ attitudes, beliefs, and perceptions, thereby establishing a strong alignment between individual work and sustainability goals.

From a resource-based perspective, environmental capabilities developed through training constitute valuable organizational assets that are difficult for competitors to replicate. Organizations that consistently invest in environmental education are more likely to develop a workforce that can propel sustainability, innovation, and long-term organizational resilience. In higher education institutions, ‘Green Training and Development’ (GTD) holds particular significance, as employees directly contribute to sustainable campus operations, environmental education, and the institution’s sustainability initiatives. Therefore, GTD can serve as a strategic approach to enhance both employee capabilities and the institution’s sustainability-related performance.

2.3 Sustainable Organizational Performance

The concept of ‘Sustainable Organizational Performance’ (SOP) has evolved beyond traditional metrics of financial success to encompass environmental stewardship and social responsibility. Organizations are increasingly evaluated based on their ability to achieve economic goals while simultaneously minimizing environmental impact and creating value for diverse stakeholders. Consequently, sustainable performance is now viewed as a multidimensional concept that integrates economic efficiency, environmental sustainability, and social contribution.

Experts emphasize that organizations prioritizing sustainability often reap benefits that extend far beyond mere compliance with environmental regulations. Improved resource utilization, reduced operational costs, enhanced stakeholder trust, a strong institutional reputation, and long-term organizational resilience are all outcomes of sustainability-focused strategies. In the context of higher education institutions, sustainable organizational performance is reflected through environmentally responsible campus management, efficient resource use, stakeholder engagement, sustainability-oriented governance, and contributions toward sustainable development goals.

Despite the rapid pursuit of sustainability goals, the mechanisms by which institutions achieve performance in this area remain an active subject of study. According to scientific study, HR procedures are crucial in shaping sustainability, as employees are crucial to implementing environmental initiatives and operationalizing sustainability-focused teams. However, the direct impact of ‘green training and development’ on performance within the higher education context has not been scientifically examined, creating a need for more empirical studies.

2.4 Employee Green Behavior (EGB)

“Employee Green Behavior” (EGB) has emerged as a key concept in sustainability research, as it captures the extent to which employees actively contribute to environmental goals within the workplace. These behaviors encompass both prescribed tasks aligned with environmental objectives and voluntary actions taken by employees to support sustainability.

The concept of 'Employee Green Behavior' highlights the understanding that organizational sustainability begins at the individual employee level. The impact of environmental policies and training programs may be limited unless employees actively translate organizational goals into practice within the workplace. Consequently, EGB serves as a vital link between organizational sustainability strategies and actual sustainability outcomes.

Previous research indicates that 'Employee Green Behavior' comprises a variety of activities, including recycling, energy conservation, waste reduction, effective equipment use, and involvement in sustainability projects. Such behaviors not only mitigate environmental impact but also contribute to fostering a sustainability-oriented culture. In higher education institutions, the 'green behavior' of staff is particularly significant, as the actions and attitudes of faculty and staff regarding environmental awareness and sustainability influence students' perspectives. Therefore, fostering environmentally responsible employee behavior is a crucial objective in achieving sustainability goals.

2.5 The Relationship Between □Green Training and Performance□

The link between “green training and learning” and “sustainability performance” has garnered significant attention in literature connecting sustainability with human resource management. The underlying argument is that environmental training equips employees with the necessary competencies to effectively support sustainability initiatives. By enhancing environmental knowledge and skills, employees are better positioned to identify opportunities for optimizing resources, minimize environmental impacts, and make informed decisions regarding sustainability.

Empirical evidence generally supports the proposition that organizations investing in environmental training achieve better sustainability outcomes. However, this relationship may vary across different environmental contexts, depending on factors such as environmental advancement, employee engagement, and organizational culture. From a resource-based view, green training and development foster unique environmental capabilities that enhance an organization's ability to achieve a sustainable competitive advantage. These capabilities contribute to sustainability performance by enabling organizations to leverage environmental expertise and respond proactively to environmental issues.

In the higher education sector, environmental training is particularly valuable because the active participation of faculty and administrative staff is essential for sustainability initiatives. Employees with strong environmental competencies are more likely to promote environmentally friendly objectives and sustainable campus operations. Sustainable environmental performance is therefore anticipated to benefit from “green training and development”.

H1: □Green training and development” have a favorable effect on environmentally sustainable performance in higher education institutions.

2.6 Relationship between Green Training and Development and Employee Green Behavior

“Social Learning Theory” provides a robust framework for explaining the relationship between “green training and development” and “employee green behavior”. Training programs serve not only as a medium for knowledge transfer but also as platforms through which employees observe, interpret, and internalize relevant values and behaviors. Environmental training initiatives familiarize employees with sustainability-related information while highlighting the importance of environmentally responsible behavior.

Research consistently indicates that employees who participate in environmental training programs demonstrate higher levels of environmental awareness, engagement, and participation. Training consolidates employees' understanding of the outcomes of environmental protection and strengthens their willingness to participate in sustainability initiatives. Furthermore, environmental learning experiences encourage employees to view sustainability as a shared responsibility rather than merely a separate, manageable concern. Among higher education personnel, environmental training can foster the practical mindset needed to support sustainability-focused campus operations. Faculty and administrative staff who receive sustainability-oriented training are more likely to adopt environmentally responsible practices and encourage similar behavior among their colleagues and students. Therefore, “green training and development” are expected to have a favorable effect on workers' green behavior.

H2: “Green training and development” have a favorable effect on workers' green behavior in higher education institutions.

