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Integrating Leadership, Organizational Culture and HRM to Promote Green Organizational Citizenship Behavior in Organizations

Haider Raza Abid[1], Tahir Saeed[2], Zubair Nawaz*[3]

[1]PhD Scholar, Department of Leadership and Management Studies, National Defence University, Islamabad, Pakistan.

[2]Professor, Department of Leadership and Management Studies, National Defence University, Islamabad, Pakistan.

[3*]Assistant Professor, Department of Leadership and Management Studies, National Defence University, Islamabad, Pakistan.

Corresponding author: zubairnawaz@ndu.edu.pk

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This study is designed to examine how Green Transformational Leadership (GTFL) and Green Organizational Culture (GOC) influence Green Human Resource Management (GHRM) practices to encourage the cultivation of Organizational Citizenship Behavior for the Environment (OCBE) within the multinational and national corporations operating in Pakistan. The data analysis was performed using Partial Least Squares Structural Equation Modelling (PLS-SEM) by employing online survey-based method of data collection from 409 middle level employees serving across various industries in which the key constructs were evaluated utilizing a Likert scale. The analysis shows a statistically significant connection between GHRM and OCBE. The findings of this research further signify that the relationship between GTFL, GOC, and OCBE is third-way mediated by GHRM. This study offers insights into applying the OCBE framework for fostering sustainable practices and providing practical methods to enhance employee voluntary engagement in environmentally friendly projects.

1. Introduction

The amplified significance of sustainability in business has seen organizations continue to incorporate the issue of environmental concern in their mainstream operations. With the world becoming increasingly environmentally responsible, organizations are considering new ways of managing their people so as to encourage sustainable behaviors. Antecedents of GHRM (GTFL and GOC) have come to the forefront in achieving Green Organizational Citizenship Behavior (OCBE), which implies the voluntary activities of employees to help achieve the targets of environmental sustainability at work place (Renwick et al., 2024; Renwick et al., 2013; Daily & Huang, 2001). Such management practices not only relate to the corporate social responsibility (CSR) efforts, but also respond to the increasing demand for environmental stewardship in organisations (Jackson et al., 2011; Jackson, 2025).

As these practices become more widely implemented, there is a paucity of empirical studies that combine these constructs in an attempt to comprehend their combined effects on OCBE, especially in developing countries. The dynamics connecting GHRM, GOC, and GTFL and their further influence on OCBE are not well understood, have been only minimally explored in prior studies that examined the direct effects of individual green management practices (Ahmed et al., 2008; Zhu et al., 2005). This gap emphasizes the necessity to draw attention at the indirect consequences of such practices through employing GHRM as a mediating factor.

Nevertheless, ability, motivation, and opportunity variables on organizational green behavior remains unclear despite a thorough examination. The existence of this gap underscores the necessity for further research that considers both individual and organizational factors within the AMO framework in order to address the knowledge gap surrounding their influence on environmentally responsible corporate behavior (Appelbaum, 2000; Pandey & Risal, 2025).

This study explores how policies can be adjusted using the AMO framework to enhance employees' skills, motivation, and abilities, thus fostering a sustainable corporate culture over the long-term. Understanding the variables affecting employee involvement in sustainability initiatives can help these businesses develop more effective sustainable strategies.

The present research endeavours to bridge this gap through an examination of the influence of GOC and GTFL on GHRM, and its further impact on OCBE. In particular, the study will examine the mediating role of GHRM in the correlation between GTFL and OCBE as well as between GOC and OCBE. The study is relevant as it will contribute to the overall knowledge on how organizations can harness leadership, culture, and HR practices to create a sustainability-related environment and promote pro-environmental behaviors among employees voluntarily.

The following paragraph highlights the specific objectives of the study:

This study aims to examine the influence of Green Transformational Leadership (GTFL) and Green Organizational Culture (GOC) on Green Human Resource Management (GHRM). It further seeks to investigate whether GHRM mediates the relationship between GTFL and GOC and Organizational Citizenship Behavior for the Environment (OCBE). Additionally, the

study explores the indirect effects of GTFL and GOC on OCBE through the mediating role of GHRM.

This research study primarily focuses on OCBE, a concept that incorporates employees' voluntary activities that contribute to environmental sustainability beyond their assigned job responsibilities. OCBE is distinguished from compliance-based environmental measures by employees' genuine commitment, values, and proactive participation in environmentally responsible practices, such as energy conservation, waste reduction, and green initiatives. Emphasizing organizational, cultural, and behavioral elements enables the study to capture the human and behavioral dimensions of sustainability that are critical for translating environmental policies into effective and lasting practices.

