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ENHANCING EMPLOYEES' COMMITMENT TOWARDS SUSTAINABLE ENVIRONMENT VIA GREEN HUMAN RESOURCE MANAGEMENT: A CASE FROM CHEMICAL INDUSTRY OF PAKISTAN

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ABSTRACT

This research attempts to investigate the interplay of Green Human Resource Management and Pro-environmental Behaviors (PEBs) using GOC as a mediator variable in Pakistan's chemical industry. The Structural Equation and Partial Least Squares techniques are employed for estimation purposes.. The research established that GHRM produces positive effects on PEB and GOC, while GOC generates positive effects on PEB. GOC strengthens the connection between GHRM and PEB, thus demonstrating its ability to enhance GHRM's influence on sustainable workplace behaviors. The findings suggest that effective GHRM enhances employee motivation, skills, and engagement in eco-friendly practices, ultimately improving productivity and organizational sustainability. Organizations should integrate environmental values into HR policies, training programs, and incentive structures to cultivate a green organizational culture. However, the study's focus on Pakistan's manufacturing sector limits its generalizability. Future research should examine other industries, conduct cross-country comparisons, and explore additional mediators using larger samples for a comprehensive understanding of these relationships.

1. INTRODUCTION

The growing awareness of environmental degradation has driven businesses to incorporate environmentally sustainable initiatives into operational frameworks. **This strategic shift serves a dual purpose** strengthening competitive advantage while reducing ecological impact (Afsar & Umrani, 2020; Dahiya, 2020; Kautish & Sharma, 2020). HRM contributes significantly to facilitating the transition toward organizational environmental sustainability (Renwick et al., 2016). In response, HR practitioners have increasingly incorporated eco-conscious considerations into traditional HRM functions, leading to the emergence of GHRM. The incorporation of environmentally sustainable initiatives into organizational operations drives a systemic transformation, impacting a wide range of essential functions. This "greening" process requires modifications in supply chain management, production methods, waste disposal and processing, as well as fundamental aspects of organizational culture. These include core values, strategic direction, operational decision-making, and employee behavioral patterns, all of which must align with sustainability objectives (Dahiya, 2020; Kautish & Sharma, 2020).

The evolving landscape of corporate responsibility has shifted from a singular focus on profit maximization to the integration of environmental sustainability, necessitating the strategic employment of HRM practices. Businesses committed to sustainable development increasingly rely on HRM to drive green initiatives (Kim et al., 2019). Empirical research highlights GHRM as a key mechanism for advancing organizational environmental sustainability (Ren et al., 2020). Fawehinmi et al. (2020) further emphasize HRM in promoting awareness and embedding sustainability targeting employee education and training programs. These initiatives seek to reshape employee attitudes and behaviors, aligning them with sustainable organizational practices. Mishra (2017) explores the operationalization of GHRM by integrating sustainability principles into core HRM functions, including compensation, workforce planning, recruitment, selection, development, training, and performance appraisal. This comprehensive approach ensures that sustainability objectives are deeply embedded within human capital management frameworks.

Much research has been conducted regarding GHRM, especially in areas such as employee commitment, corporate environmental sustainability, supply chain management, and financial performance of corporations. Although GHRM has been widely recognized by both scholars and practitioners, an important gap persists in the knowledge of GHRM on how it motivates employees for pro-environmental attitudes and behavior. It is imperative to address the gap to reduce corporate environmental impact and encourage sustainable business operations.

Within the GHRM framework, pro-environmental behaviors (PEBs) are recognized as key drivers of organizational sustainability. PEBs serve as catalysts for improved environmental performance (Lülfs & Hahn, 2013). Despite growing interest in the relationship between GHRM and employee environmental behaviors, such as PEBs, the mechanisms underlying this connection remain relatively underexplored. The paper consists of five sections, beginning with the introduction, followed by the literature review, methodology, results, conclusions, and recommendations.

The study attempts to achieve two objectives
1. To explore GHRM 's direct relation to pro-environmental behaviors (PEBs) among chemical industry staff in Pakistan
2. To examine how GHRM initiatives influence PEBs, modelling the Green Organizational Culture (GOC) as a mediator and ESSL as a moderator within the GHRM-PEB framework.

2. LITERATURE REVIEW

2.1. GHRM

GHRM integrates HRM practices with organizational sustainability goals, actively targeting environmentally sustainable initiatives. Ability, Motivation, Opportunity, and Social Identity Theory have been used to analyse GHRM practices.

According to AMO employee performance derived from ability, motivation, and opportunity. Applied to GHRM, **this implies that organizations can** (1) develop employees' green competencies, (2) implement green performance evaluations and incentives, and (3) foster participation and autonomy to promote eco-friendly workplace behaviors (Amrutha & Geetha, 2020).

