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Research Article

The Effect of Green HRM Practices on Environmental Performance: A Moderated Mediation Model with Empirical Examination

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ABSTRACT

This research aims to investigate employees' environmental responsibility (EER) and green transformational leadership (GTL) influence the relationship between green human resource practices (GHRMP) and environmental performance (EP) in KP universities, Pakistan. We collected data from 377 actively involved faculty members in KP universities, utilizing descriptive and inferential statistical analyses following Hayes Model 7. The results reveal that the association between green HRM practices and environmental performance is partially mediated by green transformational leadership. Furthermore, employees' environmental responsibility moderates the relationship between green HRM practices and green transformational leadership significantly. In the context of moderated mediation, employees' environmental responsibility emerges as a significant moderator in the link between green HRM practices and environmental performance through green transformational leadership. We also discuss in detail the theoretical and practical implications of the study's findings.

KEYWORDS

Green Human Resource Management Practices, Environmental Performance, Employees' Environmental Responsibility, Green Transformational Leadership

1 | INTRODUCTION

In an era marked by growing environmental concerns and a deepening commitment to sustainability, organizations across various sectors are increasingly recognizing the imperative to integrate environmentally responsible practices into their operations. Higher education institutions, as key contributors to societal development and knowledge dissemination, are not exempt from this imperative. The convergence of human resource strategies, environmental sustainability, and the involvement of university staff stands as a critically significant topic, calling for intricate examination and empirical scrutiny (Merlin & Chen, 2022; Gomes, Sabino & Antunes, 2023; Mukherjee,

Bhattacharjee, Paul, & Banerjee, 2020). Furthermore, the link between HR practices and organizational outcomes is a thoroughly researched domain in academia (Guest, 2017). However, the intersection of human resource practices with environmental performance, especially within the unique environment of universities, remains an underexplored terrain. Universities are complex organizations with multifaceted functions, encompassing teaching, research, and societal engagement. As they cultivate the minds that will shape the future, these institutions must exhibit a commitment to environmental sustainability (Noonari, Junejo & Ahmed, 2021; Goel, Mehta, Kumar & Castaño, 2022; Mtembu, 2017; Kuo et al., 2022).

Similarly, with a comprehensive perspective, this study attempts to understand the intricate connection between environmental performance and human resource practices at universities. Two key factors are considered as potential conduits shaping this relationship: employees' environmental responsibility and green transformational leadership. Employees' environmental responsibility refers to the individual commitment and accountability of staff members towards sustainable practices (Jackson & Ruderman, 1999). Green transformational leadership involves leaders who inspire and guide their teams toward environmentally conscious behaviors and decisions (Ding et al., 2018). Ergo, Numerous researchers have explored the realm of Human Resource Management (HRM) within the framework of developing countries. In their study, Mohammed Othman and Sharifa (2020) delve into the impact of employees' GHRMP on long-lasting and sustainable performance, while also evaluating the degree of implementation of various bundles of GHRM practices. Similarly, Ikram et al. (2020) conducted research on the integration of GHRMP within professional organizations in developing nations, emphasizing the importance thereof. Whether in private or public sectors, organizations can significantly contribute to environmental sustainability by incorporating diverse environmentally friendly initiatives into their operations. Furthermore, several studies have specifically examined HRM within the context of Pakistan, assessing the significance of Green HR within organizations (Atif Mahmood et al., 2016; Ahmed et al., 2021; Khan, 2022).