Middle-level staff in Pakistani companies have a significant influence on promoting OCBE because of their position between senior management and operational workers. Participating in OCBE results in tangible benefits on an individual level, such as increased environmental awareness, stronger personal responsibility, and heightened ethical awareness.

It also fosters intrinsic motivation, job satisfaction, and a sense of purpose, as employees align their actions with organizational goals and Pakistan's pressing environmental challenges. Indirectly, OCBE encourages prosocial behavior, collaboration, and positive workplace relationships, with middle managers often serving as role models who influence subordinates' environmental conduct.

At the organizational level, OCBE directly contributes to improved environmental performance through efficient resource use, reduced operational costs, and better compliance with environmental standards. These voluntary behaviors facilitate the implementation of environmental management systems with limited reliance on formal controls. Indirectly, OCBE enhances organizational reputation, stakeholder trust, and the development of a supportive environmental culture while encouraging innovation in green practices. Collectively, these outcomes strengthen organizational resilience, competitiveness, and long-term sustainable performance.

2. Literature Review

In the recent past, the strategic role of Human Resource Management (HRM) in enhancing corporate environmental sustainability has been concern for research interest in the course of organisations' endeavouring to align their operations with the green environmental objectives (Jabbour & Santos, 2008). GHRM is an activity that involves integration of the environment within the traditional HR practices as recruitment, selection, training and evaluation of performance (Yong et al., 2020). Indicatively, companies are currently designing training programs to promote environmental awareness and green recruiting as a way of ensuring that they attract employees who prefer green sustainability programs more than others.

The favourable influence of GTFL on GHRM will encourage leaders to incorporate green issues into HR policies and introduce green practices relating to recruitment, training, and performance evaluation. The leaders who promote green values have a higher chance of influencing their HR departments towards practices that will ensure sustainability (Renwick et al., 2013; Khan & Sohaib, 2024).

Furthermore, the implications of Green Human Resource Management (GHRM) in fostering a green culture in the organisations cannot be overstated. According to Renwick et al. (2013), the adoption of green values in HRM practices; recruitment, training and performance appraisal is the key to the fact that the pro-environmental behaviors would be formed in the employees. The practices are useful in aligning the workforce of organizations to sustainability goals, which eventually boost OCBE.

Moreover, the Self-Determination theory (SDT) implies that employees tend to take actions in order to protect the environment when they believe that this process is intrinsically rewarding, as opposed to the situation when such actions are driven by some external incentives (Ryan & Deci, 2000). By matching the HR practices with the environmental values, GHRM assists the employees in achieving a sense of meaning in their green behaviors, thus increasing their voluntary input towards sustainability.

Green Transformational Leadership (GTFL) is the idea that incorporates transformational leadership, with environmental goals, which is a key catalyst in the inculcation of green values in an organization (Robertson & Barling, 2013). Transformational leaders promote sustainability as a value among employees by motivating them to work under the motivation of leaders who demonstrate transformational leadership behaviors (Sanusi & Farida, 2023).

Green leaders are essential in harmonizing HR practices towards sustainable development objectives. Green recruitment, training, and performance evaluations are some of the HR practices that are likely to be properly undertaken when leaders promote green values. Some studies have also highlighted the significance of leadership styles in green practices in organisations. As an example, Green Transformational Leadership (GTFL) has been demonstrated to have a substantial contribution to embracing sustainability in terms of employee motivation and shared vision of environmental accountability (Boiral, 2009).

Research in Pakistan's hospitality and tourism industry has discovered that Green Transformational Leadership, particularly when paired with Green Servant Leadership, greatly boosts employee green performance by improving work engagement and environmental consciousness, thereby highlighting the essential function of green leadership in achieving sustainable results (Ahmed et al., 2025).

Transformational leaders, including inspirational motivation and personal consideration, are also able to influence employees to adopt pro-environmental behaviors (Robertson & Barling, 2013). Such leaders not only promote sustainability but also provide a climate in which workers feel motivated to work towards environmental objectives (Rihal et al., 2025).

The GTFL concept in influencing the environmental behavior is not only in motivating employees to be sustainable, but also assists in the development of a vision that resonates with environmental targets with the organizational goals. It has been established that pro-environmental behaviors, a green vision, and innovation habits among leaders are key attributes that facilitate green HR practices (Robertson & Barling, 2013).