Social identity theory, on the other hand, explains how individuals define themselves through group affiliations (Hogg & Turner, 1987). In an organizational context, employees who identify with a green workplace culture are more likely to adopt pro-environmental behaviors, enhancing sustainability performance (Kim et al., 2019).

2.2. Relationship between GHRM and PEB

Pro-Environmental Behaviors (PEBs) are

measurable employee actions that support environmental sustainability within companies (Wesselink et al., 2017). These voluntary efforts go beyond regular duties and include energy conservation, using stairs over elevators, reducing paper waste, and proposing eco-friendly initiatives (Cheema et al., 2020). Employee-driven environmental efforts are crucial for organizational success (Baughn et al., 2007). Effective sustainability initiatives depend on PEBs, which also enhance financial performance and job satisfaction (Robertson & Barling, 2013; Norton et al., 2014).

Properly communicated GHRM practices boost participation in workplace sustainability initiatives (Zibarras & Coan, 2015). Studies show GHRM encourages green attitudes in various sectors, from hospitality to academia (Kim et al., 2019; Anwar et al., 2020). Reward systems and training on environmental management further enhance employee engagement in pro-environmental activities (Ari et al., 2020; Tseng et al., 2013). **The following statement is a hypothesised**

H1: GHRM positively impacts PEB.

2.3. Relationship between GHRM and Green Organizational Culture (GOC)

GOC incorporates organizational members' beliefs, values, and behaviors toward environmental sustainability. The HRM department contributes to shaping this culture by integrating green practices into hiring, development of the staff through training, and appreciation arrangement. Pellegrini et al. (2018) emphasized that HR strategies enhance employee commitment to sustainable growth. Attaianese (2012) further highlighted that employee training fosters a green corporate culture.

Leadership, communication, empowerment of the staff, and peer engagement are critical in shaping organizational culture (Srinivasan & Kurey, 2014). Arda et al. (2018) demonstrated that integrating quality and environmental governance systems enhances business performance. GHRM initiatives contribute to GOC by embedding sustainability into leadership development, peer collaboration, and incentive structures (Jabbour et al., 2016). Organizational culture significantly influences environmental policies and behaviors (Newton & Harte, 1997; Howard-Grenville & Bertels, 2012). Culture shapes employee perspectives, guiding environmental engagement and operational success (Daft, 2014; Cadden et al., 2013). Research links GOC to adopting green practices, emphasizing the need for clear communication of eco-values (Fernandez et al., 2003; Gürlek & Tuna, 2018). A strong GOC

enhances employees' green behavior (Lu et al., 2020), making it essential for effective environmental initiatives (Ahmad, 2015). Organizational norms influence employees to align with green governance strategies (Parr, 2012), reinforcing that GOC shapes pro-environmental attitudes and actions (Chen, 2011). The below hypothesis is constructed.

H2: GHRM positively influences GOC

2.4. Relationship between GOC and PEB

Organizational culture shapes environmental policies and behaviors (Newton & Harte, 1997; Howard-Grenville & Bertels, 2012). As a core framework of shared beliefs, it guides transformation and internal alignment, influencing business success (Daft, 2014; Cadden et al., 2013). A strong organizational culture enhances employee engagement in sustainability (Hilman et al., 2019; Rad, 2006).

GOC plays a key role in implementing green initiatives, as management efforts are ineffective without employee alignment Fawehinmi, et.al. 2020; Gürlek & Tuna, 2018). Organizational values directly impact employees' pro-environmental behaviors (Lu et al., 2020), making GOC essential for successful sustainability programs (Ahmad, 2015). GOC fosters consistent environmental performance by aligning employees with green norms and governance practices (Azzone & Noci, 1998; Parr, 2012). It shapes employees' attitudes and behaviors, reinforcing eco-friendly actions within organizations (Chen, 2011). The proposed hypothesis is

H3: Organizational Culture (GOC) positively influences PEB

2.5. Green Organizational Culture (GOC): A Mediator

GOC and shared values help organizations translate strategy into eco-friendly individual and collective actions (Chen et al., 2020). HRM influences organizational performance by shaping efficiency, costs, and revenues (Becker & Gerhart, 1996). Effective HRM systems enhance performance through hiring, rewards, and employee motivation (Jiang et al., 2012). However, environmental studies often overlook how organizational performance mediates environmental outcomes (Khan & Sukhotu, 2020; Lopez-Gamero et al., 2009).

