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Promoting Pro-Environmental Behaviors via Green HRM: The Roles of Green Empowerment and Leadership

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Abstract

With growing environmental concerns, organizations worldwide are increasingly integrating green practices into their operational frameworks. The interplay between GHRM practices, green empowerment, and green leadership creates a conducive environment for promoting task-related and broader proactive pro-environmental performance among employees. Effective GHRM practices lay the foundation, while green empowerment acts as the driving force, and green leadership enhances the overall impact, ensuring a sustainable organizational culture. Therefore, this study explores the influence of GHRM practices on task-related proactive pro-environmental performance (T-PEP) and proactive pro-environmental performance (P-PEP) through green empowerment. This study examines the moderating role of green leadership in GHRM and green empowerment. Using partial least squares structural equation modeling (PLS-SEM), we analyze data collected from 312 Pakistan food industry employees. The results indicate that GHRM significantly influences the P-PEP and T-PEP through green empowerment of employees' food industries of Pakistan. Additionally, green leadership is identified as a significant moderator in the relationship between GHRM and green empowerment. These findings underscore the importance of aligning HRM practices with leadership initiatives to cultivate an organizational culture supportive of environmental sustainability. Based on affective events theory principles, this study offers theoretical insights and practical guidance, presenting valuable recommendations for industry managers and academic researchers in the food manufacturing sector.

Keywords:

Green Human Resource Management;
Green Empowerment;
Task Related Pro-Environmental Performance;
Proactive Pro-Environmental Performance;
Green Leadership.

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1- Introduction

Pursuing the technological advancements of the industrial revolution, the world of work has changed drastically [1]. One of the major issues that organizations are addressing today is environmental sustainability as a major goal and the strategies required to achieve it; organizations are undergoing a fundamental shift in this regard [2]. Environmental sustainability [3] describes employee behaviors that involve activities that mitigate environmental harm and positively affect the environment [4]. Businesses recognize and adopt the interdependence of environmental, economic, and social sustainability as imperatives for achieving sustained success [5]. This creates immense pressure on firms to support

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environmentally friendly processes and to develop and implement green management [6]. Many organizations have recently tried implementing a formal environmental management system (EMS) to address this major issue. EMS has distinguished itself as one of the best methods for attaining sustainable growth since the 1990s [7] by incorporating green environmental management components into business decision-making processes [8], such as eco-friendly supply chain and sustainable finance, and others [9]. In the same context, GHRM also recently accepted the green movement [10].

According to Ly [11], GHRM is viewed as a significant participant in attaining sustainable growth since it significantly influences organizational culture, structure, strategy, and policy creation. Hence, management academics have understood the need to explore the potential role of GHRM in making organizations sustainable [12]. GHRM is the term for environmentally friendly practices and policies in HRM practices (for example, hiring, selection, training, appraisal, and compensation) that support a company's social mission while also, and most crucially, highlighting the environmental harm caused by the organization to organizational members [13]. In this regard, developing an organizational culture centered on using eco-friendly practices, giving workers opportunities, using eco-friendly products, and leading environmental efforts through GHRM would promote personal responsibility to exert greater commitment toward environmental protection [14]. Moreover, management scholars have established that empowering employees to manifest environment-friendly tasks through GHRM can play a very significant role in bringing change in organizations' green practices at the individual level [6, 15].

Moreover, the phrase "Green empowerment" refers to giving employees the power to adopt green practices willingly [7]. Green empowerment provides psychological ownership of decisions, leading to employees' pro-environmental behaviors, including P-PEP and T-PEP [6]. P-PEP stands for employee personal initiative in environmentally friendly activities that go above and beyond the call of duty. P-PEP calls for a proactive approach that includes making environmental recommendations, making the required adjustments, detecting environmental issues, locating solutions, minimizing waste, conserving water, and cutting back on energy use. On the other hand, behaviors that are formally assigned by the company and clarified within the framework of employee responsibilities are referred to as T-PEP, for example, mandatory environmental training and switching from paper to digital filing [16].

According to a past study by Zaid et al. [9], combating environmental problems, there is an immense need to spread awareness, transform attitudes, and enhance environmental performance at the individual level. In this regard, scholars have established that, among other organizational factors, green leadership plays a significant role in establishing green attitudes and improving the performance of employees. Green leadership is defined as systems that empower individuals to act as primary decision-makers to influence and transform an organization's environmental objectives [8]. Green leadership plays a crucial role in developing green empowerment in employees to adopt green practices, but organizations unaware of the significance of leadership role in motivating employees to adopt green practices are missing out on major opportunities to avail the HR practices to contribute to the most crucial problem of today's world, that is environmental degradation [17, 18].

Previous research by Adu Sarfo et al. [19] extensively explored the role of GHRM practices in promoting environmental sustainability, but there is limited empirical evidence connecting these practices to environmental performance. Although GHRM and green empowerment have been recognized as critical factors in enhancing employee performance, the specific role of green empowerment as a mediator between GHRM practices and proactive pro-environmental behaviors has not been thoroughly investigated. Existing studies often overlook how empowering employees with green initiatives can translate GHRM practices into tangible environmental performance outcomes [17, 18]. The influence of leadership on environmental performance has been acknowledged, but the moderating effect of green leadership on the relationship between GHRM practices and pro-environmental performance has received scant attention. Therefore, this study uses AET theory as a conceptual framework for understanding how GHRM practices influence task-related and broader proactive pro-environmental performance using the mediating variable green empowerment and the moderator of green leadership [12].