Moreover, in the pursuit of sustainable practices, universities are not only expected to educate on environmental issues but also to exemplify best practices in their operations (Cheng & Monroe, 2012). However, several studies have highlighted the importance of GHRP in fostering environmentally sustainable practices (Jackson et al., 2019; Ren et al., 2020; Younis & Hussain, 2023). Likewise, the specific mechanisms through which GHRP influences environmental performance, moderated by ER and mediated by GTL, remain underexplored, especially in the university settings of Pakistan. Past research suggests that ER significantly influences pro-environmental behaviors in organizational contexts (Lamm et al., 2018), while GTL has shown promising effects in promoting environmental initiatives within institutions (Zhu et al., 2021). Nonetheless, the interplay of employees' environmental responsibility and green transformational leadership and the combined effects of these factors within the unique cultural and educational landscape of KP universities remain largely unexamined (Merlin & Chen, 2022; Gomes et al., 2023). GHRMP in universities across Western and non-Western countries face distinctive challenges, necessitating tailored approaches for sustainable development. In Western countries, universities grapple with the need to align HR strategies with environmental sustainability goals, ensuring that recruitment, training, and retention practices integrate eco-friendly principles (Jabbour et al., 2018). Conversely, in non-Western nations, universities encounter hurdles in implementing GHRM due to diverse socio-cultural contexts, resource constraints, and varying levels of institutional support for sustainability initiatives (Renwick et al., 2016). Nevertheless, the proposed research intends to fill this gap by employing a cross-sectional approach, utilizing surveys to gather quantitative data. By examining the perceptions and behaviors of university employees and leaders regarding GHRP, ER, GTL, and their impact on environmental performance indicators, this study aims to offer comprehensive insights into the complex relationships at play. Therefore, we utilized the moderated mediation model developed by Preacher and Hayes (2008). "As per their framework, moderated mediation signifies the joint impact of the independent variable X and the moderating variable W on a third dependent variable Y. This mechanism operates through an intermediary M". Thus, the primary aim of this research is to fill a methodological void by empirically investigating the connection between green human resource management and environmental performance. This study delves into the concept of moderated mediation, examining employees' environmental responsibility and green transformational leadership interact (Merlin & Chen, 2022; Gomes et al., 2023). Initially, the research explores green transformational leadership mediates the relationship between human resource management practices and environmental performance. Additionally, the study extends its investigation to analyze how employees' environmental responsibility moderates the link between GHRMP and EP, particularly within the context of GTL. The findings are expected to contribute not only to academia but also to the practical implementation of sustainable strategies within educational institutions, potentially influencing policies and practices globally.

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2 | LITERATURE REVIEW

The theory known as Resource-Based View (RBV), which gained notoriety in the 1990s after its emergence in the late 20th century, has a notable impact on the advancement of Green HRM practices. Success is defined as these tactics meeting the following criteria: they must be " non-replaceable," "rare," "hard to replicate," and " valuable." Concurrently, the Social Learning Theory intersects with human behavior, facilitating cognitive interactions. This synergy is leveraged through environmental awareness initiatives led by both the Human Resources department and top management within the organization. Both the RBV and Social Learning Theory emphasize the integration of scarce, valuable, and distinctive resources. The incorporation of incentives and compensation further underscores the importance of these theories in nurturing learning, awareness, and motivation, as highlighted by (Kuo et al., 2022).

2.1 | Globally Contribution of GHRM in Universities

Around the world, GHRM plays a key role in leading university sustainability initiatives, particularly in developed nations. This approach aligns HRM practices with environmental concerns, promoting a culture of environmental responsibility and corporate social responsibility (CSR) within academic institutions. Scholars argue that GHRM contributes to sustainable development by integrating environmental concerns into HR functions such as recruitment, training, and performance appraisal (Renwick, Redman, & Maguire, 2013; Jackson & Rudolph, 2019). For instance, universities in developed countries often adopt eco-friendly hiring practices, emphasizing the recruitment of faculty and staff with expertise in sustainability. Training programs are designed to enhance environmental awareness, and performance appraisals may include criteria related to sustainable contributions. Such initiatives not only contribute to the reduction of the ecological footprint of these institutions but also instill a sense of environmental stewardship among students, faculty, and staff, fostering a holistic approach to sustainability in higher education (Renwick et al., 2013; Jackson & Rudolph, 2019).

Similarly, the management of human resources has experienced significant transformations that align with the societal shifts in the standard of living. Developed nations have seen considerable economic growth during the last century. The quantity and quality of manufacturing, agriculture, and higher education have all seen unparalleled expansion because of new innovations and technologies. Industrialized nations now benefit from worldwide production and sales. Developed nations are attempting to implement the reforms they desire. While technology has played a significant role, human involvement is still necessary, and technical specialists including finance, marketing, technicians, engineers, and resource procurement professionals, as well as logistics experts, are in greater demand. In developed nations, human resource management places a high value on workers' requirements as a resource. A wide range of individuals, from entry-level laborer’s to top management, are employed by these organisations. They assess the necessity of the abilities and know-how needed to carry out professional tasks. HRM will consider your various career goals and training requirements. Senior management succession is organized, with the human resources division bearing primary accountability (Rawat & Singh, 2021).

2.1.1 | The Paucity of (GHRM) Integration in Pakistani Universities

In recent years, the scarcity of (GHRMP) in Pakistani universities has become a pressing concern. Despite the global emphasis on sustainable development and environmental responsibility, universities in Pakistan have been slow to integrate GHRM into their organizational structures. The dearth of initiatives addressing sustainable HR practices, such as eco-friendly training programs, employee engagement in green initiatives, and the incorporation of environmental concerns into HR policies, reflects a missed opportunity for fostering a culture of environmental responsibility within academic institutions. According to the most recent data available, there has been little research on GHRM in the Pakistani context. This highlights the need for thorough studies to comprehend the situation as it is and develop plans for incorporating green practices into HRM in the nation's universities (Ahmed et al., 2022; Ali et al., 2022; Khan et al., 2021).