2.7 The Relationship Between Employee Green Behavior and Sustainability Performance

“Employee green behavior” is essential in converting sustainability goals into observable performance results. While sustainability orientations and objectives set the direction, employees determine the extent to which these objectives are implemented in practice. Consequently, environmentally responsible employee behavior has become a key determinant of sustainability performance across various organizational contexts.

Prior research indicates that organizations derive significant benefits when employees engage in environmentally responsible workplace behaviors. Such behaviors contribute to reduced resource consumption, lower operating costs, improved environmental performance, and enhanced perceptions of resilience. Furthermore, collective employee participation in sustainability initiatives can strengthen organizational culture and pave the way for advancements in sustainable development.

In the context of higher education, employee green behavior contributes to sustainability by supporting environmentally responsible campus management, promoting resource efficiency, and fostering sustainability awareness among students. Given the pivotal role employees play in implementing sustainability initiatives, it is expected that employee green behavior will positively influence sustainability performance.

H3: Employee green behavior has a major beneficial effect on sustainability performance in higher education institutions.

2.8 The Mediating Role of Employee 'Green Behavior'

Although “green training and development” is expected to enhance a company's sustainability performance, it is unlikely that this relationship operates solely through a direct effect. Training initiatives primarily develop employee capabilities; however, substantial benefits are realized when employees apply these capabilities to their daily tasks. Therefore, employee 'green behavior' serves as a critical behavioral mechanism through which environmental training yields sustainability outcomes.

The integration of the 'Resource-Based View' (a resource-based approach) and 'Social Learning Theory' provides a robust theoretical foundation for this mediating relationship. 'Green training and development' fosters valuable capabilities among employees. Employees who acquire foundational knowledge and attitudes through such training are more likely to adopt environmentally responsible behavioral habits, which subsequently contribute to sustainability performance.

Despite the theoretical framework supporting this mechanism, empirical research examining the mediating role of employee green behavior—particularly within the context of higher education—remains limited. Understanding this mediating process is crucial, as it elucidates how training initiatives translate into behavioral changes. Addressing this gap allows for a better understanding of how sustainability performance can be enhanced through employee-focused interventions.

H4: “Employee green behavior” plays a significant mediating function in the relationship between “green training and development” and “sustainability performance” in higher education.

Research Objectives

1. To examine the effect of “green training and development” on “sustainability performance” in higher education.
2. To investigate the effect of “green training and development” on “employee green behavior”.
3. To assess the effect of “employee green behavior” on “sustainability performance”.
4. To examine the mediating function of “employee green behavior” in the connection between “green training and development” and “sustainability performance”.

Research Questions

RQ1: How does “green training and development” significantly influence “sustainability performance” in higher education?

RQ2: How does “green training and development” significantly influence “employee green behavior”?

RQ3: Does “ employee green behavior” significantly influence “ sustainability performance” ?

RQ4: Does “ employee green behavior” mediate the relationship between “ green training and development” and “ sustainability performance” ?

Theoretical Framework

“Green Training and Development” (Independent Variable)

↓

“Employee Green Behavior” (Mediating Variable)

↓

“Sustainable Performance” (Dependent Variable)

Direct Path:

Green Training and Development → Sustainable Performance

Research Methodology

3.1 Research Design

A quantitative research method is employed to assess the effects of “ Green Training and Development (GTD)” on “ Sustainable Performance (SP)” in Higher Education Institutions (HEIs), while also investigating the mediating function of “ Employee Green Behavior (EGB)” . Given the objective of empirically examining the relationships between latent constructs, the quantitative approach is considered the most appropriate research strategy. Quantitative methods facilitate statistical measurement, statistical validation, and the empirical investigation of cause-and-effect relationships between variables.

Data was gathered from respondents at a particular point in time using a cross-sectional survey design. Examining perceptions, attitudes, and actions among a broad community and evaluating structural links among research variables are two areas in which this method excels. The positivist research paradigm, which holds that organizational phenomena may be methodically surveyed and examined through empirical observation, serves as the foundation for the study. A deductive research approach was used in accordance with this paradigm, and the survey data was used to empirically evaluate hypotheses generated from the “ Resource-Based View (RBV)” and “ Social Learning Theory (SLT)” .

3.2 Population and Data Sources

The target population comprised faculty members and administrative staff working in higher education institutions. These groups were selected because they play a pivotal role in implementing environmental policies, participating in sustainability initiatives, and contributing to organizational change. Their direct involvement in operational and academic activities makes them particularly relevant for evaluating environmental training programs and sustainability-related behavioral practices.

The study relied primarily on primary data obtained through a structured questionnaire. Primary data was deemed essential as it provided context-specific insights directly related to the research objectives. Furthermore, secondary sources—such as books, peer-reviewed journal papers, environmental sustainability reports, policy documents, and scholarly publications on Green Human Resource Management—were reviewed to establish a theoretical foundation and support instrument development.

3.3 Sampling Technique

A multi-stage sampling process was employed to ensure the appropriate selection of respondents. In the first stage, higher education institutions actively involved in environment-related initiatives—such as 'Green Pyramid' programs or sustainability-focused frameworks—were identified. Institutions with explicit sustainability mandates were selected to ensure relevant responses.

In the second stage, faculty and staff members were designated as potential respondents. Subsequently, 'proportionate stratified sampling' was used to ensure representation across various departments. This approach improved institutional representation and minimized the likelihood of sampling bias. By combining 'purposive' and 'stratified' sampling techniques, the study ensured that respondents possessed up-to-date knowledge and experience regarding the

environmental initiatives implemented at their respective institutions.

3.4 Sample Size

For structural equation modeling (SEM) to be stable, a sufficient sample size is essential. Existing literature suggests that a sample size of at least 200 respondents is generally sufficient for SEM-based studies; however, larger samples are often preferred to enhance statistical robustness and model reliability.