Hence, this study addresses the following research questions. First, does GHRM influence green empowerment? Second, does green empowerment mediate the relationship between GHRM, T-PEP, and P-PEP? Third, does green leadership moderate the relationship among GHRM and green empowerment? Therefore, the interplay between GHRM practices, green empowerment, and green leadership creates a conducive environment for promoting task-related and broader proactive pro-environmental performance among employees [20]. Effective GHRM practices lay the foundation, while green empowerment acts as the driving force and green leadership enhances the overall impact, ensuring a sustainable organizational culture.

2- Literature Review and Derivation of Hypothesis

2-1- Theoretical Foundation

This study model is based on two theories, such as Affective Events Theory (AET) and Transformational Leadership Theory (GLT). AET explains how attitudes influence job performance and behaviors [21]. The AET states that emotions are the response to an event in the work environment, for example, the nature of the job, leadership, and organizational factors. These work events trigger emotions that might be positive or negative as a reaction to and further affect job

performance and satisfaction [9]. The model proposed in this study is broadly consistent with the AET. GHRM (organizational feature), in interaction with green leadership (organizational feature), develops employees' attitudes toward green empowerment, which further leads to employees' pro-environmental behaviors (attitude-driven behavior).

GHRM practices create a supportive work environment that prioritizes environmental sustainability. These practices can include green training programs, green performance metrics, and environmentally focused incentives. According to AET, these practices are considered work environment features that influence employees' emotional states and attitudes towards pro-environmental behaviors [22]. Events such as green empowerment initiatives and interactions with green leaders serve as specific workplace events that trigger emotional and attitudinal responses. Green empowerment gives employees the necessary tools and authority to engage in pro-environmental behaviors, positively impacting their emotions and motivation [12]. Green leadership acts as a moderator by enhancing or buffering the effects of GHRM practices. Leaders who model and encourage green behaviors can amplify employees' positive emotional responses and proactive behaviors [23]. By applying AET, the GHRM practices shape the work environment, leading to emotional responses mediated by green empowerment and moderated by green leadership. These emotional responses enhance employees' proactive pro-environmental behaviors, both task-related and broader initiatives. Therefore, organizations aiming to improve environmental performance should focus on comprehensive GHRM practices, empower employees, and foster strong green leadership.

Furthermore, this study also applies transformational leadership theory (GLT), which emphasizes how green leaders inspire and motivate employees to exceed expectations by fostering a shared environmental vision, encouraging innovation, and modeling eco-friendly behaviors [24]. Transformational leaders influence employees' values and attitudes, thereby enhancing their green empowerment and commitment to pro-environmental actions [25]. This leadership style strengthens the effect of GHRM practices by creating an emotionally engaging environment where sustainable performance becomes a collective goal [26].

2-2- GHRM and Green Empowerment

Green empowerment is a motivating approach that urges employees to participate in more decision-making [27]. It inspires decision-making and breaks down barriers between staff and upper management. In addition, academics claim that "green empowerment" is a method by which employers share power with workers to address environmental challenges [28]. Employees are allowed to create novel solutions to environmental issues and make the greatest possible investments because of this [29]. In green environmental management practices, green-empowered employees can significantly improve the environment [30]. Green behaviors at an organizational level require a change in attitudes at the individual level, which is quite a difficult task. Because of the complexities of these issues, green-empowered individuals with diverse competencies are required to implement environmentally friendly management systems and effective solutions [14, 31].

HR can encourage staff members to participate in and start green and environmentally friendly ideas by empowering staff members as part of the green environmental performance enhancement strategies [32]. HR managers can emphasize the importance of creating a participatory work environment for top management since it allows employees to disagree with management, negotiate, and offer solutions to pressing issues. However, the importance of employee green empowerment and participation comes from the fact that staff members are free to decide how to address environmental issues and other concerns that could come up when putting environmental sustainability programs into practice [33]. Moreover, human resource managers can encourage green practices by connecting them with human resource functions in the organization, for example, by rewarding employees who adopt human resource practices [6, 21]. GHRM practices strengthen employee green empowerment by increasing skills, knowledge, and incentives for the organization's environmental performance [34]. Hence, it is proposed that;

H1*: GHRM positively impacts green empowerment in Pakistan's food manufacturing sector.*

2-3- Green Empowerment Relation with T-PEP and P-PEP

A prior study by Nimran et al. [35] established that empowerment is a potent mindset that can change how individuals behave at work. According to a study on green empowerment, employees who feel empowered by their jobs exhibit favorable green attitudes and behaviors because they are motivated internally [36]. According to Shahzad & Xu [27], an empowered green workforce has several advantages, such as enhanced dedication, increased productivity, and increased job satisfaction. Employees can contribute to their organizations' environmental sustainability by making responsible choices, optimizing current processes, and adopting environmentally friendly innovations [37]. From a certain viewpoint, green empowerment is "an endeavor involving the construction, enhancement, and amplification of power through collaboration, sharing, and collective effort". Employees can use green empowerment further to demonstrate environmentally friendly behaviors, including both required and optional actions, such as recycling, waste management, energy consumption reduction, turning off lights upon leaving the office, adopting double-sided printing practices, abstaining from disposable cup usage, aiding organizations in the implementations of eco-friendly strategies, opting for bicycles as a mode of commute, minimizing waste, and innovating new initiatives to safeguard the planet against environmental risks [9, 38].