Simultaneously, numerous studies have demonstrated the positive correlation among Green Human Resource Management (HRM) practices, employees' environmental responsibility, and green transformational leadership with environmental performance in organizations. Green HRM practices, which involve integrating environmental concerns into human resource functions, have been shown to contribute to improved environmental performance by

fostering a sustainability-oriented organizational culture (Renwick, Redman, & Maguire, 2013; Kuo et al., 2022). Employees' environmental responsibility plays a crucial role in this relationship, as environmentally conscious employees are more likely to engage in eco-friendly behaviors within the workplace, positively impacting the overall environmental performance (Ramus & Steger, 2020). Additionally, green transformational leadership, characterized by leaders who inspire and motivate employees toward sustainability goals, has been found to enhance organizational environmental performance through the promotion of environmental initiatives and the cultivation of a green mindset among employees (Zhu, Liu, & Fan, 2019; Ren et al., 2021; Jackson & Ruderman, 2019).

H1: Green HRM practices, employees' environmental responsibility, and green transformational leadership have a positive relationship with environmental performance.

H2: Green HRM has significantly positive influence on environmental performance.

2.2 | Mediation of Green Transformational Leadership

The relationship between transformational leadership and enhanced firm performance is well-established, yet the mechanisms that mediate this relationship remain unresolved, presenting a special area of interest for researchers (Para-González et al., 2018; García-Morales et al., 2012).The significance of exploring the connection between transformational leadership and firm performance is highlighted, particularly in times when companies must prioritize innovation in both their processes and products to secure a competitive edge and achieve superior performance (Della Peruta et al., 2018; Donate and de Pablo, 2015). In this research, we define green transformational leadership (GTFL) as a style of leadership characterized by its emphasis on providing clear vision, inspiration, and motivation to employees, while also supporting their developmental needs towards the attainment of environmental objectives within the organization (Mittal and Dhar, 2016; Chen and Chang, 2013). GTFL inspires employees to acquire fresh insights and knowledge (Le and Lei, 2018; Han et al., 2016), encouraging their active involvement in activities related to green process and product innovation. This involvement enables the organization to introduce environmentally friendly products and services to the market (Andriopoulos and Lewis, 2010) and enhance its overall environmental performance (Dranev et al., 2018; Martinez-Conesa et al., 2017). Therefore, Previous research indicates the need for additional investigation into the mechanisms that mediate the relationship between transformational leadership and innovation (Le and Lei, 2019; Para-González et al., 2018; Xiao et al., 2017; Gumusluoglu and Ilsev, 2009), as well as between HRM practices and organizational performance (Para-González et al., 2018; Heffernan et al., 2016; Singh et al., 2020). Moreover, research has underscored the correlation between Green HRM practices and improved environmental performance within companies (Ren et al., 2021). Transformational leaders are pivotal in cultivating a culture conducive to supporting and reinforcing environmentally responsible behaviors among staff, thus magnifying the influence of Green HRM practices on environmental results (Zhang et al., 2021; Sun et al., 2022).Likewise, the role of transformational leadership as a mediator in the connection between Green HRM practices and environmental performance highlights the crucial influence of leadership on fostering sustainability efforts within organizations (Niazi, et al., 2023).

H3: Employees' environmental responsibility mediates the paths between GHRM practices and environmental performance.

2.3 | Moderated Mediation of Employees' Environmental Responsibility

Environmental orientation refers to the level of dedication exhibited by both employees and employers towards promoting environmental sustainability. It arises from their readiness to acknowledge and integrate concerns about the natural environment into business operations (Banerjee et al., 2003). According to research by Paillé et al. (2014, p. 455), there exist two distinct types of environmental orientation within organizations. Firstly, there's the "external environmental orientation," which pertains to how a company's decisions impact external stakeholders such as customers, business partners, or the wider community. Secondly, there's the "internal environmental orientation," which refers to the level of importance attributed to environmental issues within the organization, as demonstrated by the formulation of clear policies, instilling values regarding environmental preservation, or managerial efforts to support employees in environmentally friendly practices. Therefore, an employee's environmental orientation can be defined as their personal or interpersonal engagement with environmental matters. Research suggests that employees may exhibit a strong inclination towards environmentally conscious employers and societal well-being (Bustamante et al., 2020).