Accordingly, this study aimed to recruit 450 respondents from the selected higher education institutions. 400 valid questionnaires were kept for final analysis following data screening and the elimination of incomplete or invalid responses, yielding an impressive response rate of approximately 88.9 percent. The final sample size was enough for “Partial Least Squares Structural Equation Modeling (PLS-SEM)” and “mediation analysis,” providing a robust basis for hypothesis testing and model assessment.

3.5 Measurement of Constructs and Research Instruments

Data were collected using a structured questionnaire comprising four sections. Demographic data, including gender, age, position, work experience, and startup tenure, was covered in the first section. The subsequent sections addressed the latent constructs within the conceptual framework.

Green Training and Development (GTD) was assessed using measurement items adapted from established scales. These items evaluated employees' perceptions regarding the extent and quality of green-related training opportunities provided to them.

Employee Green Behavior (EGB) was measured using a scale reflecting environmentally responsible behaviors. The scale assessed actions such as resource conservation, waste reduction, recycling, collaboration, and adherence to sustainability practices.

Sustainable Marketing Practices (SMP) were operationalized as a multidimensional construct encompassing marketing, social, and business performance dimensions. Respondents evaluated the extent to which their organizations implemented sustainability-oriented marketing outcomes and practices.

All measurement items were assessed utilizing a Likert scale with five points, from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). The Likert scale was selected because it is widely used in behavioral and structural research and is good at capturing respondents' views and impressions.

3.6 Assessment of Reliability and Validity

The constructs and tools were assessed before the structural model was reviewed in order to guarantee the psychometric qualities of the measuring instruments. Cronbach's alpha and Composite Reliability (CR) were used to assess internal consistency. Consistency and stability among the measurement items were indicated by values that were higher than the 0.70 threshold.

Convergent and discriminant validity were used to evaluate construct validity. Standardized factor loadings, Average Variance Extracted (AVE), and Composite Reliability scores were used to assess convergent validity. Validity indicators were defined as factor loadings larger than 0.70 and AVE values greater than 0.50.

The Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio were used to assess discriminant validity. These evaluations reduced the possibility of construct overlap and guaranteed that each construct measured a unique phenomenon.

A pilot study with thirty respondents was carried out before the main survey to evaluate the questionnaire's measurement qualities, content adequacy, and intelligibility. Comments obtained during the pilot program was incorporated into the final version of the questionnaire, thereby enhancing the quality of the tool and the respondents' understanding.

3.7 Data Analysis Techniques

IBM SPSS Statistics version 29 and SmartPLS version 4 were used for data analysis. Several steps were followed to comprehensively evaluate the proposed research model.

Initially, the distribution of the study variables was examined and the respondents were profiled using descriptive statistics (such as frequency, percentage, mean, and standard deviation). The measurement model's applicability was then determined by evaluating its validity and reliability.

Next, correlation analysis was employed to examine the relationships and directionality among green training and research, employee green behavior, and sustainable creative business practices. Partial Least Squares Structural Equation Modeling (PLS-SEM) was utilized to assess the structural model and test the suggested hypotheses after the initial analysis.

“PLS-SEM” was selected because it is suitable for predictive research and theory development. This technique is particularly effective when examining complex models involving latent constructs. The direct correlations between GTD, EGB, and SOP were evaluated using standardized path coefficients, t-values, and significant levels.

The mediating role of Employee Green Behavior (EGB) was investigated using bootstrapping with 5,000 resamples. The significance of the impacts was assessed using p-values and confidence intervals. When the proposed effect was statistically supported, mediation was deemed substantial.

The coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and standardized path coefficients were used to evaluate the explanatory and predictive ability of the model. These metrics offer a thorough assessment of the model's predictive ability, explanatory capacity, and structural soundness.

3.8 Ethical Considerations

Throughout the entire research process, ethical guidelines were followed. Respondents were made aware of the nature, importance, and goals of the study, and participation was completely voluntary. Before any data was collected, all employees gave their prior informed consent.

In order to protect respondents' privacy and confidentiality, steps were made to prevent sensitive information or their identities from being revealed. It was guaranteed that the information gathered would only be utilized for research. Furthermore, to protect the respondents' reputations and maintain the integrity of the study, all data were securely handled and analyzed in aggregate form. In order to investigate how "green training" affects employees' "green behavior" in higher education institutions, this study uses a quantitative statistical technique. It integrates established measurement scales to assess these variables among faculty and staff.

Data Analysis and Results

4.1 Respondent Profile

A total of 450 questionnaires were distributed to faculty members and administrative staff at Higher Education Institutions (HEIs). 400 valid questionnaires—representing an impressive response rate of 88.9%—were kept after incomplete or invalid replies were eliminated.

The respondents comprised 58% men and 42% women. Regarding age, 21% were under 30 years old, 37% were between 31 and 40, 28% were between 41 and 50, and 14% were over 50. Faculty members accounted for 68% of the respondents, while 32% were administrative staff. Regarding work experience, 26% had five years or less, 41% had five to ten years, and 33% had more than ten years.

The demographic data includes a representative mix of employees across various age groups, job categories, and experience levels, thereby lending confidence to the generalizability of the findings.

4.2 Descriptive Statistics

An analysis was conducted to understand the respondents' perceptions regarding Green Training and Development (GTD), Employee Green Behavior (EGB), and Sustainability-Oriented Practices (SOP).

Variable	Mean	Standard Deviation
Green Training and Development	4.08	0.71
Employee Green Behaviour	4.12	0.68
Sustainable Organizational Performance	4.05	0.73

The results show high mean scores for all constructs, revealed the majority of respondents had favorable opinions about supporting sustainability programs, actively promoting green training, and encouraging green behavior.