An empirical study conducted by (Renwick et al., 2013) discusses leaders as role models and their leadership behavior tends to be emulated by the employees. They convey the significance of OCBE whereby the employees feel their efforts towards sustainability are not

only appreciated, it is anticipated. In this regard, GTFL not only encourage employees to achieve green behaviors; it also codifies green behaviors by the HR system, such as green rewards, recognition, and training programs.

The second construct in the study's framework, Green Organizational Culture (GOC), is conceptualized as the common values, beliefs, and norms of environmental responsibility in an organisation (Zhu et al., 2005). An effective GOC makes employees embrace pro-environmental practices and Organizational values that focus on sustainability. GOC has been found to make a tremendous impact on GHRM since it provides the space where green HR practices become relevant and are adopted more by workers (Jackson et al., 2011).

Furthermore, a study conducted by Jackson et al. (2011) indicates the effectual role of Green Organizational Culture (GOC) on influencing the behavior of employees towards sustainability. Having a strong GOC with emphasis on environmental responsibility, the employees are also prone to incorporating sustainable practices into their day-to-day working patterns, which would most likely result in better Organizational Citizenship Behavior towards Environment (OCBE) (Zhu et al., 2005).

A robust GOC influences attitudes and values of the employees toward environmental responsibility. The HR practices would tend to be more consistent with the values promoted by GOC (Zhu et al.,2005; Khan et al., 2025). GOC is also likely to positively impact GHRM; organizations that have a green culture are inclined for implementation of HR practices that would ensure environmental sustainability.

GOC is able to influence the perception of employees towards sustainability, which concentrates on shared responsibility. GHRM is more likely to be effective in organisations with strong green cultures since they are rooted in employees' attitudes and commitment to the environment. An organizational culture with a strong emphasis on environmental sustainability significantly enhances employees' eco-friendly commitment and shared environmental values, ultimately boosting their organizational commitment through a strengthened sense of their role in protecting the environment (Abou Al Nile & Abdel-shakoor, 2025).

The correspondence of the organizational culture to the environmental objectives may help to increase the feeling of responsibility in the employees and lead to greater adherence to the eco-friendly behaviors even outside the frames of the job descriptions. GOC is very instrumental in instilling sustainability practices in an organisation. With organisations building up a culture that embraces environmental responsibility, there are chances of employees embracing OCBE without having to be nudged. GOC not only promote the value of sustainability but also promotes behaviors beyond the official job roles (Zhu et al., 2005).

The organizations that adopt the GHRM practices give the employees the resources and incentives that they need to get involved in OCBE. This interdependence is effectively presented in the literature, where it is revealed that green HR practices, such as green training, environmentally friendly reward systems, prompt employees to engage in voluntary pro-environmental behaviors (Jabbour & Santos, 2008; Waqas et al., 2025).

GHRM affects OCBE indirectly through GOC. GOC influences organizational environment and organizational values that focus on environmental responsibility. GHRM can also promote

OCBE by instilling these values into HR practices that motivate employees to take voluntary environmental behaviors that are aligned with organizational objectives, as these individual values are similar to Organizational objectives (Jackson et al., 2011).

An important relationship in the study is between GHRM and Organizational Citizenship Behavior towards the Environment (OCBE). OCBE is a voluntary type of behavior among the employees that can lead to environmental sustainability within the workplace setting, for example, waste minimization or energy saving (Daily & Huang, 2001). Since GHRM provides a system that fosters green behavior, it will have a positive impact on OCBE because it will align the behaviors of individual employees towards the sustainability of the organization.

It is possible to consider the relationship between GHRM and OCBE in terms of employee engagement. Green HRM does not merely entail inculcating environmental behaviors but also a feeling of responsibility and ownership towards environmental practices by the employees. This corresponds with the framework of Self-Determination Theory (SDT), which hypothesizes that people have high chances of engaging in behaviors when they feel they are intrinsically motivated, and not externally rewarded (Ryan & Deci, 2000).

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Research conducted at Saudi universities shows that implementing GHRM practices has a substantial impact on OCBE among faculty, leading to an increase in voluntary pro-environmental behavior, which ultimately results in better environmental performance outcomes. The study also shows that GHRM's positive effects on OCBE are influenced by factors such as technological expertise and organizational flexibility, which underscore the complexity of HRM's role in environmental sustainability (Rehman et al., 2025).