A strong green culture fosters environmental performance once employees understand GHRM (Roscoe et al., 2019). Shared beliefs and attitudes create a collective mindset that supports sustainability (Pellegrini et al., 2018). Implementing green rewards, hiring practices, and sustainability-

focused policies strengthens GOC (Amini et al., 2018).

An employee-centered green culture promotes eco-friendly behaviors, benefiting both environmental performance and well-being (Temminck et al., 2015). Organizational culture also shapes environmental policies and practices by influencing discourse and norms (Howard-Grenville & Bertels, 2012). As culture guides behavior, GOC acts as a mediator between GHRM and pro-environmental attitudes.

H4: GOC plays a mediation role between GHRM and PEB.

2.6. *Moderating Role of Environmentally Specific Servant Leadership (ESSL)*

A servant leader who values environmental responsibility and supports employees' green behaviors fosters their confidence as pro-environmental citizens in a socially responsible organization. ESSL enhances employees' perceptions of their organization as a socially conscious entity, encouraging eco-initiatives and pro-environmental attitudes through role modeling (Farrukh, et.al. 2022; Rodgers, 2010).

Servant leadership is known for its role in changing the outcomes in individual, group and organizational levels (Eva et al., 2019; Van Dierendonck et al., 2017). Focusing on environmental leadership, recent studies extend the concept to include these concepts.(Luu, 2020; Tuan, 2020, Ying et al., 2020). Tuan (2020) termed ESSL as leadership which empowers, nurtures, and enables employees to become pro-environmental citizens and displays humbleness, authenticity, and stewardship when it comes to sustainability of efforts. This aligns with the concept of "green servant leadership," which emphasizes fostering environmentally responsible behaviors (Luu, 2020). Based on this, we propose:

H5: ESSL positively moderates between GHRM and PEB.

3. RESEARCH METHODOLOGY

A survey is used in the study to achieve these objectives. Survey is one of the research methods in collecting information and data from a group or sample of individuals or a population (Sekaran and Bougies, 2016). Surveys are an exemplary method for gathering data from many respondents in a systematic and structured manner. Therefore, they are suitable in being used with various topics such as opinions, behaviors, and characteristics (Churchill and Lacobucci, 2004). In addition, a survey is usually a convenient means to obtain data from a large and heterogeneous sample. They help researchers put out a word wide message in comparatively less time (Sekaran and Bougies, 2006).

3.1. Population and Sample

A cross-sectional survey design is adopted since we can capture the information at one point in time.. The population of the study was employees of the chemical industry in Pakistan, such as the chemical, fertilizer, and pesticide sectors. Questionnaires were distributed to 250 respondents using a simple random sampling technique. Two hundred and ten responses were collected as valid and complete; the response rate was 84%.

3.2. Research Instrument & Procedure

For the purpose of the questionnaire adaptation, we used (Dumont et al., 2017; Ansari et al., 2021; and Fraj et al., 2011). The privacy of respondents' identities has been ensured. The survey used a five-point Likert scale. The researcher engaged directly with relevant management personnel to gather accurate data. These interactions involved explaining the study's purpose, ensuring data confidentiality, and discussing survey distribution. Formal permission was obtained before administering questionnaires to employees, who received detailed participation instructions to mitigate social desirability bias (Podsakoff & Organ, 1986).

Several measures were taken to address the issue of Common Method Variance (CMV): dimensions and variables were not labeled to prevent participants from inferring the study's purpose, anonymity was assured, sealed envelopes were provided for confidentiality, and respondents were encouraged to answer candidly, emphasizing the absence of right or wrong responses. We conducted our survey from September to November 2023 to track and evaluate all necessary data during this period.

3.3. Data Analysis

The study analysed the proposed model using Structural Equation Modelling (SEM) based on Partial Least Squares (PLS). Smart PLS 3.2 software was utilized for this purpose. PLS-SEM is an advanced statistical technique designed to estimate relationships between variables, particularly when latent constructs are involved. It shares similarities with regression techniques while offering distinct advantages.

First, PLS-SEM enables the estimation of relationships between indicators and their respective latent constructs, encompassing both measurement

and structural models. Second, it has been widely recognized for its effectiveness in mediation research frameworks (Hair et al., 2017). Third, PLS-SEM features a user-friendly graphical interface, making it more accessible than other path modeling software such as AMOS. Finally, it is a widely adopted and robust analytical technique, extensively utilized in prior research (Ansari, et.al. 2018; and Blanco Gonzalez et al., 2020). At the first stage, the PLS-SEM assesses the validity and reliability of the model, and the involved hypotheses are tested (Hair et al., 2017).