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Likewise, gaining insight into the fundamental mechanism by which Green Human Resource Management (GHRM) practices impact employee performance requires an understanding of the specific employee demographics influenced by these practices. Existing literature underscores the pivotal role individual values play in shaping attitudes and behaviors (Choe and Kim, 2018; Hansen et al., 2018). Within this framework, it is hypothesized that employees are more likely to adopt environmentally friendly attitudes and behaviors when their personal values align with the organization's green initiatives. Given that GHRM practices often reflect a company's environmental stance, it follows that an employee's environmental orientation could moderate the effects of these practices on their environmental performance. Drawing from the attraction-selection-attrition model, we contend that individuals are drawn to organizations that mirror their attributes, interests, personalities, and values (Iftikhar et al., 2021; Schneider, 1987; Ren & Hussain, 2022). Therefore, when employees' values align with the environmental ethos of the organization, they are likely to exhibit higher performance levels. Although previous research has explored the moderating role of personal environmental orientation, findings have been inconsistent. For instance, Paillé et al. (2014) observed significant moderation in the relationship between strategic human resource management and organizational citizenship behavior towards the environment, while Chaudhary (2019) noted a similar effect in the link between GHRM and job pursuit intention. Conversely, Dumont et al. (2017) found no evidence of moderation in the relationship between psychological green climate and in-role green performance. Consequently, building upon this prior research, we posit that.

H4: The indirect impact of GHRM on environmental performance through green transformational leadership is moderated by employees' environmental responsibility.

2.4 | Conceptual Framework of The Study

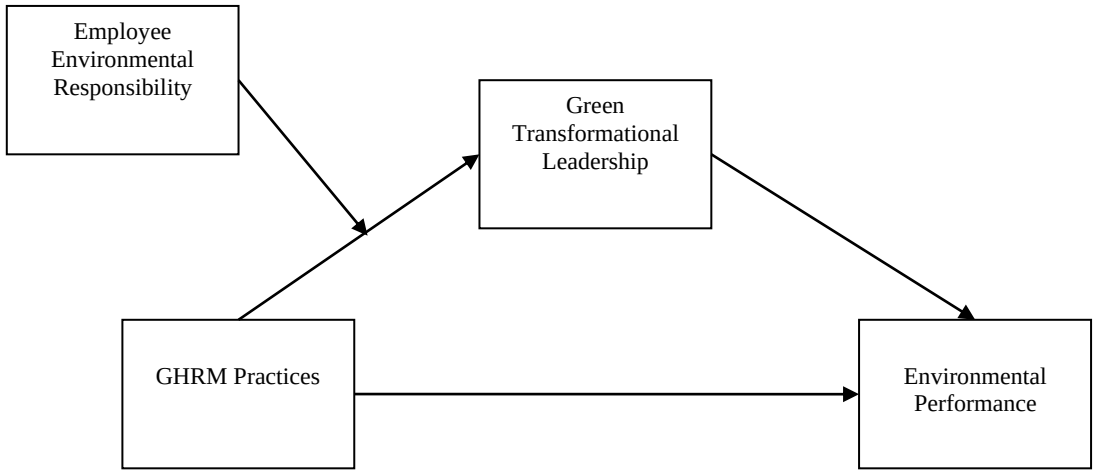

Fig 1: Conceptual Framework

3 | RESEARCH METHODOLOGY

The study's populations comprise all the components from which the researchers get their findings (Blumberg et al., 2014). All 32 universities' KP faculty members make up the study's population. The suitable sample size was 377 as the total number of faculty members is 4915, which is fewer than 5000, according to source HEC statistics (2017–2018). We contacted 377 members of the Pakistani KP universities' teaching faculty. The co-author visited the targeted KP universities and had face-to-face meetings with the teaching staff. The faculty members promptly completed the questionnaire and returned it to us on the same day that they volunteered to participate in the study. Surveys on green HRM practices, green transformational leadership, employees' environmental responsibility, and environmental performance were completed by the teaching faculty members. 475 surveys were handed out, of which 377 were considered valid, yielding a study participation rate of 79.52%. The data collected was analyzed using SPSS for mediation and moderated mediation. This study utilized the PROCESS macro developed by Hayes (2013), employing Model 4 for simple mediation analysis and Model 7 for testing simple moderation and conducting moderated mediation analysis.

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3.1 | Sampling Technique and Sample Size

The present research employed a convenience sampling (Non-probability) method to collect data. In addition, convenient sampling selects its sample members based on their proximity to the researcher. Moreover, this sampling method can be employed in both qualitative and quantitative studies (Obilor, 2023). The sample size, comprising 377 participants, was determined using the formula outlined by Yamane (1967) and validated by the sample size table for known populations provided by Krejcie and Morgan (1970). This research adopts a quantitative approach, involving the analysis of numerical data to address research inquiries (Taylor, 1998). The Likert 5-Point Scale framework was adopted for the questionnaire in this study, with respondents indicating their agreement levels on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree) as proposed by Mowday, Steers, and Porter (1979). Data analysis to ascertain the impact of variables was conducted using SPSS.