In this context, Tiong et al. [39] reported that green empowerment encourages workers to engage in green practices, which assists the firm in attaining a competitive advantage. Furthermore, through GE, management can encourage employees to take personal initiatives and engage in environmentally friendly behaviors [7]. Previously, the general perception of management was that it simply took pro-environmental measures to meet social pressures and expectations [40]. However, it has recently been discovered that the combined efforts of both management and employees can significantly impact environmental preservation [41]. Employees' pro-environmental behavior can also be promoted if organizations engage in pro-environmental behaviors [19]. Encouraging employee engagement in environmental matters and promoting environmental behaviors is an effective approach to fostering environmental responsibility within organizations and enhancing environmental performance [7]. T-PEP and P-PEP are both classified under pro-environmental behaviors. Thus, the study proposed that;

H2*: Green empowerment has a positive impact on T-PEP.*

H3*: Green empowerment has a positive impact on P-PEP.*

2-4- The Mediating Role of Green Empowerment

Environmental concern has been integrated into a broader framework of human resource development, which implies that in an organization, a significant change in the context of sustainability can be brought about by changing human resource attitudes and behaviors by providing them with a green environment, such as green goals, policies, and strategies [27]. Similarly, the model presented in this study implies the same concept; on one extreme, organizations have adopted strategic green practices, for example, GHRM, and on the other extreme, the focus is on employees' green performance through changing their attitudes as a mediator [42]. The research by Ginsberg & Bloom [43] claimed that it's rather difficult to go green successfully without developing employees and implementing environmentally friendly strategies. Consequently, human resource practices are essential to long-term business development [44].

Human resource professionals enable companies to make green businesses by encouraging and empowering employees to think outside the box with environmentally friendly ideas and implement them further [6, 12]. Hence, green empowerment serves as a bridge between GHRM and employees' pro-environmental performance. In this context, Nimran et al. [35] stated that a green environmental management system highly emphasizes human resources initiatives that further generate greater efficiencies and better environmental performance at the employees' level. He responded that green empowerment among workers and their willingness to make suggestions are critical for long-term environmental success [45]. In addition, management must make a concerted effort to create a climate that encourages employees to develop themselves and feel comfortable offering suggestions [46]. Employee initiative should have the support and direction of management. According to Darvishmotevali & Altinay [21], the provision of green empowerment to employees can aid firms in achieving their green performance objectives. As a result, it is suggested;

H4*: Green empowerment positively mediates the relationship between GHRM and T-PEP.*

H5*: Green empowerment positively mediates the relationship between GHRM and P-PEP.*

2-5- Moderating Role of Green Leadership

Green leaders inspire their followers, manage change, alter perceptions and values, fostering innovative thinking and problem-solving competencies in the workforce to help organizations achieve environmentally friendly goals [19]. Moreover, the green leader has been claimed to foster employees' positive perceptions of the company's objectives, policies, and systems targeting environmental goals. Hence, organizations with green policies can integrate with leaders for effective policy and strategy implementation [47, 48]. The specific green leadership behaviors encompass setting an example, coaching, informing, demonstrating concerns, and facilitating participatory, environmentally friendly decision-making [49]. The green leader has a crucial influence on implementing GHRM concepts, objectives, goals, and policies [50]. Hence, GHRM practices transform an essential platform for senior managers to implement organizational friendly environmental strategies and visions [51]. When an organization aims for an environment-friendly goal, green leadership can effectively incorporate green goals in GHRM and, on the other hand, communicate them to employees, which can make a positive difference [52]. Moreover, scholars have established that green leaders can use intellectual nourishment to empower employees [17].

It is established by Gotsis & Grimani [53] that sharing certain decision-making authority by leaders with employees is a precondition for encouraging intellectual stimulation in them. Employees with decision-making authority repay leaders' trust by achieving organizational objectives and goals. The delegation of authority gives employees the sense that they are admired and valued by the organization. In response, they participate in mandatory and voluntary behaviors [54]. Hence, it can be concluded that when green leaders delegate decision-making authority to subordinates, they feel empowered and work towards the organization's green goals. Further establish that when an organization adopts the empowerment approach, some amendments must be made in its environment to support the execution of this strategy. One of the most crucial success elements for empowerment is the modification of management and leadership styles [55]. According to He et al. [56], green empowerment is not a simple process because it requires coordination of the

responsibilities and activities of the organization, management, and personnel. However, this process is intricate, with overlapping procedures; it is impossible to generate green empowerment in an unsuitable production and creativity environment where leadership support is lacking. Particularly, some recent studies have claimed that green leaders tend to stimulate green empowerment in employees, provided a conducive environment is given by management [37, 57]. Thus, the study proposed that;

H6*: Green leadership positively moderates the association among GHRM and green empowerment.*

2-6- Theoretical Framework

The current study has suggested a conceptual framework while considering the theoretical foundation and literature evaluation for formulating the hypothesis used by affective event theory. The current study has suggested a conceptual framework for examining the independent variable GHRM, the dependent variables T-PEP and P-PEP, the mediator as green empowerment, and the moderator as green leadership. Figure 1 demonstrates the conceptual framework.