By ensuring that the HR practices are relevant to the environmental values, GHRM can help employees of the organization find green behaviors more meaningful and intrinsically oriented, which will result in higher OCBE.

In the light of preceding literature, following hypotheses have been formulated:

H1: Green Transformational Leadership (GTFL) positively influences Green Human Resource Management (GHRM).

H2: Green Organizational Culture (GOC) positively influences Green Human Resource Management (GHRM).

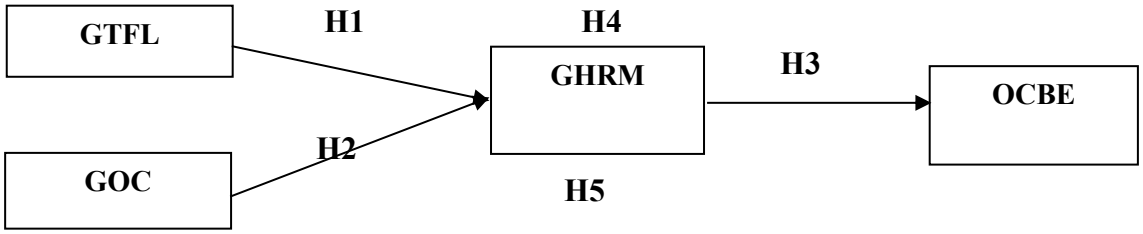
H3: Green Human Resource Management (GHRM) positively contributes to the promotion of Organizational Citizenship Behavior for the Environment (OCBE).

H4: GHRM mediates the relationship between GTFL and OCBE.

H5: The relationship between GOC and OCBE is mediated by GHRM.

Drawing from the above discussion, the conceptual framework is illustrated as following:

Figure No 1: Conceptual Framework



2.1 Theoretical Framework

This study is grounded in the theoretical framework of; Ability-Motivation-Opportunity (AMO) theory, Social Learning Theory, and the Resource-Based View (RBV). They provide a good provision of solidifying the connections between the components of GHRM, GTFL, GOC, and OCBE. The AMO is the overarching theory in the study which signifies that the performance of employees is dependent on their ability, motivation, and opportunity (Appelbaum, 2000).

GHRM in this model offers employees the opportunity to take pro-environmental behaviors via sustainability-focused training and development programs. The incentives and rewards of green practices are used to motivate them, and the opportunity is established by developing a green working environment. GTFL and GOC have an impact on all three components of AMO, where the leaders and organizational culture determine the opportunities and motivation that employees have to undertake OCBE. The model, therefore, is backed by the AMO Theory, which postulates that GHRM allows an employee to deliver their best in sustainable activities concerning the environment.

As proposed by Social Learning Theory (Bandura, 1986), observation and imitation of others and in particular leaders, in the learning process are important. The role of GTFL on this aspect is to model pro-environmental behaviors that employees would imitate. When the leaders demonstrate sustainability, the employees are likely to embrace the same values and are later reinforced by the GHRM practices. This theory contributes to the assumption that GHRM is affected by GTFL, which eventually improves OCBE as per social learning.

The Resource-Based View (RBV) maintains that the organization's resources, including the HR practices, leadership, and organizational culture, are the ones that enable an organization to experience a competitive advantage (Barney, 1991). GHRM, GTFL, and GOC are useful internal assets in this context that will promote sustainable performance.

GHRM ensures that HR activities are in line with the organizational sustainability, GTFL offers leadership aimed at facilitating environmental initiatives, and GOC develops a culture that promotes environmental responsibility. The resources interact to make an organization more efficient in involving the employees in OCBE to provide the organization with a competitive advantage in terms of sustainability (Barney, 1991).

3. Methodology

3.1 Research Design

A quantitative methodology is adopted in this research to investigate the relationships between GHRM, GTFL, GOC, and OCBE. The exploratory dimension aided in determining the effect that GHRM practices have on Organizational outcomes, specifically the environmental sustainability, whereas the explanatory dimension considered the impact of Organizational outcomes in relation to the practices. The research seeks to investigate causal relationships between leadership, culture, HR practices and employee behaviors as far as sustainability is concerned.

The research will fill the gap in the literature by offering empirical data on the effect of GHRM practices on Organizational sustainability, specifically in Pakistan, which is an emerging economy. The research is aimed at the middle level employees who have supervisory job roles regarding their decision-making in the HR and sustainability initiatives.

In the most effective way data were collected using an online survey, which is suitable to reach a wide range of employees of both multinational and national corporations in various regions of Pakistan. This was effective in gathering information and giving the necessary edge to get the answers from a geographically dispersed sample.