Table 1
Study scale

Construct	Variables (Items)	References
Green HRM Practices	Independent (44)	Haldorai et al., (2022), Renwick et al. (2013) and Sun et al. (2007).
Employees' environmental responsibility	Moderator (7)	Etheredge (1999).
Green transformational leadership	Mediator (5)	Chen and Chang (2013).
Environmental performance	Dependent (6)	Daily et al. (2007) and Melnyk et al. (2003).

4 | RESULTS AND ANALYSIS

4.1 | Descriptive Tools

"The main aim of this study is to address a particular problem. To enhance comprehension of the data, it will be presented through a diverse range of visual aids including graphs, charts, and tables. In a similar vein, Bannigan et al. (2015) utilized a diverse set of tools to effectively visualize the data in their study. Their research notably presented insights into employees' opinions and demographics through the incorporation of multiple tables."

Table 2
Reliability statistics

Variables	Items Deleted	Cronbach Alph
Green HRM Practices	0	0.923
Employees' environmental responsibility	0	0.789
Green transformational leadership	0	0.702
Environmental Performance	0	0.770

Table 1 presents the Cronbach's alpha scores for the various measures of GHRMP, EEP, GTL, and environmental performance. The alpha score for GHRMP stands at a robust 0.923, as highlighted in column 1. Additionally, the employees' environmental performance scores and green transformational leadership are 0.789 and 0.702, respectively. The environmental performance measure yielded a score of 0.770. These findings collectively suggest that the employed tool exhibits satisfactory internal consistency and reliability in capturing responses. Notably, all obtained results surpass the minimum threshold value, reinforcing the tool's credibility in effectively measuring the intended constructs.

4.2 | The Data Normality

Ensuring the normality of data stands as a pivotal prerequisite when embarking on regression analysis. Before engaging in parametric tests such as regression and correlation, it is imperative to thoroughly examine and confirm the normalization of the dataset. Failure to normalize the data may jeopardize the validity and reliability of the outcomes derived from parametric tests. Consequently, the normalization of data becomes indispensable for drawing accurate inferences. Various assessments, including the examination of measures like Skewness, kurtosis, and standard deviation (SD), as well as the application of statistical tests like the Kolmogorov-Smirnov test, can be employed to scrutinize data normality (Warrick et al., 2017).

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Table 3
Normality test

	N	Minimum	Maximum	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error of Skewness	Statistic	Std. Error of Kurtosis
GHRMP	377	3.32	4.98	.306	.126	-.989	.251
EER	377	3.57	5.00	.224	.126	-1.087	.251
GTL	377	2.40	5.00	-.292	.126	.811	.251
EP	377	3.50	5.00	.527	.126	-1.017	.251
Valid N (listwise)	377						

Following the assessment of the internal consistency of the instrument, it becomes crucial to examine the normal distribution of the collected data. Various tests, including Skewness and kurtosis, Cronbach's Alpha, among others, are available for this purpose. In this particular study, which employed cross-sectional data, the analysis was conducted using SPSS version 25. Notably, Skewness and kurtosis emerged as pivotal techniques employed to evaluate the normality of the data. The results from the Skewness and kurtosis statistics reveal that all values lie within the acceptable range of -3 to +3.

Table 4
Correlation analysis

Correlations							
		Mean	SD	GHRMP	EER	GTL	EP
GHRMP	Pearson Correlation	4.1152	.38756	1	.351**	.614**	.781**
	Sig. (2-tailed)				.000	.000	.000
EER	Pearson Correlation	4.3695	.40079	.351**	1	.343**	.514**
	Sig. (2-tailed)			.000		.048	.000
GTL	Pearson Correlation	4.2955	.47647	.614**	.343**	1	.610**
	Sig. (2-tailed)			.000	.000		.000
EP	Pearson Correlation	4.3196	.36894	.781**	.514**	.610**	1
	Sig. (2-tailed)			.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The study hypothesis indicated a correlation between green HRM practices, employees' environmental responsibility, green transformational leadership, and environmental performance. We conducted a correlation analysis, revealing a notable positive correlation between green transformational leadership (Mean=4.1152, SD=0.38756, r=0.351, p=0.000), employees' environmental responsibility (Mean=4.3695, SD=0.40079, r=0.343, p=0.000), green transformational leadership (Mean=4.2955, SD=.47647P=0.000 with environmental performance respectively (see table 4). These findings demonstrate the interrelation between Green HRM practices, employees' environmental responsibility, green transformational leadership, and their collective impact on environmental performance. It suggests that fostering a conducive work environment through the implementation of environmentally responsible HRM practices and cultivating green transformational leadership plays a significant role in enhancing the workforce's commitment to environmental responsibility within the organizational context. Hence H1 is accepted.