4. FINDINGS AND DISCUSSION

4.1. Demographics of the Participants

The data presented in the data gathered reveals that a male-dominated respondent group, with 80% male and 20% female. 60% are between 25 and 35, while 25% are in the 36 to 45 age range, and only 15% are above 50. Regarding educational qualifications, a significant portion of participants (65%) held either a diploma or a bachelor's degree. This demographic composition provides valuable insights into the respondent profile, reflecting a young, predominantly male workforce with a solid educational background.

4.2. Descriptive Statistics

The means of each construct are presented in Table 1 at 3.73 and 4.18. GHRM was rated with a mean and standard deviation of 3.73 and 0.885 (relatively low participant expectations for GHRM). The perception of the GOC was found to have a mean of 4.18 and a standard deviation of 0.614, indicating a moderate amount of perception. For instance, although moderate, participants held the views about PEB that average rather (Mean = 3.90, SD = 0.684). ESSL was computed with a mean value of 3.80 and standard deviation of 1.006.

Table 1: Descriptive Statistics.

SN	Variables	Items	Mean	Standard deviation
1	GHRM	6	3.734	.885
2	GC	4	4.181	.614
3	PEB	4	3.954	.684
4	ESSL	3	3.809	1.006

Results are presented in Table 3. It is shown, that all factor loadings are above the accepted 0.70 threshold. Also composite reliability (CR) values passes that recommended cut off point of 0.70 and average variance extract (AVE) values exceeds 0.50 which indicate convergent validity.

Instead of relying on Cronbach's alpha, which assumes same impact from all items and does not

consider the impact of item loadings on an individual, the internal consistency reliability was assessed using the composite reliability coefficient (Götz et al., 2010). On this occasion CR is a more robust measure because Cronbach's alpha can overestimate or underestimate reliability.

Table 2: Items Loading, AVE and CR.

Constructs	Items	loadings	*AVE	*CR
GHRM	GHRM1	0.921		
	GHRM2	0.880	0.706	0.935
	GHRM3	0.844		
	GHRM4	0.844		
	GHRM5	0.772		
	GHRM6	0.770		
GC	GC1	0.793		
	GC2	0.861	0.689	0.898
	GC3	0.876		
	GC4	0.785		
PEB	PEB1	0.819		
	PEB2	0.796	0.664	0.888
	PEB3	0.857		
	PEB4	0.785		
*AVE= Average Variance Extracted, *CR = Composite Reliability				

4.3. Ascertaining Convergent Validity

Convergent validity means that the items effectively represent the underlying concept and show a correlation with other measures of the same concept (Hair et al., 2006). AVE is a recommended metric for assessing the convergent validity of indicators in a measurement model .According to Chins (1998), an AVE value of at least 0.50 for each component is necessary to ensure adequate convergent validity. In this evaluation shown in Table 3, the AVE values have verified loadings that surpass the 0.50 threshold.

4.4. Ascertaining Discriminant Validity

In the context of latent constructs, validity refers to the degree to which a construct is distinct from others (Duarte & Raposo, 2010). The AVE approach was used to assess validity, following Fornell and Larcker (1981). This involved comparing the squared correlations between paired constructs with the AVE of each construct. According to Fornell and Larcker (1981), an AVE score of 0.50 or higher is considered an acceptable benchmark for validity.

Table 3: Latent Variable Correlations and Square Roots of Average Variance Extracted.

	1	2	3
GC	0.830		
GHRM	0.346	0.840	
PEB	0.407	0.460	0.815

The validity is satisfactory, as the AVE values

ranged from 0.565 to 0.741, as shown in Table 2. Moreover, Table 3 reveals that the square root of each AVE exceeded the correlations between the constructs, thus indicating that the discriminant validity was sufficient.

4.5. Assessment of the significance of the Structural Model

In this section, results are provided from the testing of the hypotheses of the structural model, using both direct and mediating effects. Hair et al. (2017) and Henseler et al. (2009) determine the significance of the path coefficients of PLS standard bootstrapping procedure. Standard errors of coefficients, external loadings, external weights, and path coefficients are estimated from their nonparametric bootstrapping method to assess their significance. The complete structural model with the moderator variable being environmentally specific servant leadership is illustrated in Figure 1.

Hypothesis 1 proposed a positive relationship between GHRM and PEB. The results confirmed this association (β = 0.363, t = 4.621, p < 0.001) (Table 5, Figure 1). Similarly, the findings supported the second hypothesis, demonstrating a positive relationship between GHRM and GOC (β = 0.346, t = 4.995, p < 0.001). Furthermore, the third hypothesis, which suggested a positive correlation between GOC and PEB, was also supported (β = 0.281, t = 3.508, p < 0.001).