4.3 Assessment of the Measurement Model

Reliability Analysis

Reliability was assessed using “Cronbach's Alpha” and “Composite Reliability (CR)”. The results are presented below:

Construct	Cronbach's Alpha	Composite Reliability
GTD	0.891	0.916
EGB	0.903	0.924
SOP	0.887	0.913

The measuring scales' internal consistency and dependability are confirmed by the fact that all results are higher than the suggested cutoff of 0.70.

□ Convergent Validity □

Average Variance Extracted (AVE) and factor loadings were used to evaluate convergent validity.

Construct	AVE
GTD	0.687
EGB	0.709
SOP	0.673

Convergent validity is confirmed by the AVE values above the suggested cutoff of 0.50. Furthermore, all factor loadings are above 0.70, indicating that the indicators accurately represent their respective constructs.

Discriminant Validity

Discriminant validity was evaluated using the Heterotrait-Monotrait ratio (HTMT) and the Fornell-Larcker criterion. All HTMT values were less than 0.85, and the square root of the AVE for each construct was higher than its inter-construct correlations. These results confirm discriminant validity and indicate that the constructs are distinct from one another.

4.4 Correlation Analysis

The links between the study's variables were investigated using Pearson correlation analysis.

Variables	GTD	EGB	SOP
GTD	1.000		

EGB	0.652**	1.000	
SOP	0.601**	0.684**	1.000

** $p < 0.01$

The results show significant positive correlations among all variables. Green Training and Development (GTD) demonstrated a favorable association with green behavior among employees ($r = 0.652$, $p < 0.01$) and Sustainable Organizational Practices (SOP) ($r = 0.601$, $p < 0.01$). Similarly, Employee Green Behavior (EGB) exhibited a positive correlation with Sustainable Organizational Practices (SOP) ($r = 0.684$, $p < 0.01$).

4.5 Portable Model

Partial Least Squares Structural Equation Modeling (PLS-SEM) with bootstrapping based on 5,000 resamples was used to evaluate the model.

Coefficient of Determination (R^2)

The model's descriptive capacity (explanatory power) was assessed using the R^2 value.

Endogenous Variable	R^2
Employee Green Behaviour	0.425
Sustainable Organizational Performance	0.583

The results indicate that Green Training and Development explains 42.5% of the variation in Employee Green Behavior. Furthermore, Green Training and Development and Employee Green Behavior together explain 58.3% of the variation in Sustainable Organizational Practices. These values indicate a moderate to high explanatory power.

4.6 Hypothesis Testing

Path coefficients, t-values, and p-values were used to test the suggested hypotheses.

Hypothesis	Path	β	t-value	p-value	Decision
H1	GTD $\rightarrow$ SOP	0.312	5.642	<0.001	Supported
H2	GTD $\rightarrow$ EGB	0.652	13.754	<0.001	Supported
H3	EGB $\rightarrow$ SOP	0.471	8.926	<0.001	Supported

H1: Impact of Green Training and Development on Sustainable Organizational Practices

The study reveals that "Green Training and Development" has a significant favourable effect on Sustainable Organizational Practices ($\beta = 0.312$, $t = 5.642$, $p < 0.001$). Therefore, H1 is supported. The results indicate that environmental training directly contributes to better sustainability practices within the organization.

H2: Impact of Green Training on Employee Green Behavior

The green conduct of engineers and personnel was found to be positively and significantly correlated with green training ($\beta = 0.652$, $t = 13.754$, $p < 0.001$). Thus, H2 is supported. This conclusion indicates that employees who receive environmental training exhibit a greater sense of environmentally responsible behavior.

H3: Impact of Employee Green Behavior on Sustainable Performance

The results show that employee green behavior significantly influences the sustainability performance of restaurant enterprises ($\beta = 0.471$, $t = 8.926$, $p < 0.001$). Therefore, H3 is supported. This emphasizes the significance of fostering sustainability-oriented behavior among staff.

4.7 Detailed Analysis

The bootstrapping method—ideal for testing within the PLS-SEM framework—was used to examine the mediating role of employee green behavior.

Indirect Effect	β	t-value	p-value
GTD $\rightarrow$ EGB $\rightarrow$ SOP	0.307	7.842	<0.001

It was discovered that employee green behavior mediated the strong impact of green training and development on sustainable performance ($\beta = 0.307$, $t = 7.842$, $p < 0.001$).

Since both the direct and indirect effects (GTD $\rightarrow$ EGB $\rightarrow$ SP) remained significant, the association between “ sustainable performance” and “ green training and development” was shown to be partially mediated by employee green behavior.

Essentially, H4 is supported.

The findings provide strong empirical support. Green training and development make a significant contribution to sustainable performance, highlighting the role of environmental training in fostering sustainable outcomes. This conclusion is according to the resource-based view's tenets, which posits that employee knowledge and capabilities are valuable assets capable of generating sustained advantage.

The results indicate that environmental training and development significantly foster eco-friendly employee behavior. Grounded in social learning theory, the findings suggest that workers who obtain environmental training are more likely to follow eco-friendly procedures. Such training cultivates awareness and the motivation to participate in sustainability initiatives.

Additionally, it was discovered that eco-friendly staff conduct significantly improved sustainability performance. Personnel actively engaged in energy conservation, waste reduction, recycling, and other eco-friendly activities contribute significantly to sustainability goals.

Crucially, the analysis reveals that eco-friendly employee behavior acts as a vital mechanism through which environmental training and development influence sustainability outcomes. This conclusion implies that training alone is insufficient to improve sustainability results unless it translates into actual changes in employee behavior. Therefore, higher education institutions should concentrate on creating a supportive atmosphere in addition to offering environmental training that sustains and encourages these behaviors.