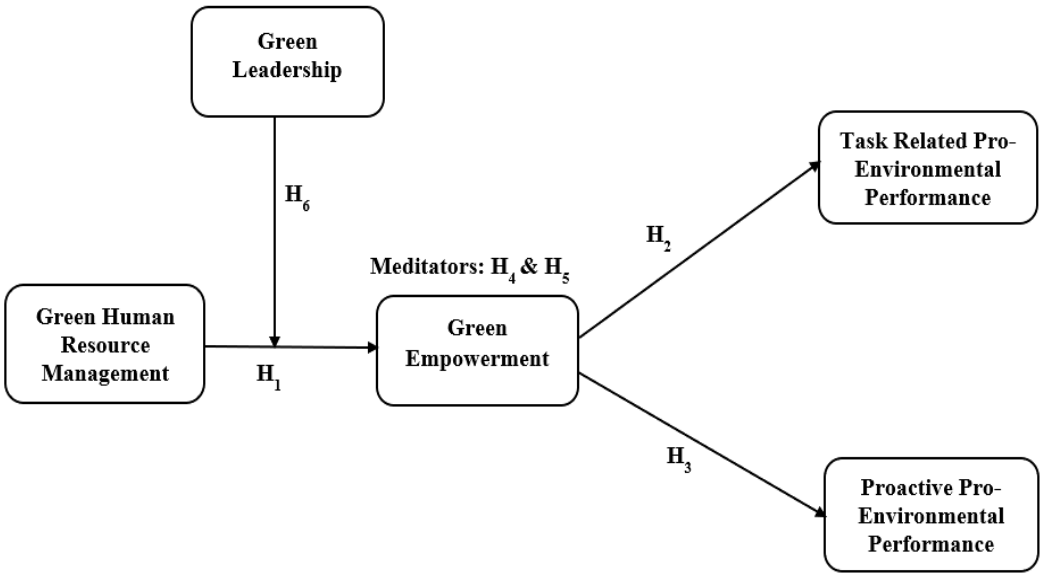

Figure 1. Conceptual framework

3- Research Methodology

Using this quantitative survey methodology, the study aims to provide empirical evidence on how GHRM practices influence pro-environmental performance in the food manufacturing sector of Pakistan, with insights into the roles of green empowerment and green leadership. This study chooses the food manufacturing sector, because this sector significantly contributes to environmental pollution due to waste generation, water usage, and energy consumption. Implementing GHRM practices can have substantial environmental benefits. This sector is a major part of Pakistan's economy, employing many people and contributing significantly to GDP [58]. Studying this sector can provide insights with broad economic implications. Furthermore, this sector has a high potential for improvement in environmental performance through GHRM practices, making it a fertile ground for research.

A cross-sectional study was carried out to measure the conceptual framework variables. Six food-sector organizations with certification of ISO 14001 in Pakistan volunteered to participate in the survey. GHRM data were collected from a company-allocated officer from the human resource department. Data for the other variables were collected from middle-level employees of the selected organizations. The targeted personnel were chosen at random from different organizational departments. All participants were made aware of the aim of the study and given assurances about the privacy of their personal data. The human resources divisions of the targeted companies provided employee email lists. With the consent of each employee's supervisor, the researchers personally contacted the workers. Since middle-level personnel have sufficient language skills to understand and respond to questions in that language, the questionnaire was written in English. There are two primary sections to the questionnaire. In the first section, demographic data like age, gender, and organization were gathered. The operational definitions of all the variables were presented in the second section, followed by questions to ensure respondents understood the concepts as they answered the questionnaire.

In addition, a convenience sample is taken into account while examining the anticipated conceptual framework variables. Nonetheless, upper managers, middle managers, and lower managers from every functional department in the food industry located in Pakistan participated in the current study. Lahore is a major industrial and economic hub of Pakistan, with a well-established food manufacturing sector that reflects urban consumer trends and industrial practices.

Its diverse market and accessibility to skilled labor make it a strategic choice for data collection. 500 questionnaires were distributed to randomly chosen employees; 452 responded to the survey, and 312 were deemed useful, yielding a response rate of 62.4%. The sample size was adequate to conclude because it complied with research's guideline that the Smart PLS 4.0 technique requires at least 150 sample sizes [59]. PLS-SEM is a high-level modeling approach that uses t-values to examine the link between the inner model and the PLS method. Men comprised 53.5% of the responders, while women comprised 46.5%. Details of demographics are provided in Table 1.

Table 1. Participant specification

Characteristic	Categories	n = 312	%
Gender	Male	167	53.5
	Female	145	46.5
Age	18-27	111	35.6
	28-37	83	26.6
	38-47	54	17.3
	48-57	43	13.8
	More than 57	21	6.7
Education	Bachelor	110	35.2
	Master	140	44.87
	PhD	62	19.87
	Others	0	0
Position	Upper Manager	70	22.43
	Middle Manager	160	51.28
	Lower Manager	82	26.28
Professional experience	1-5 years	90	28.84
	6-10 years	160	51.28
	11-15 years or above	62	19.87

3-1-Sampling Procedure

A convenience sampling procedure is used to acquire research data from food manufacturing industries in Lahore, Pakistan. The evidence for analysis is typically acquired by visiting the industry and comprehensively explaining the research purpose to each respondent. Furthermore, respondents are provided with a comprehensive questionnaire to complete and return to the concerned person. The survey questionnaire involves the demographic and item information of each construct. More specifically, the questionnaire survey data is gathered over 25 days.