3.2 Sampling Strategy

The chosen sampling technique is a purposive sampling technique relevant to the participants of the current study. Purposive sampling is best in a situation where the researcher wants to deal with participants of a particular experience or knowledge (Etikan et al., 2016). In this case, the incentive used to select the respondent was the involvement in the HRM decisions and corporate sustainability processes.

A sample of 409 middle level employees serving in either multinational or local corporations that implemented GHRM practices has been considered final. The selection of participants ensured that they had direct involvement understanding of GHRM practices and their consequences.

It was a sample of the representatives of the various age groups (including Generation Z to Generation X) and professional experience (1-10 years). This facilitated the ability to reflect on the magnitude of perspectives on the impacts of GHRM practices on OCBE in different organizational contexts.

3.3 Data Collection

Data were obtained through using an online survey and measure significant constructs such as GHRM, GTFL, GOC, and OCBE. The questionnaire was structured into four sections in which all the constructs with the statements were rated under the Likert scale (1 strongly disagree, 5 strongly agree). The scale gave a chance to learn about the perception of sustainability of the environment adopted by the respondents within their organizations.

3.4 Pilot Study

An initial pilot study was performed to confirm the reliability and adequacy of the survey items based on 50 employees before the actual data collection. The pilot study indicated that the constructs were adequately reliable, as they had a Cronbach's alpha coefficient exceeding 0.70. The sample of 409 employees was then given a survey that consisted of the final version.

3.5 Sampling Size

According to the guidelines for Structural Equation Modelling (SEM), a sample size of at least 200 participants is required to guarantee reliable estimates and achieve statistical power. Taking into account the model's complexity and the necessity for reliable data, a sample comprising of 409 employees is chosen. This size surpasses the minimum requirement and offers a more dependable foundation for analyzing the relationships in the study.

3.6 Variables and Constructs

This study focuses on four key constructs:

Green Human Resource Management (GHRM): GHRM means the incorporation of the concept of sustainability into HR practices, including recruitment, training, performance management, and compensation systems, which promote environmental responsibility (Renwick et al., 2013).

Green Transformational Leadership (GTFL): GTFL is a kind of leadership that offers inspiration and motivation to the employees to follow pro-environmental behaviors that align organizational sustainability objectives with those of the employees (Robertson and Barling, 2013).

Green Organizational Culture (GOC): GOC is the set of values, beliefs, and norms of an organisation in regards to environmental sustainability that employees hold. A strong GOC promotes green behaviors amongst employees (Zhu et al., 2005).

Organizational Citizenship Behavior to the Environment (OCBE): OCBE is an extra-role action done at the will of the employees and which helps to sustain the environment, like recycling, conserving energy, and also reducing waste (Daily & Huang, 2001).

All these constructs are important in helping to understand how organizational leadership, culture, and HR practices influence employees' behaviors concerning environmental sustainability.

3.7 Ethical Considerations

The study adhered to established ethical considerations. All the Participants were notified and given consent on the purpose and the freedom to participate in the research. The survey needed to guarantee confidentiality and anonymity, and no personal information that could identify the respondents. Their responses were ensured to be confidential and applicable only for academic purposes.

Besides, the respondents were assured that their participation would not affect their professional status in any manner, and they could opt out of the study at any time without any

form of penalty. Any data that stored was secured and could only be accessed by the researchers to analyze it.

4 Results and Analysis

PLS-SEM which is a versatile and efficient analytical tool to analyze multifaceted relationships between latent variables, as used to analyze the data, in particular, with non-normally distributed data (Hair et al., 2014).

4.1 Measurement Model

Table 1 presents the reliability testing confirming all the constructs possess excellent internal consistency in the model. Cronbach's alpha values of GHRM (0.967), GOC (0.925), GTFL (0.880), and OCBE (0.930) exceed the recommended threshold of 0.70, which implies that the measurement items have a high degree of reliability.

Table No 1: Reliability and Convergent Validity

Construct	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
GHRM	0.967	0.967	0.970	0.700
GOC	0.925	0.926	0.944	0.770
GTFL	0.880	0.881	0.917	0.735
OCBE	0.930	0.931	0.943	0.705

Also, composite reliability (rho c) values are adequate (0.917-0.970) that the constructs are highly internally consistent and that the constructs are of high quality as per the desired level of reliability in PLS-SEM. The rho values also confirm the validity of the individual constructs and are within acceptable limits.