Overall, the study confirms that green training and development—facilitated through green employee behavior—is an effective strategy for enhancing sustainability performance in higher education institutions.

Discussion

This study's main goal was to investigate the impact of Green Training and Development (GTD) in Higher Education Institutions (HEIs), while also exploring the mediating role of Employee Green Behavior (EGB). The results provide robust empirical support for the conceptual framework and add to the expanding corpus of research on green human resource management (GHRM), sustainability, and pro-environmental behavior. The findings indicate that green training directly influences sustainable organizational practices and also impacts them indirectly through employee green behavior,

highlighting the importance of employee-led sustainability initiatives within Higher Education Institutions (HEIs).

The first hypothesis (H1) proposed that green training positively influences sustainable organizational practices. The study confirmed this relationship, revealing that environmental training significantly improves sustainability outcomes within HEIs. This conclusion supports the argument that staff training serves as a key mechanism for integrating sustainability principles into organizational operations. By enhancing employees' practical knowledge, skills, and awareness, green training enables the more effective implementation of sustainability initiatives. Employees who undergo such training are better equipped to identify environmentally responsible solutions, minimize operational inefficiencies, and contribute to sustainability-related decision-making. Ultimately, these improvements lead to enhanced performance and greater organizational sustainability.

The positive impact of green training is based on the Resource-Based View (RBV) framework, which emphasizes that employee capabilities and knowledge are valuable resources capable of generating sustainable competitive advantages. In the context of higher education institutions, environmentally competent employees represent valuable assets that support the institution's sustainability goals. The findings suggest that investment in environmental training yields superior performance outcomes.

The second hypothesis (H2) looked at how employee green behavior and green training were related. Employees that take part in environmental training programs are more likely to act in an environmentally responsible manner, according to a strong and significant positive association that was found. This conclusion highlights the role of green training as a mechanism for fostering sustainability-oriented mindsets and behaviors among employees. Such training equips employees with the knowledge and professional mindset necessary to incorporate environmental responsibility into their daily work routines.

The 'Social Learning Theory,' which holds that people pick up new behaviors through social contact, training, and observation, is supported by these findings. Green training provides employees with the opportunity to acquire environmental knowledge, understand sustainability principles, and contribute to their institution's environmental initiatives. Employees are more likely to participate in activities like recycling, waste reduction, energy saving, and effective resource use when they adopt these practices. Consequently, the results show that green training serves as a crucial foundation for fostering 'green behavior' (environmentally friendly behavior) within higher education institutions.

The third hypothesis (H3) proposed that employees' 'green behavior' (environmentally friendly behavior) has a positive impact on the organization's sustainable performance. Evidence supports this premise, indicating that the actions of environmentally responsible employees contribute significantly to sustainability principles. This conclusion highlights the crucial role employees play as active participants in an organization's sustainability initiatives. However, while an ideal framework for environmental sustainability programs exists, the actual implementation and maintenance of these eco-friendly practices depend heavily on the employees' willingness and commitment.

The importance of employees' 'green behavior' is particularly relevant in higher education bodies, where employees influence not only operational concepts but also the institution's broader sustainability culture. Faculty members and administrative staff often act as role models for students and other bodies, and their environmental behavior can shape prevailing attitudes and values. Findings suggest that employees who actively adopt 'green behavior' contribute to reducing environmental impact, improving environmental efficiency, and enhancing environmental sustainability performance. Thus, sustainability goals can be achieved more effectively when employees demonstrate a strong commitment to an environmentally friendly environment.

The most significant contribution of this study lies in examining the mediating role of employees' 'green behavior'. The results confirmed the fourth hypothesis (H4), revealing that employees' 'green behavior' partially mediates the association between “green training and development” and “organizational sustainability performance”. This discovery offers crucial insights into the mechanism through which environmental training yields sustainability outcomes. Although 'green training and development' directly improves performance, a significant portion of its impact occurs indirectly through changes in employee behavior.

The partial mediating effect suggests that environmental training alone is not sufficient to maximize sustainability outcomes unless the knowledge and skills acquired by employees translate into practical behavioral changes in the workplace. This finding highlights the importance of behavioral change as a crucial pathway linking human resource interventions to enhanced sustainability performance. In other words, 'green training and development' establishes the necessary knowledge base, but employees' 'green behavior' acts as the mechanism through which sustainability benefits are realized. Therefore,

in addition to offering environmental training, efforts should concentrate on developing an organizational culture that supports and promotes "green behavior" in order to enhance sustainability performance.

From a theoretical standpoint, these results add to the literature on "Green Human Resource Management" by combining "organizational sustainability performance," "green behavior," and "green training and development" into a cohesive explanatory framework. This study builds on earlier research by showing that employees' "green behavior" is a crucial behavioral mechanism through which green training affects a variety of outcomes. Furthermore, these results confirm the relevance of the 'Resource-Based View' and 'Social Learning Theory' in explaining the multifaceted nature of sustainability-related phenomena within higher education institutions.

Practically speaking, this study provides useful information for human resource specialists, legislators, and university administrators. The results indicate that institutions should design comprehensive 'green training programs' that not only enhance environmental awareness but also foster behavioral changes. Furthermore, management should establish supportive policies, reward systems, and organizational cultures that encourage environmentally responsible behavior among employees. Such initiatives can enhance the effectiveness of sustainability programs and contribute to long-term organizational sustainability.