3-2-Survey Development and Measure

The research questionnaires have been segregated into two constituents. Hence, the first part contains demographic details, while the second part is composed of the survey of the GHRM, T-PEP, P-PEP, green empowerment, and green leadership. Therefore, participants are required to fill out a complete questionnaire prepared via Google Forms over live communication. Moreover, Table 2 provides a more comprehensive explanation of the measurement items for the respective latent variables used to scrutinize food manufacturing managers' performance. To endorse the reliability and validity of the present investigation, we have applied measurement scales from pre-existing and well-defined scales in the present study. For variables, a measurement was used on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). For GHRM, six items were derived from Shen & Benson [59]. A six-item scale was adapted for the measurement of green empowerment [60]. P-PEP was measured by three items that were adapted from Bissing-Olson et al. [61]. T-PEP was measured by three items adapted from Bissing-Olson et al. [61]. For the green leadership, five items were adapted from Mittal & Dhar [62]. Details are provided in Appendix I.

4- Analysis and Results

The analysis section summarizes the findings of the hypothesis testing. Statistical software SPSS 22.0 and SmartPLS 4 were used for data analysis. To check the variability and reliability, we used PLS-SEM via SMARTPLS4 [63]. Mediating and moderating analyzing through the PLS-SEM method. The findings' discussion is divided into many sections. The first portion covers the model's validity and reliability of the latent constructs. The next section presents correlation coefficients for each variable to show how strongly and in what direction they are related.

4-1- Control Variable

The control variable is very important. It's part of a research survey and can affect the experiment's result. In this research, control variables include age, gender, and organization. There is no correlation between the control and independent, dependent, mediating, and moderating variables. So, this research uses only dependent, independent, mediating, and moderating variables for data analysis and results.

4-2- Reliability and Validity of Variables

First, the PLS-SEM method is used to validate the important parameter measurement model in the present investigation. In this paradigm, the variables' convergent validity is verified by applying confirmation factor analysis (CFA). Furthermore, Cronbach's Alpha is used for internal consistency and reliability of all variables shown in Table 2. It demonstrates how closely the items in each construct are related to one another. A score of at least 0.7 is necessary to prove that a measurement is internally consistent [64]. Loading values of items measured using SmartPLS-4 are represented in Table 2. If the values of items are greater than 0.5, it means that the model meets convergent validity. Convergent validity ensures that items accurately reflect their corresponding factor [65]. Similarly, it demonstrates the extent to which one factor positively correlates with another factor of the same construct. CR and AVE are also used for the internal consistency of all variables. The values of all variables are placed in the range. Therefore, our study model is highly reliable.

Table 2. Reliability and validity

Variables	Items	Outer loadings	Cronbach alpha	CR	AVE
Green Human Resource Management (GHRM)	GHRM1	0.972	0.992	0.994	0.963
	GHRM2	0.966			
	GHRM3	0.988			
	GHRM4	0.980			
	GHRM5	0.985			
	GHRM6	0.996			
Green Empowerment (GE)	GE1	0.767	0.929	0.945	0.741
	GE2	0.829			
	GE3	0.884			
	GE4	0.901			
	GE5	0.894			
	GE6	0.884			
Green Leadership (GL)	GL1	0.855	0.939	0.952	0.799
	GL2	0.908			
	GL3	0.903			
	GL4	0.906			
	GL5	0.896			
Task-related Pro-Environmental Performance (T-PEP)	T-PEP1	0.923	0.910	0.943	0.847
	T-PEP2	0.938			
	T-PEP3	0.900			
Pro-active Pro-Environmental Performance (P-PEP)	P-PEP1	0.903	0.874	0.923	0.799
	P-PEP1	0.914			
	P-PEP1	0.864			

The result shows that all loading values of items are above 0.7. That identifies this model meets convergent validity. The loading values of items that are measured are placed in a range. The model has convergent validity if the item values are greater than 0.5. Convergent validity is used to ensure that items accurately reflect their corresponding factor [66]. Similarly, it demonstrates the extent to which one factor positively correlates with another factor of the same construct [67]. Discriminant validity measured through PLS-SEM is shown in Table 3. Discriminant validity is used to ensure that each study variable is different from the others [68]. The threshold value for AVE squared is > 0.7. While employing reflective measurement, analyzed by goodness of fit (GOF).