Secondly, values of Average Variance Extracted (AVE) of all constructs are higher than the required minimum of 0.50, where GHRM = 0.700, GOC = 0.770, GTFL = 0.735 and OCBE = 0.705. These findings signify that the two constructs explain over half the variance of their indicators, which is good convergent validity.

Given the cross-sectional design of the study, common method bias was assessed. The variance inflation factor (VIF) values were examined and were below the recommended threshold of 3.3, suggesting that common method bias is unlikely to influence the results.

The table 2 presents the computation of the outer loading of the observed variables on their respective construct namely: Green Human Resource Management (GHRM), Green Organizational Culture (GOC), Green Transformational Leadership (GTFL), and Organizational Citizenship Behavior (OCBE) towards the environment.

All the values are the correlations of the observed variable and the underlying construct. All the loadings exceed the suggested limit of 0.7, which is a good indicator of convergent validity of the model. For example, the loading of GHRM1 is 0.831, GOC1 is 0.863, GTFL1 is 0.839, and OCBE1 is 0.819, indicating that there are strong associations between the observed variables and their constructs.

Table No 2: Outer Loadings for Constructs in the Model

	GHRM	GOC	GTFL	OCBE
GHRM1	0.831			
GHRM10	0.816			
GHRM11	0.851			
GHRM12	0.822			
GHRM13	0.823			
GHRM14	0.855			
GHRM2	0.846			
GHRM3	0.834			
GHRM4	0.857			
GHRM5	0.835			
GHRM6	0.838			
GHRM7	0.834			
GHRM8	0.828			
GHRM9	0.842			
GOC1		0.863		
GOC2		0.908		
GOC3		0.879		
GOC4		0.871		
GOC5		0.866		
GTFL1			0.839	
GTFL2			0.878	
GTFL3			0.873	
GTFL4			0.839	
OCBE1				0.819
OCBE2				0.808
OCBE3				0.820
OCBE4				0.857
OCBE5				0.883
OCBE6				0.846
OCBE7				0.841

For GHRM, the square root of AVE has a value of 0.837, which is higher than the correlation with other constructs: 0.814 with GOC, 0.825 with GTFL, and 0.770 with OCBE. It means that GHRM meets the criteria of the Fornell-Larcker discriminant validity, and AVE exceeds all the correlations of its square root as observed in table 3.

Table No 3: Discriminant Validity: Fornell-Larcker Criterion

	GHRM	GOC	GTFL	OCBE
GHRM	**0.837**			
GOC	0.814	**0.878**		
GTFL	0.825	0.754	**0.858**	
OCBE	0.770	0.709	0.783	**0.840**

The square root of AVE in the case of Green Organizational Culture (GOC) is 0.878, which is higher than the square root of AVE that it provides against other constructs, 0.814 with GHRM, 0.754 with GTFL, and 0.709 with OCBE. This means that GOC conforms to the Fornell-Larcker provision of discriminant validity in which the square root of the AVE is surpassing the correlations.

Green Transformational Leadership (GTFL) has the highest value of 0.858 for the square root of AVE compared to the correlation with the other constructs, which are 0.825 with GHRM, 0.754 with GOC and 0.783 with OCBE. The fact that the square root of AVE is greater than the correlations implies that GTFL also satisfies the Fornell-Larcker criterion of discriminant validity.

Finally for Organizational Citizenship Behavior for the Environment (OCBE), the square root of AVE is 0.840, which exceeds the correlation with the other constructs: 0.770 with GHRM, 0.709 with GOC, and 0.783 with GTFL. This demonstrates that OCBE is also compliant with the Fornell-Larcker criterion of discriminant validity.

As demonstrated in table 4, the value of HTMT between Green Human Resource Management (GHRM) and Green Organizational Culture (GOC) is 0.860, which is much less than 0.90. This observation implies that GHRM and GOC are not similar notions within the green management profession, although latent, as they quantify various dimensions of sustainability of an organization. To the same degree, the value of HTMT between GHRM and Green Transformational Leadership (GTFL) is 0.894; that is, both constructs are related, though not identical. GTFL is a leadership behavior oriented in such a way that it improves the responsiveness of the environment, and GHRM is interested in the organizational policy to incorporate green practices in HR proceedings.