Table 4: Structural model Assessment Direct Relationship.

Hypothesis	Relation	Beta	T-value	p-value	Findings
H1	GHRM -> PEB	0.363	4.621	0.000	Supported
H2	GHRM -> GOC	0.346	4.995	0.000	Supported
H3	GOC > PEB	0.281	3.508	0.000	Supported

4.6. Testing Mediating Effect

The bootstrapping function in Smart PLS was employed to assess the mediating effect of GOC in the relationship between GHRM and pro-environmental behavior, following the recommendations of Hair et al. (2017). Bootstrapping is a nonparametric approach, does not require assumptions about the distributional characteristics of variables or the sample distribution of statistics. Moreover, its effectiveness has been well-documented, even for smaller sample sizes.

The results in Table 6 exhibit a significant indirect effect of GHRM on PEB through GOC (β = 0.097, t = 2.494). According to Hair et al. (2017), complementary mediation occurs when both direct and indirect effects are significant and aligned in the same direction

Table 6: Mediation Analysis.

Hypo	Relation	Path coefficient	Bias	2.5%	97.5%	T-value	p-Values
H4	GHRM->GOC->PEB	0.097	0.003	0.036	0.187	2.494	0.013

4.7. Summary of Findings

Table 7: Hypothesis Results.

Hypothesis	Hypothesized relationships	Results
Hypothesis1	GHRM positively influences PEBs	Supported
Hypothesis 2	GHRM positively influences GOC	Supported
Hypothesis 3	GOC positively influences PEBs.	Supported
Hypothesis 4	GHRM and PEBs are mediated by GOC.	Supported
Hypothesis 5	ESSL positively moderates GHRM and pro-environmental behavior.	Supported

5. DISCUSSIONS

The function of HRM in environmental sustainability has attracted great academic interest over the past few years (Ren et al., 2018). The present study enriches the increasing stream of literature on GHRM by examining how GHRM practices influence employees' green attitudes and behaviors. To this end, it proposes a framework connecting GHRM to Pro-Environmental Behaviors (PEBs), with Green Organizational Culture (GOC) as a mediating factor.

The findings reveal that organizations which implement effective GHRM initiatives will cause employees to display environmentally friendly behavior significantly. It also supports previous studies (Ansari et al., 2021; Saeed et al., 2019) in which green HR practices were considered as potent incentive mechanisms that enable employees to incorporate sustainable workplace behaviors. Results further support the idea that GHRM creates an environmentally aware workforce by employing HR policies, training programs, and employee

engagement strategies.

Moreover, the paper reinforces the mediating role of GOC in strengthening the GHRM-PEB connection. Consistent with prior research (Lu et al., 2020; Saeed et al., 2019), the findings confirm that GHRM practices not only directly influence PEBs but also exert an indirect effect through cultural transformation within the organization. This implies that to maximize the impact of GHRM, organizations must cultivate a strong GOC where sustainability becomes an integral part of the workplace ethos (Muisyo & Qin, 2021). Aligning the Environmental Management System (EMS) with organizational values, operational standards, and daily practices is essential for fostering a holistic green approach.

Additionally, the role of environmentally oriented leadership in reinforced the GHRM-PEB nexus. Leadership that prioritizes sustainability and actively models green behaviors significantly contribute in modelling employees' attitudes and commitments towards environmental sustainability. By nurturing a culture of shared responsibility and environmentally conscious leadership ensure the efficacy of GHRM initiatives.

6. CONCLUSION

Organizations significantly impact environmental degradation but also hold the potential to drive sustainability. Encouraging pro-environmental behaviors (PEBs) is a strategic approach to enhancing environmental conservation. GHRM) fosters such behaviors by promoting environmentally responsible practices. However, research on GHRM's impact, particularly in Pakistan, remains limited. The findings verify the mediation role of GOC and moderation of ESSL supported the proposed model. Effective GHRM enhances employee motivation, skills, and readiness for sustainable practices, ultimately improving productivity.

Additionally, GHRM-driven HR practices increase job satisfaction, reinforce a green organizational culture, decrease environmental waste, and foster sustainability. Given the growing need for competitive advantage, organizations in Pakistan should adopt GHRM initiatives to enhance environmental sustainability and organizational efficiency. To strengthen sustainability efforts, organizations should align HRM policies, training, and incentives with environmental values, embedding sustainability into workplace culture. A well-integrated GHRM framework can enhance resource efficiency and competitiveness. However, the study's focus on Pakistan's manufacturing sector limits generalizability. Future research should explore diverse industries, cross-country comparisons, and additional mediators, using larger and longitudinal samples for deeper insights.

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