Overall, the results indicate that 'green training and development' is a crucial factor in fostering sustainability within higher education institutions. However, its effectiveness is further amplified when employees actively engage in environmentally responsible behaviors. Therefore, institutions aiming to achieve organizational sustainability and fulfill their broader social responsibilities should prioritize the promotion of 'green behavior' among their employees.

Conclusion

The growing importance of environmental sustainability has compelled all organizations, including Higher Education Institutions (HEIs), to adopt personnel initiatives that promote sustainable development and responsible resource management. In this situation, "Green Human Resource Management" (GHRM) practices act as essential instruments for cultivating a sustainability-oriented organizational culture. Among these practices, "Green Training and Development" (GTD) is essential in enhancing employees' knowledge and commitment regarding sustainability goals. This study examined the effect of "Green Training and Development" on "Sustainable Organizational Performance" (SOP) in higher education institutions, while also investigating the mediating role of 'Employee Green Behavior' (EGB).

The study's findings provide robust empirical evidence supporting the proposed conceptual framework. First, the analyses confirmed that "green training and development" has a major beneficial effect on "sustainable organizational frameworks." This finding indicates that environmental training initiatives directly contribute to enhancing sustainability outcomes by raising employee awareness and fostering an understanding of responsible, eco-friendly practices. The result reinforces the argument that sustainability-oriented training should be viewed as an investment in human capital rather than merely a means to ensure regulatory compliance. Organizations that prioritize environmental education and skill development are more likely to increase their overall organizational efforts and accomplish their long-term sustainability goals.

A second study found that 'green training and learning' significantly influences employees' 'green behavior' (environmentally friendly actions). Employees who receive training on environmental topics—covering areas such as recycling, waste minimization, energy conservation, and appropriate resource use—are more likely to adopt these practices. This highlights the effective role training plays in shaping employees' perspectives and behaviors regarding sustainability. It also supports the tenets of "Social Learning Theory," which asserts that people pick up and acquire behaviors through practical learning exercises and instructional interactions. Environment-related training not only enhances employees' knowledge but also reinforces their commitment to environmentally responsible practices.

Thirdly, the research revealed that employees' 'green behavior' contributes significantly to organizational sustainability. Staff members are key agents in the implementation of sustainability initiatives. Their environmentally conscious actions play a crucial role in minimizing environmental impact and optimizing resource usage. The findings indicate that when employees actively support and participate in environmental initiatives, the likelihood of achieving sustainability goals increases. Therefore, fostering green behavior among employees is essential for realizing sustainability objectives within the organization.

Most importantly, the association between "green training and learning" and "organizational sustainability" was shown to be mediated by employees' "green behavior." Detailed analysis showed that 'green training and learning' not only has a direct impact but also effectively enhances sustainability outcomes by fostering environmentally responsible employee

behavior. Consequently, the success of green training programs largely depends on how effectively staff integrate the acquired knowledge and skills into practical application. Thus, employee 'green behavior' serves as a crucial link connecting human resource development initiatives with organizational sustainability tools.

By incorporating ideas like "green training and development," "employee green behavior," and "organizational sustainability" into a thorough framework, it theoretically broadens the body of literature on green human resource management (GHRM). The results show how ecologically focused training promotes sustainability through behavioral change, supporting the "Resource-Based View" and "Social Learning Theory." By concentrating on higher education, a field that has gotten little attention in GHRM research, the study empirically fills a sizable vacuum in the literature.

In terms of implementation, the conclusion is that universities and policymakers should invest in comprehensive environmental training programs that promote sustainable behaviors beyond mere knowledge acquisition. To effectively foster eco-friendly employee behavior, training initiatives should be complemented by supportive mechanisms—such as incentive and reward systems, leadership commitment, and the cultivation of a sustainability-oriented organizational culture. Such efforts can significantly strengthen long-term sustainability and contribute to broader institutional goals.

In conclusion, this study highlights 'Green Training and Engagement' as a key factor in achieving a Sustainable Higher Education Institution (SHEI). However, its effectiveness is maximized when employees actively embrace environmental responsibilities. Therefore, institutions aiming for long-term sustainability must focus on developing environmental competencies and fostering green behaviors among their staff. By organizing workshops dedicated to sustainability, higher education institutions can improve their environmental performance, fulfill their social responsibilities, and make meaningful contributions to sustainability.

Suggestions

Based on various studies, recommendations are offered for implementing “Green Training and Engagement” (GTE) within Higher Education Institutions (HEIs) to foster sustainability. Evidence confirms that “Green Training and Engagement” has a favourable impact—both directly and through “Employee Green Behavior” (EGB)—on the sustainability of higher education institutions; therefore, these institutions should adopt a comprehensive approach to environmental training and employee engagement.

First, higher education institutions should integrate 'Green Training and Engagement' into their overall human resource management strategy, rather than viewing it merely as an isolated environmental initiative. Environmental training programs should be designed with a focus on sustainability to foster the development of sustainability-related knowledge, skills, and capabilities among employees. Training modules should cover key areas such as energy conservation, waste management, efficient resource utilization, sustainable petroleum operations, and environmental safeguards in nuclear energy. Continuous learning and employee engagement can be ensured through regular training sessions, workshops, orientation programs, and online training modules.

Secondly, leadership must play an active role in promoting environmental sustainability. In conclusion, 'employee green behavior' serves as a crucial mechanism through which sustainability-focused training and coaching contribute to organizational goals. Therefore, leaders must articulate a clear vision for sustainability and institutionalize environmental responsibilities across the entire organization. Leadership support fosters a positive environmental culture and motivates employees to actively participate in sustainability-related initiatives.