Table 3. Discriminant validity

Variables	GE	GHRM	GL	PPEP	TPEP
Green Empowerment	**0.861**				
Green Human Resource Management	0.563	**0.981**			
Green Leadership	0.293	0.322	**0.894**		
Proactive Pro-environmental Performance	0.801	0.493	0.269	**0.894**	
Task-related Pro-environmental Performance	0.734	0.690	0.243	0.709	**0.920**

4-3- Hypothesis Testing

To verify statistical significance, a bootstrapping procedure with 5000 resamples was applied to the structure model to determine all PLS-SEM tests [69]. Regression analysis determines a direct relationship between GE, GL, GHRM, T-PEP, and P-PEP. Direct and indirect connections are shown in Table 4. The results of the hypothesis show that GHRM positively influences green empowerment with values (β = 0.485, t = 9.751, p = 0.000). Green empowerment positively influences T-PEP with values (β = 0.734, t = 16.926, p = 0.000). Green empowerment positively influences P-PEP with values (β = 0.801, t = 22.611, p = 0.000). For meditation analysis, green empowerment positively mediates the association among GHRM and T-PEP with values (β = 0.356, t = 7.039, p = 0.000). Green empowerment positively mediates the association among GHRM and P-PEP with values (β = 0.388, t = 8.345, p = 0.000). For moderation analysis, green leadership positively moderates the association among GHRM and green empowerment with values (β = 0.162, t = 2.664, p = 0.008). Results show that the R square value of GE = 0.350, P-PEP = 0.641, and T-PEP = 0.539, respectively. GoF indicates a good fit for our model; our study GoF is considered in range. Figure 2 shows all regression analysis results.

Table 4. Hypothesis testing

Path	β-values	STDV	t-values	p-values	Results
GHRM → GE (H1)	0.485	0.050	9.751	0.000	Accepted
GE → T-PEP (H2)	0.734	0.043	16.926	0.000	Accepted
GE → P-PEP (H3)	0.801	0.035	22.611	0.000	Accepted
GL → GE	0.201	0.054	3.708	0.000	Accepted
GHRM → GE → T-PEP (H4)	0.356	0.051	7.039	0.000	Accepted
GHRM → GE → P-PEP (H5)	0.388	0.046	8.345	0.000	Accepted
Moderating Effect of GL (H6)	0.162	0.061	2.664	0.008	Accepted

Note: GHRM = Green human resource management; GE = Green empowerment; T-PEP = Task related pro-environmental performance; P-PEP = Proactive pro-environmental performance; GL = Green leadership.

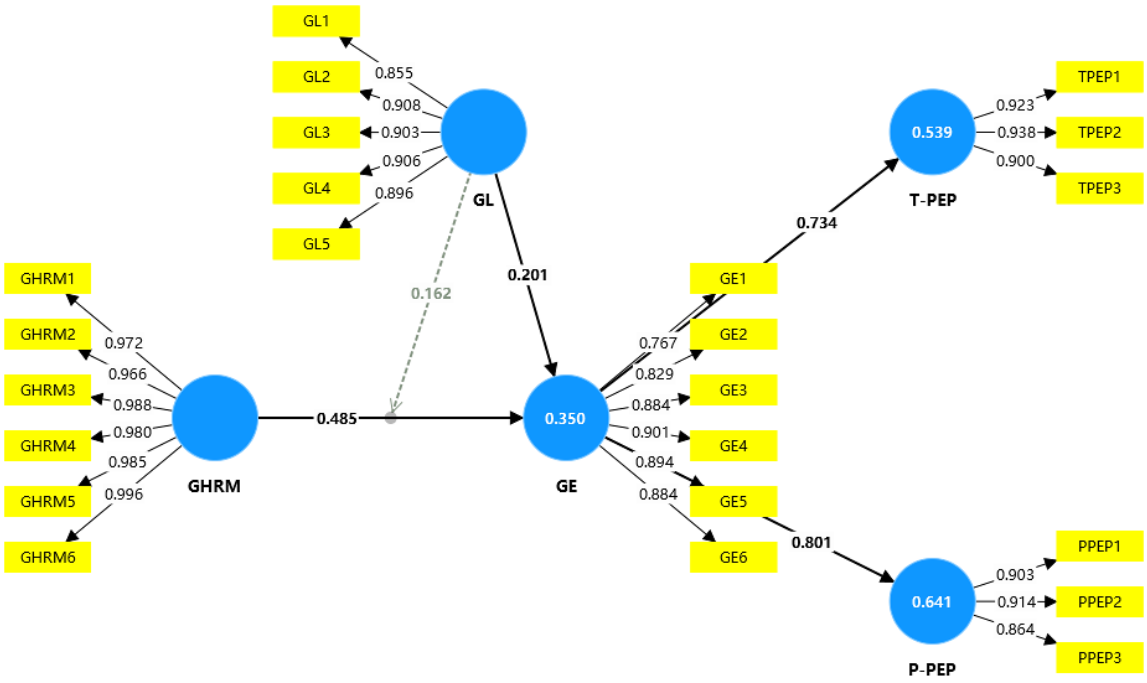

Figure 2. PLS-diagram

5- Discussion

The study highlights the significant impact of GHRM practices on employees' proactive pro-environmental behaviors, mediated by green empowerment and moderated by green leadership. By incorporating green practices into HRM systems, empowering employees, and promoting green leadership, organizations can effectively promote a culture of environmental sustainability and enhance their overall environmental performance [29]. The food manufacturing industry significantly impacts the environment through energy and water usage, waste production, and greenhouse gas emissions.