Table 5
Linear regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.571	.147		3.894	.000
	EP	.820	.034	.781	24.237	.000

a. Dependent Variable: GHRMP, F=587.438, R=.781[a], R Square=.609

Table 5 revealed the results of model coefficient revealed that GHRMP has a beta value of 0.781, which indicates

that for every one-unit change in GHRMP, there is a 0.781-unit change in environmental performance, with t = 24.237 and a significance level of less than 0.05 having F (587.438). Based on the results H2 accepted.

Table 6
Mediation analysis model summary

R	R Square	MSE	F	DF1	DF2	P	Outcome
.6138	.3768	.1419	226.6912	1.0000	375.0000	.0000	**GTL**
.7983	.6373		328.5516	2.0000	374.0000	.0000	**EP**
.7809	.6098		586.1385	1.0000	375.0000	.0000	**EP**

Table 7
Mediation analysis coefficients

Model	Coeff	Se	T	P	LELCI	UELCI	Outcome
Constant	1.1901	.2072	5.7448	.0000	.7828	1.5975	**GTL**
GHRMP	.7546	.0501	15.0563	.0000	.6561	.8532	**GTL**
Constant	1.0671	.1278	8.3487	.0000	.8185	1.3184	**EP**
GHRMP	.6208	.0306	16.5313	.0000	.5469	.6946	**EP**
Constant	1.2604	.1269	9.9313	.0000	1.0109	1.5100	**EP**
GHRMP	.7434	.0307	24.2103	.0000	.6803	.8038	**EP**
GTL	.1625	.0305	5.3195	.0000	.1024	.2225	**EP**

Note: GTL: Green transformational leadership, GHRMP: Green HRM Practices, EP: Environmental performance

Using a simple mediation analysis, the study looked at the linkages that have been suggested between the study examined the proposed relationships between Green HRM Practices (GHRMP) and environmental performance (EP) through the lens of green transformational leadership (GTL) using a straightforward mediation analysis. To investigate the mediation effects, the PROCESS Model 4 developed by Hayes (2013) was utilized. green HRM practices GHRMP and environmental performance (EP)via the green transformational leadership (GTL). Using the PROCESS Model 4, which Hayes (2013) created, the mediation effects were examined. The current study's mediation results are shown in Tables 6–7. Table 6 shows that Green HRM Practices (GHRMP) account for 37.68% of the variances in Green Transformational Leadership (GTL). Furthermore, there is clear evidence of a statistically significant GHRMP effect on GTL (β =.7546, p-value =.0000). Furthermore, Table 6 shows that the predictor (GHRMP) influences 63.73% of the variability in the criterion (EP), with a significant effect of GHRMP on EP (β =.6208, p-value =.0000). Moreover, Table 6 explores the dynamics and shows that the predictors (GHRM and GTL) account for 60.98% of the changes in EP. Additionally, the outcomes highlight a statistically significant impact of GTL on the criterion (EP) with β =.6207 and p-value =.0000. However, there is also a substantial impact of GTL on EP when GHRMP is present (β =.1625, p-value =.0000). The results of the study indicate that GTL mediates a portion of the effect of GHRMP on EP, with non-zero confidence intervals at both the lower and upper levels. Consequently, it may be said that GTL is mediating the effect of GHRMP on EP. H3 is therefore approved.

5 | MODERATED MEDIATION ANALYSIS

Table 8
Model summary

R	R-sq	MSE	F	df1	df2	P	Outcome
.6399	.4094	.1352	36.1959	3.0000	373.0000	.0000	**GTL**
.7983	.6373	.0496	328.5516	2.0000	374.0000	.0000	**EP**

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Table 9
Coefficients

Model	Coeff	Se	T	P	LELCI	UELCI	Outcome
Constant	4.2728	.0204	209.4696	.0000	4.2327	4.3130	**GTL**
GHRMP	.6546	.0537	12.1892	.0000	.5490	.7602	**GTL**
EER	.2040	.0516	3.9552	.0001	.1026	.3054	**GTL**
Int_1	.4170	.1397	2.9845	.0030	.1423	.6918	**GTL**
Constant	3.6217	.1317	27.4985	.0000	3.3633	3.8807	**EP**
GHRMP	.6208	.0376	16.5313	.0000	.5469	.6945	**EP**
GTL	.1625	.0305	5.3195	.0000	.1024	.2224	**EP**