Third, higher education institutions should formulate effective policies and guidelines that formalize and standardize 'employee green behavior.' While training raises environmental awareness, sustainable behavior among employees is more likely when backed by the support of leadership and colleagues. Green workplace policies regarding energy consumption, paper reduction, recycling, waste segregation, and sustainable procurement should be implemented. Further measures can be introduced to integrate sustainability into daily tasks, such as setting clear environmental goals and incorporating performance metrics related to sustainability.

Fourth, systems for recognition and rewards should be established to acknowledge employees' commitment to environmental responsibilities. Employees demonstrating exemplary green performance can be recognized through formal evaluations, awards, incentives, certificates, or public acknowledgment. Such measures can boost employee motivation and encourage sustainability-oriented behavior throughout the organization.

Fifth, higher education institutions should foster a culture of sustainability that supports continuous improvement. Sustainability principles should be integrated into organizational operations. Partnerships with external stakeholders and



environmental management experts should be encouraged. Creating opportunities for staff participation can further strengthen green behaviors among employees.

Sixth, institutions should leverage various methods to enhance green training initiatives. Continuous experiential learning and supervision regarding environmental management can be facilitated through digital learning platforms, classroom sessions, and specialized workshops. Technology-enabled training programs can improve accessibility, reduce training costs, and equip employees with practical tools to foster excellence in their work environments.

Beyond the aforementioned suggestions, there are several key takeaways for those shaping higher education. Regulatory authorities and innovative educational bodies must make concerted efforts to integrate sustainability training and environmental engineering expertise into their quality assurance frameworks. Furthermore, efforts should be made to cultivate sustainability-related competencies among higher education staff and to strengthen the implementation of 'green' human resource practices across colleges.

Additionally, this paper makes recommendations for further research. Future researchers could look into additional mediating and moderating factors, such as environmental consciousness, green organizational culture, green leadership, or employees' enthusiasm for the environment, that affect the relationship between green training and development and sustainable organizational performance. Deeper understanding of the long-term impacts of environmental training on employee behavior and sustainability-related outcomes may be possible through longitudinal research. Additionally, comparative research across many academic fields, geographical areas, and nations may improve the findings' generalizability and offer a deeper comprehension of sustainable practices in higher education.

In conclusion, the results indicate that green training and development should be viewed as a strategic tool for achieving sustainability goals within higher education institutions. However, the extent of this impact largely depends on how effectively employees translate environmental knowledge into green workplace behaviors. Therefore, institutions should focus on fostering a supportive organizational climate that encourages green employee behavior while continuously investing in environmental training and development initiatives. Such efforts would significantly support the overarching objective of sustainable development and contribute to sustainable organizational performance within the higher education sector.

Study Limitations

While this study offers insightful information about the connections between employee green behavior (EGB), sustainable organizational performance (SOP), and green training and development (GTD) in higher education institutions (HEIs), some limitations should be taken into account when interpreting the results.

First, a cross-sectional research design was used in this study, meaning that data were gathered all at once. While the findings revealed significant relationships among the study variables, this design limits the ability to establish definitive cause-and-effect relationships. As organizations implement new environmental policies and training programs, employee attitudes, behaviors, and organizational sustainability practices may evolve over time. Consequently, the links that have been identified should be understood as affiliations rather than definitive proof of cause and effect. Longitudinal research designs would provide a better understanding of how green training and development influence employee green behavior and organizational sustainability initiatives in the long run.

Secondly, this study was primarily based on self-reported data collected via structured questionnaires. Although self-administered surveys are widely used in organizational research, they are susceptible to “common method bias” and “social desirability bias.” It's possible that respondents exaggerated their involvement in environmentally responsible behaviors or provided overly favorable assessments of their institution's sustainability initiatives. Despite efforts to ensure anonymity and confidentiality, the possibility of response bias cannot be entirely ruled out.

Thirdly, the study was limited to faculty members and administrative staff within the educational institutions. While these individuals represent key stakeholders in sustainability initiatives, the exclusion of other groups—such as students, institutional leaders, maintenance staff, and external stakeholders—may limit the scope of the findings. Sustainability performance in educational institutions is influenced by multiple stakeholder groups, and future studies could benefit from a more inclusive approach.

Fourthly, this study focused specifically on “green training and development” as a Green Human Resource Management (GHRM) practice. Although studies have highlighted its significant contribution to sustainable organizational performance, Other GHRM activities like green hiring and selection, green performance management, green pay and incentives, and

green employee involvement were not included in the research model. Omitting these variables may limit the explanatory power of the study, as organizational sustainability outcomes are often influenced by a combination of interconnected HR practices.

Fifth, “employee green behavior” was examined as the sole mediating factor in the association between “green training” and “sustainable organizational performance.” Although this research confirms its significant mediating role, other factors could also influence this relationship. Variables such as environmental orientation, green organizational culture, environmental knowledge, green leadership, employee participation, and environmental support could be relevant, but they were outside the scope of this study.

Sixth, this study was conducted within the context of higher education institutions, which have specific organizational structures, objectives, and stakeholder groups. Consequently, these findings cannot be directly applied to other sectors such as manufacturing, healthcare, telecommunications, public administration, or professional services. Aspects such as sustainability, employee mindsets, and the overall environmental context differ significantly across these sectors, which could influence the applicability of the theories in different settings.

Seventh, although the study utilized a sample of 400 responses—sufficient for Structural Equation Modeling (SEM) and robust analysis—the data was drawn from a specific subset of institutions. Factors such as institutional size, organizational structure, geographic location, and sustainability initiatives can influence employee perceptions and behaviors. Therefore, caution should be exercised when generalizing these findings to the entire higher education sector.