This study has three main findings. Firstly, study results indicate that GHRM significantly influences green empowerment in the context of Pakistan's food manufacturing industry. The GHRM comprises several functions of HRM: recruitment, selection, training, appraisal, promotion, and compensation. Results show that all dimensions effectively generate pro-environmental behaviors. However, previous research has supported the positive and significant relationship between green selection, recruitment, training, and employees' pro-environmental behaviors [34]. This pattern might depict those employees only getting motivated when they think the organization recognizes and compensates for their efforts toward a social cause [70]. This implies that having environmental awareness or getting it through training does not empower employees enough to instigate pro-environmental behavior. Compensation in any form (promotion, monetary or non-monetary) can be a useful tool to catalyze pro-environmental behaviors at the individual level through green empowerment [71].

Secondly, green empowerment significantly mediates the relationship among GHRM and both P-PEP and T-PEP. As past studies showed, providing career development opportunities to employees as a part of compensation gives them a feeling of empowerment over their lives, eventually leading to P-PEP and T-PEP [72]. This study further proves the positive and significant relationship between green empowerment and employees' pro-environmental behaviors. This complies with the previous research that claims that organizations can empower their employees by rewarding and encouraging them to provide suggestions and initiatives for environmental improvement [6, 39]. This study established that green empowerment fully mediates the relationship between GHRM, T-PEP and P-PEP. The mediation role of green empowerment is in line with previous research, as they have claimed that green empowerment generated by organizational policies, such as GHRM, further leads to pro-environmental behaviors of employees [73].

Thirdly, this study proves the significant moderating effect of green leadership between GHRM and green empowerment. In this context, previous literature has claimed that their leaders' behavioral patterns influence employees through close observation and internalization of the leader's values [74]. Moreover, researcher also explains that in suitable circumstances, leaders can influence their subordinates by idealizing influence and inspiring them through their personality, motivational individualized consideration, and intellectualism. Another explanation that justifies the integrative relationship of GHRM and green leadership on green empowerment and, ultimately, on the pro-environmental behaviors of employees is that leaders can provide monetary and non-monetary compensation. Monetary compensation is achieved through appraisal and promotion, and non-monetary compensation is achieved in the form of praise, acknowledgment, and participation in decision-making. This monetary and non-monetary compensation further leads to generating the feeling of empowerment in subordinates and ultimately molds their behaviors [75].

Adopting sustainable practices is essential because the sector comprises frequently resource-intensive operations, such as using raw materials, electricity, and water. Businesses may be compelled to implement green practices by the Pakistani government's growing regulatory emphasis on sustainability and environmental requirements. Companies are incentivized by the market to enhance their environmental performance due to the growing consumer demand and awareness for eco-friendly products. Companies can stand out in the market and obtain a competitive edge by implementing GHRM principles successfully and exhibiting great environmental performance [43]. Reducing waste and using resources efficiently can result in large cost savings, increasing the business's total profitability. Environmental performance can significantly increase when employees are given the knowledge, abilities, and authority to take pro-environmental measures. Leadership's dedication to environmental objectives is essential. Green leaders have the potential to develop a sustainable culture that inspires workers to take proactive measures to protect the environment.

5-1- Theoretical and Practical Contributions

The current study contributes significantly to GHRM studies by outlining a mechanism by which GHRM can be successfully translated into pro-environmental behaviors at the individual level, specifically in a setting where environmental protection is a direct concern, like the food manufacturing industry. Second, we use the AET theory in my study model to clarify how GHRM influences proactive environmental behaviors through green empowerment. It supports the principles of AET by balancing the importance of green empowerment with the effects of green HRM on proactive and task-related P-PEP. Additionally, prior research had limitations regarding the mediating mechanism between GHRM and the two primary subtypes of employees' green behavior, P-PEP, and T-PEP, so this study intended to close this gap [76]. Third, this study uses the transformational leadership theory to support the green leadership moderating function in the model. This research advances the idea by demonstrating that green leadership can encourage employees to demonstrate pro-environmental behaviors above and beyond the requirements of their jobs. Most

importantly, the data demonstrate that green leadership must collaborate closely with the GHRM department to produce better and more meaningful effects to accomplish certain job outcomes or attitudes. Generally, this study provides evidence to encourage pro-environmental behaviors by assessing the role of green-oriented organizations and green leadership in supporting individuals' green behaviors.

This research provides valuable insights relevant to decision-makers, professionals, scholars, and organizations. In addition, leaders can be crucial in implementing pro-environmental strategies to encourage staff members to adopt green behaviors. It is crucial to emphasize that green consideration should begin at the first stage of strategy and policy creation. This study has demonstrated that large industries' environmental sustainability responsibilities are more crucial than individuals' responsibilities. In other words, green planning and practices may have a greater impact on generating sustainable activities at the macro level. These groups have a significant societal impact on the effort to address the worldwide environmental sustainability problem [77]. As a result, they must adopt a transformational strategy to include environmental values in their plans and methods by implementing the worldwide standards of conduct that demand environmental impact statements in Pakistan. In particular, we advise incorporating green principles into employee incentives, rewards, and performance measuring procedures. Pro-environmental actions can be incentivized and acknowledged through both intrinsic and extrinsic rewards. For instance, cash bonuses represent an extrinsic incentive that encourages positive conduct. On the other hand, recognizing employees as the green employee of the month constitutes an intrinsic reward, celebrating exemplary pro-environmental behavior. Leadership should also provide a clear "green orientation" and assist staff in achieving green organizational goals for the good of the neighborhood, society, nation, and planet. Green leaders should constantly challenge the current quo and reshape their companies to adopt more proactive measures for everyone's environmental preservation and awareness.