Table No 4; **Discriminant Validity: Heterotrait-Monotrait Ratio (HTMT) Matrix**

	GHRM	**GOC**	**GTFL**	**OCBE**
GHRM				
GOC	**0.860**			
GTFL	0.894	**0.835**		
OCBE	0.811	0.764	**0.866**	

The overall value of HTMT between the GHRM and the Organizational Citizenship Behavior in the Environment (OCBE) is 0.811, which does not meet the threshold value of 0.90. This observation assists in confirming that GHRM, which embraces green HR practices and OCBE, which explains voluntary behaviors of employees with regard to encouraging environmental sustainability, are two distinct constructs. The two constructs have a value of 0.835 with one another, denoting the fact that despite the two being related, GOC, common beliefs within the organisation, and GTFL, the influence of leadership in promoting the environmental behaviors are not in close proximity to one another.

The difference between the HTMT of GOC and OCBE is 0.764, which means that the organizational culture values of GOC are different from the personal voluntary environmental behavior of OCBE. Lastly, the value of HTMT between GTFL and OCBE is 0.866, still less than the 0.90 mark, which supports the difference between the two models of leadership

behavior, namely, GTFL and OCBE, and the difference between voluntary environmental behaviors of employees, which is the focus of OCBE.

4.2 PLS Structural Model

In case of the path that exists between Green Human Resource Management (GHRM) and Organizational Citizenship Behavior to the Environment (OCBE), the original sample value is 0.770 with a standard deviation of 0.038. The T statistic equals 20.088, which is much above the test value of 1.96, and the P value is equal to 0.000, which means that the relationship is highly significant. This shows close and statistically significant effect of GHRM on OCBE as presented in table 5.

Table No 5: Path Coefficients, T-Statistics, and P-Values for the Structural Model Relationships

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
GHRM -> OCBE	0.770	0.770	0.038	20.088	**0.000**
GOC -> GHRM	0.444	0.443	0.060	7.458	**0.000**
GTFL -> GHRM	0.490	0.491	0.059	8.323	**0.000**
Model Fit					
SRMR	0.050	0.059			
d_ULS	1.173	1.616			
d_G	1.383	1.423			

The initial sample figure is 0.444, and a standard deviation of 0.060 between the path between Green Organizational Culture (GOC) and GHRM. The T-statistics are 7.458, whereas the P value is 0.000, which means that the correlation between GOC and GHRM is statistically significant. This finding means that GOC has a positive effect on GHRM that is significant.

Equally, in the case of the path between Green Transformational Leadership (GTFL) to GHRM, the original sample's standard deviation is 0.490, and the standard deviation of the original sample is 0.059. T-statistics are 8.323, and the P-value is 0.000, which proves the outstanding effect of GTFL on GHRM. It means that GHRM is highly predicted by GTFL in the model.

Model fit indices of the saturated model and the estimated model give an insight into how well the model fits the data. Another significant measure of model fit is the Standardized Root Mean Square Residual (SRMR), which has a value of 0.050 (saturation model) and 0.059 (estimated model). A value below 0.08 is considered a good fit, and therefore, the two models have a good fit, although the estimated model has a slightly higher SRMR, indicating a slight reduction in the fit.

Another model fit indicator is the d_ULS (distance-based unweighted least squares) statistic. In the saturated model, the value of d_ULS is 1.173, and in the estimated model, it rises to 1.616. The d_ULS value ideally should be as low in which case it would fit better. The growth of the estimated model indicates that the estimated parameters give the model a marginally lower fit.

Equally, the d_G value, which indicates the goodness of fit, is followed by a slight variation of 1.383 and 1.423 in the saturated and estimated models. This minor gain represents a minor deterioration of the fit of the estimated model, yet the difference is insignificant and is acceptable.

Chi-square statistic is employed to determine the general fit of the model. In the saturated model, the value of Chi-square is 3011.801 compared to the estimated model, 3075.181. Although the Chi-square statistic does depend on the size of the sample, the higher this value, the poorer the fit. Nonetheless, it must be taken along with other fit indices.

Finally, as presented in table 6, the Normed Fit Index (NFI) is used to compare how well the model fits against a model of the best fit is 0.779 and 0.774 in the saturated and estimated models. A good fit is an NFI value of 0.90 or more; however, values above 0.80 also demonstrate an acceptable fit to the model. Both the models in this instance are marginally lower than the required threshold, yet they have a decent fit.