Finally, the study primarily assessed organizational performance based on employee perceptions rather than objective performance metrics. While the findings offer valuable insights into perceived sustainability, they may not fully capture actual sustainability performance. Future studies could strengthen their findings by incorporating data such as energy resource records, ecological footprint statistics, carbon footprint measurements, sustainability rankings, and environmental stock reports.

Despite these limitations, this work significantly adds to the body of knowledge on sustainability, higher education, and green human resource management (GHRM). It provides valuable insights into how 'Green Training and Development' contributes to 'Sustainable Organizational Practices' through 'Employee Green Behavior.' Although the study's shortcomings are acknowledged, a number of directions for further investigation are noted that could further enhance our understanding of sustainability-oriented human resource practices and their role in promoting organizational sustainability.

Directions for Future Research

GHRM, or green human resource management, has established itself as a significant area of scientific inquiry regarding organizational sustainability. This study reinforces the understanding of how 'Green Training and Development' (GTD) and 'Employee Green Behavior' (EGB) influence 'Sustainable Organizational Practices' (SOP) within Higher Education Institutions (HEIs). Furthermore, the results highlight promising avenues for future research. Expanding the scope of inquiry—across theoretical, methodological, and contextual dimensions—can offer a more thorough comprehension of sustainable HR practices and how they affect businesses.

An important direction for future research is the adoption of longitudinal research designs. The current study provides a cross-sectional assessment of the relationships between GTD, EGB, and SOP; however, sustainability-oriented behavioral change is inherently dynamic and evolves over time. Longitudinal studies would enable an examination of how multidimensional training interventions influence employee behavioral trajectories and sustainability outcomes across various stages of development. Such an approach would provide robust evidence regarding causality and the persistence of training-related effects.

Future research should also broaden the scope of GHRM by examining integrated green human resource dimensions rather than isolated practices. While sustainability performance has been found to be significantly predicted by green training and development, sustainability outcomes are often shaped by the combined effects of green recruitment, multidimensional performance appraisal, green rewards, employee engagement, and sustainability-oriented career development. Investigating the synergistic effects of these practices could provide a more holistic understanding of how organizations create sustainability-oriented and enabling environments.

Another avenue for future research lies in exploring alternative psychological and behavioral mechanisms that explain how green training contributes to enhanced sustainability. While employee green behavior has been identified as a crucial mediating factor, future studies could examine aspects such as green psychological climate, green self-efficacy,

sustainability engagement, green awareness, and ecological values. Investigating multiple mediating pathways would enrich the understanding of the diverse mechanisms through which sustainability-oriented HR interventions generate outcomes.

Future research should also examine the roles of leadership and organizational context as boundary conditions influencing the efficiency of “green development and training”. Variables like green transformational leadership, ethical leadership, top management support, organizational support, sustainability culture, and environmental governance structures could strengthen or weaken the relationships identified in this study. Understanding contextual influences helps explain why similar training initiatives yield varying results across different integrated settings. Sustainability performance emerges from interactions across multiple levels; future studies could provide valuable insights into how multidimensional capabilities developed at the individual level translate into broader emergent and environmental outcomes.

Future research should also broaden the range of perspectives included by involving students, academic leaders, sustainability officers, technical staff, and external community members. Within higher education structures, sustainable development initiatives are collaborative in nature, involving diverse stakeholder groups whose collective actions influence sustainability performance. Incorporating these varied perspectives will foster a more comprehensive understanding of the conceptual framework of environmental sustainability.

Comparative research across diverse emerging and geographical contexts presents another significant opportunity. Studies comparing public versus private sectors, research-intensive versus teaching-focused institutions, or organizations operating in varied cultural and regulatory environments can reveal crucial contextual variations in the implementation and outcomes of “Green Human Resource Management (GHRM)” practices. Such inquiries would enhance the external validity and generalizability of these practices.

Given rapid technological advancements, future research should examine the interplay between digital transformation and environmental sustainability. Emerging elements—such as AI-driven learning, digital certification, modern training platforms, and digital sustainability management—are rapidly shaping the landscape of environmental training. Researchers could investigate whether technology-based green training programs yield stronger behavioral and sustainability outcomes compared to traditional training methods. This area remains relatively underexplored and offers significant potential for both theoretical and practical contributions.

While quantitative studies are effective for testing hypothesized relationships, qualitative methods—such as interviews, case studies, focus groups, and ethnographic inquiries—can provide a deeper understanding of employees' experiences, motivations, and perceptions regarding environmental training and sustainability initiatives. Such approaches can uncover contextual nuances and behavioral mechanisms that standardized surveys might fail to capture fully.

Another important direction involves the use of objective measures of environmental sustainability performance. Future research should complement conceptual measures with verifiable performance data, such as carbon footprint levels, energy efficiency, waste management performance, water conservation outcomes, sustainability audit results, environmental achievements, and sustainability rankings. Integrating subjective and objective measures will strengthen the validity of sustainability research and provide more robust evidence regarding the impact of Green Human Resource Management (GHRM) interventions.

Finally, future research should align sustainability-focused human resource development with broader worldwide sustainability agendas, especially the Sustainable Development Goals (SDGs) of the United Nations. Examining how Green Human Resource Management systems contribute to environmental progress towards specific sustainability goals will enhance the societal relevance of future research and strengthen the role of higher education institutions in advancing sustainable development.

Conclusion: Future research on “employee green behavior”, “sustainable performance”, and “green human resource management (GHRM)” would benefit greatly from this study. By adopting scientific theories, multidisciplinary analysis, technological innovation, diverse stakeholder perspectives, and more sophisticated statistical analyses, future research can generate robust scientific and practical theories. Such efforts will contribute significantly to developing sustainability-focused competencies and support the broader goal of fostering environmentally responsible higher education institutions.

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