6- Conclusion

The study on promoting employees' pro-environmental behaviors through GHRM practices and leadership culminates in several pivotal conclusions that reinforce the importance of environmental sustainability in the workplace and highlight the crucial roles that HRM practices and leadership styles play in fostering an eco-friendly organizational culture. This study has three main findings after analysis. Firstly, the findings underscore that GHRM significantly influences green empowerment in Pakistan's food manufacturing industry. Practices such as eco-friendly job design, green training and development, environmental performance appraisals, and green rewards and recognition have significantly influenced employees' attitudes and behaviors towards the environment. Secondly, green empowerment significantly mediates the relationship among GHRM and both P-PEP and T-PEP. Thirdly, green leadership significantly moderator the relationship between GHRM and green empowerment. Leadership styles emphasizing transformational, participative, and ethical dimensions effectively motivate employees towards pro-environmental behaviors. Moreover, this study reinforces the notion that promoting pro-environmental behaviors in the workplace requires a holistic approach that combines effective green HRM practices with strong, supportive leadership. Organizations that integrate these elements into their operations will advance their sustainability agendas and gain a competitive edge in the increasingly eco-conscious business landscape.

6-1- Limitations and Future Research

Despite these implications and contributions, this research has some limitations that can be used as research ideas in the future. First, this research focused on GHRM practices to provide insights into pro-environmental behaviors and generate interesting results. Future research would concentrate on a particular green management strategy, including green training or personnel hiring standards. Future research might also look at possible GHRM outcomes, like green consumer behavior or creativity. Second, our findings can be strengthened by incorporating additional organizational and individual elements, like green empowerment, to clarify the mediation process. It is also suggested that future studies be done to explore additional moderating options, such as intrinsic rewards and supervisory personality qualities, that may increase the links between GHRM and pro-environmental behavior. Third, given that our study was a cross-sectional quantitative study, future research can be extended using a longitudinal, qualitative, or mixed approach. Fourth, this study is limited to the food manufacturing sector in Pakistan. Future studies would consider other industries or regions with different cultural, economic, and environmental conditions. Lastly, green leadership was considered a moderating variable in this study. For future studies, potential moderating factors such as organizational culture, size, or regulatory environment were not examined, which might also influence the studied relationships.

7- Declarations

7-1- Author Contributions

Conceptualization, F.S. and M.U.A.; methodology, M.F.S., and J.M.M.; software, F.S.; formal analysis, M.U.A. and J.M.M.; data curation, J.M.M. and M.F.S.; writing—original draft preparation, M.F.S., F.S., and J.M.M.; writing—review and editing, M.U.A. and M.F.S. supervision, F.S. All authors have read and agreed to the published version of the manuscript.

7-2- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7-3- Funding

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7-4- Institutional Review Board Statement

Not applicable.

7-5- Informed Consent Statement

Not applicable.

7-6- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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Appendix I: Measures of Variables

ID	Questions	References
	Green human resource management	
GHRM1	My company considers the environment friendly-employees fit in hiring and choosing candidates.	[59]
GHRM2	My company offers sufficient green training to promote environment friendly as a fundamental principle of the firm.	
GHRM3	My company offers eco-friendly training programs to enhance employees' abilities to engage with stakeholders effectively and communicate efficiently.	
GHRM4	My company considers employee environment-friendly performance when making promotion decisions.	
GHRM5	My company incorporates workers' green performance into their performance appraisals.	
GHRM6	My company ties employee green performance to rewards and compensation.	
	Task-related P-EP	
T-PEP1	I Proficiently fulfill assigned duties using environmentally friendly methods.	[61]
T-PEP2	I execute the responsibilities outlined in my job description using an environmentally sustainable method.	
T-PEP3	I carry out tasks expected of me using environmentally conscious methods.	
	Proactive P-EP	
P-PEP1	I seize the opportunity to engage actively in environmental protection initiatives at work.	[61]
P-PEP2	I proactively take action to behave in environmentally friendly ways at work.	
P-PEP3	I go above and beyond expectations in contributing to environmental efforts at work.	
	Green empowerment	
GE1	In my company, employees can openly and freely express their environmentally friendly opinions without fear of retaliation.	[60]
GE2	In my company, we often employ teamwork to address issues in the environmental management system.	
GE3	My company frequently uses cross-functional teams to promote environmentally friendly protection initiatives.	
GE4	In my company, senior management fosters employee input to enhance environmental performance by establishing environmental suggestion schemes.	
GE5	I feel comfortable discussing environmentally friendly concerns with a manager besides my direct supervision.	
GE6	In my company, managers and supervisors rarely allow employees to take necessary action related to environmental protection.	
	Green leadership	
GL1	The leader articulates a coherent environmental vision for employees to adhere.	[62]
GL2	The leader motivates employees with environmental strategies.	
GL3	The leader encourages collaboration among employees towards shared environmental objectives.	
GL4	The leader motivated employees to attain the environmental objectives.	
GL5	The leader considers the employees' environmental values when making decisions.	