Table 10
Direct effect of X on Y

	Effect	SE	T	P	LELCI	UELCI	Mediator	OC	Effect	Boot SE	Boot LELCI	Boot UELCI	Index
Direct Effect	.6208	.0376	16.5313	.0000	.5469	.6946							
Indirect effect							GTL	-.4008	.0792	.0225	.0391	.1268	
							GTL	.0000	.1064	.0267	.0565	.1601	
							GTL	.4008	.1335	.0342	.0691	.2028	
Index							GTL			.0282	.0225	.1327	.0678

The hypothesis of moderated mediation was assessed through the utilization of the PROCESS macro in SPSS, following the technique outlined by Hayes (2013). The analysis integrated the moderating influence of employees' environmental responsibility (EER) within a comprehensive model to examine the relationship between green HRMP and EP, with a focus on green transformational leadership (GTL) as the mediator. To guarantee strong results, 5,000 bootstrap samples were used to generate bias-corrected 95% bootstrap confidence ranges for the indirect effects.

Similarly, the results of Hayes Model 7, which illustrates moderated mediation, are shown in Tables 8-10. Conversely, the model summary for H4 is explicitly shown in Table 8. Table 8's coefficient of determination (R2) shows that the model explains 40.94% of the variation in the outcome variable (GTL). With a value of 36.1959, the F statistic evaluates the model's general fitness. Tables 7 and 8 examine how GHRMP affects GTL while taking EER's moderating effect into account. Table 8 clarifies how EER interacts with other variables as a moderator. The results show that EER has a substantial effect on GTL; the p-value of.0000 indicates statistical significance at the.05. Furthermore, there is a notable impact of GHRMP on GTL. With a p-value of.0030, the interaction term (int_1) between these factors is clearly significant. further supported by non-zero lower and upper limits of the confidence interval. This implies that EER indeed moderates the relationship between GHRMP and GTL. Hence, condition one, as proposed by Hayes (2013), is satisfied.

Furthermore, a summary of the mediation results is also included in Table 8, where the criteria is EP, the mediator is GTL, and the independent variable is GHRMP. The results of the analysis show that the proposed model fits well: the R2 value is 63.73%, the F value is 328.5516, and the p-value that goes with it suggests statistical significance, which indicated that the suggested model is a good fit. Additionally, Table 8 presents a summary of the mediation results, with the independent variable being GHRMP, the mediator being GTL, and the criterion being EP. The analysis reveals that R2 stands at 63.73%, the F value is 328.5516, and their associated p-value indicates statistical significance, suggesting that the proposed model fits well. Furthermore, Table 7 highlights the significance of both GTL and GHRMP. In Table 0, the direct effect of X on Y proves to be significant, indicating that GTL serves as a partial mediator in the relationship between GHRM and EP. Moreover, Table 9 specifies that both Boot LELCI and Boot UELCI are positive and exclude zero across all six values. This suggests that EER functions as a moderator at all three levels—low, average, and high. Both the lower-level and upper-level moderation confidence intervals are

positive and do not include zero, according to Table 9's data. Thus, the moderated mediation hypothesis 4 is supported by this study's results.

6 | DISCUSSION

In the Contemporary era of educational institutions (EIs) are making significant attempts to transition to ecologically sustainable practices, but the rate of change remains slow. This observation is based on the gaps in current literature, indicating a need for additional investigation. There has been little research on the primary and secondary barriers that prevent EIs from adopting and recognizing GHRMP. Efforts to overcome the issues faced by EIs in this regard are noticeably missing (Goel et al., 2022). Firstly, empirical findings of our study pointed out a positive relationship between green HRM practices, employees' environmental responsibility, green transformational leadership, and environmental performance. This means that universities in KP, Pakistan, that embrace green human resource management methods and cultivate a good environmental ethos through green transformational leadership contribute to long-term organisational development and ecological responsibility. The study supported by the findings of (Kuo et al., 2022; Zhu, Liu, & Fan, 2019; Ren et al., 2021; Jackson & Ruderman, 2019; Zhang et al., 2021; Para-González et al., 2018; Sun et al., 2022). Furthermore, the study is supported by the RBV and Social Learning Theory. Secondly, the study showed the positive influence of green HRM practices on environmental performance, study align with (Kuo et al., 2022). Thirdly, the study showcases the mediating role of green transformational leadership in the relationship between green HRM practices and environmental performance. The indirect path provided significant evidence of green transformational leadership is to maintain connection between green HRM practices decisions that ultimately help to boost workforce performance. Meaning that, if public universities in KP prioritize green transformational leadership, fostering a strong commitment among employees, it is likely to boost both their organizational dedication and performance in promoting environmental sustainability. This approach can help overcome the lack of green HRM practices within universities, aligning with the study's objectives. (Para-González et al., 2018; Singh et al., 2020; Zhang et al., 2021; Sun et al., 2022). Lastly, the forth hypothesis is also accepted because the employees' environmental responsibility significantly moderates the impact of green HRM practices on environmental performance through green transformational leadership. As no studies have yet been conducted to measure this specific condition, this result can serve as a foundational reference for future research. The findings affirm each of the research hypotheses. The theoretical and practical ramifications of the study are covered in the next section.

7 | IMPLICATIONS

7.1 | Theoretically

The current study holds significant theoretical implications. Firstly, drawing from established theories like social learning theory and resource-based view theory, it suggests that the positive correlations between GHRMP and EER impact EP through the intermediary role of GTL. Secondly, while most research on resource-based view (RBV) has focused on industrialized nations, little attention has been paid to RBV in other contexts (Vargas-Halabí et al., 2017; Kuo et al., 2022). This study contributes incrementally by examining RBV in a specific context and its relationship with environmental performance and green transformational leadership. Therefore, this research represents an important theoretical advancement in that it integrates social learning theory with RBV and incorporates GHRMP, GTL, and EP.

7.2 | Practically

Firstly, the research underscores the critical role of GTL and EER in elucidating the concept of environmental sustainability, particularly when integrated with GHRMP within academic institutions. This understanding holds significant importance for university administrators and academic leaders, who are increasingly acknowledging the necessity of promoting environmentally conscious behaviors within educational environments. Secondly, the study emphasizes the necessity for top management in academic institutions to prioritize environmental sustainability. GHRMP is essential for fostering eco-friendly practices at universities by incorporating sustainable initiatives within HRM policies and processes. Transformational leadership is characterized by personalized attention and inspirational motivation. It is recognized as a critical enabler for creating an organizational commitment to environmental objectives and a proactive environmental performance. Moreover, employees' environmental

responsibility, which encompasses their awareness and dedication to sustainable practices, serves as a catalyst for achieving environmental goals within academic settings. The synergy of GHRM, transformational leadership, and employees' environmental responsibility contributes significantly to enhanced environmental performance in universities, as evidenced by studies conducted by researchers such as Ren and Tang (2019) and Singh et al. (2020).

8 | CONCLUSION

The conclusion of the study thoroughly explores the intricate dynamics of GHRMP, EER, GTL, and EP within KP universities. GHRMP plays a pivotal role in achieving various organizational objectives. Through empirical investigation, this study validated a moderated-mediation model, revealing that Universities' sustainable environmental performance is greatly enhanced by environmentally sensitive GHRMP and transformational leadership that is centered on sustainability. These procedures help faculty members become more adept leaders while also fostering a strong sense of environmental stewardship among staff members. Drawing from these insights, it is imperative for universities to integrate green HRM practices into their environmental management programs, actively enhance employees' environmental skills and motivation, foster green leadership, and engage them effectively in environmental management initiatives. By doing so, universities can address the challenge of integrating GHRM practices into their organizational structure and effectively pursue their environmental sustainability goals. Authors should thoroughly discuss the findings in relation to existing research and hypotheses, exploring their broader implications. This discussion should also shed light on potential avenues for future research in this domain.

9 | FUTURE CONTRIBUTION

The current study utilizes a cross-sectional research design. To attain a more comprehensive understanding, forthcoming investigations may adopt a longitudinal research approach to explore the progression of EER (Environmental Employee Responsibility) and GTL (Green Task Leadership) consequent to the implementation of GHRMP over time. Furthermore, numerous KP Universities are endeavoring towards sustainability and green transformation. To enhance the generalizability of research findings, future studies ought to encompass universities from diverse countries and cultural backgrounds. Subsequent research employing qualitative methodologies can delve into the link between GHRMP and EP. Moreover, future studies should incorporate additional influential factors such as managerial support (Ramus, 2002), corporate culture (Levy & Marans, 2012), and employee attitudes, as highlighted by prior research (Ahmad et al., 2023; Harvey, Williams & Probert, 2013). Further research endeavors must incorporate other green HRM strategies, such as green work-life balance (Muster & Schrader, 2011). These investigations may encompass non-academic personnel, including administrative, technical, and operational staff, to present a comprehensive perspective of the university ecosystem. Additionally, future inquiries can explore alternative moderators such as employee green behavior (Amrutha et al., 2020), organizational citizenship behavior towards the environment (Anwar et al., 2020), and green employee empowerment (Tariq et al., 2016), in lieu of solely focusing on EER (Ahmad et al., 2023).

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