Table No 6: R Square and Adjusted R Square Values

	R-square	R-square adjusted
GHRM	0.766	0.765
OCBE	0.593	0.592

Pertaining to Green Human Resource Management (GHRM), the value of R-square is equal to 0.766, implying that the predictors in the model can account for 76.6 per cent of the variation in GHRM. Adjusted R-square of GHRM equals 0.765, which is nearly equal to R-square, and this implies that the model is not overfitting and the explanatory power is strong despite controlling the number of predictors. So, the following table 6 demonstrates the model can be effectively used to explain GHRM.

In the case of Organizational Citizenship Behavior for the Environment (OCBE), the value of R-square is 0.593, it implies that about 59.3 per cent of the variability in OCBE can be attributed to the predictors. The adjusted R-square of the OCBE is 0.592, indicating that the model has a good fit despite the adjustment of the predictor number, but not as powerful as that of GHRM. This implies that although the predictors affect OCBE, the predictors leave a lot of unexplained variances.

The specific indirect effects for the key variables as shown in table 7, in case of the path GOC > GHRM > OCBE, initial sample value is 0.342, whose standard deviation is 0.049. The T-statistic of this indirect effect is 6.953 with a P-value of 0.000, suggesting high statistical significance. This implies that GHRM shows that GOC has a positive relationship with OCBE, which is an indirect relationship with a strong and statistically significant impact.

Likewise, when the path is GTFL > GHRM > OCBE, the sample of the first stage is 0.377 and the standard deviation of 0.052. This indirect effect has a T-statistic of 7.311, and the P value of that relationship is also 0.000, showing that the relationship is very strong. The result illustrates the positive indirect impact of GTFL on OCBE by GHRM.

Table No 7: Specific Indirect Effects for Key Variables

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
GOC -> GHRM -> OCBE	0.342	0.342	0.049	6.953	0.000
GTFL -> GHRM -> OCBE	0.377	0.378	0.052	7.311	0.000

4.3 Discussion

The study has been informative on the connection between Green Transformational Leadership (GTFL), Green Organizational Culture (GOC), Green Human Resource Management (GHRM), and Organizational Citizenship Behavior of Environment (OCBE). It could be believed that both GTFL and GOC could influence the GHRM practices and, in turn, the voluntary environmental behaviors of the employees (OCBE) based on the main results of the research. Findings of the research reveal that there is a positive impact of GTFL on GHRM that is comparable to other prior studies that are also based on the relevance of the role of leadership to instil sustainability in organizational practice (Robertson & Barling, 2013).

Leaders can build a framework around which the HR policies of recruiting, training, and managing performance can be streamlined in line with the environmental goals by promoting green attitudes and setting the example of pro-environmental behaviors. On the same note, GOC was also reported to positively affect GHRM, which underlines the significance of organizational culture in promoting a culture that enables the promotion of green HR practices. Once an organisation adopts a robust green culture, then employees are likely to be motivated to embrace and adopt the environmentally sustainable behaviors into their day-to-day activities (Zhu, Sarkis & Geng, 2005).

Particular interest was the mediation role of GHRM in the relationship between GTFL, GOC and OCBE. The findings revealed that GHRM is an intermediary between GTFL, GOC, and OCBE of the employees. This implies that although leadership and organizational culture can establish the environment towards sustainability, GHRM practices play a critical role in converting them into actual and quantifiable employee behaviors.

Results indicate the necessity of ensuring the existence of HR strategies that foster sustainable behaviors, such as the provision of training on issues of environmental concerns, awards for green behaviors, as well as the incorporation of sustainability in performance appraisal.

The study offers practical guidance, suggesting that organizations should consider managers and leaders to enhance environmentally responsible organizational culture. In order to successfully incorporate sustainability into an organization, leaders should not only support green practices but also confirm that the HR practices are consistent with the organizational culture and sustainability objectives. Leaders can enable employees to be empowered so to encourage them to take pro-environmental behaviors, including recycling, energy conservation, and waste reduction, by promoting green HR practices.

In addition, organizations ought to invest in leadership development programs that will help in improving green transformational leadership aspects among their leaders. Equipping leaders with the resources to inspire and motivate employees towards environmental sustainability will aid in instigating the intended changes in the organizational culture. Likewise, having green values embedded in the organizational culture and the HR systems will contribute to the increased employee commitment to the practice of sustainability.

In order to maximize the power of GHRM, organizations should also take into consideration implementing environmental reward systems that will identify and reward OCBE. These may involve the rewards of employees who may contribute to the energy-saving program or corporate sustainability programs. Adding green rewards to the overall GHRM strategy would not only motivate OCBE, but it would also make sure that sustainability is turned into a major event within the organizational culture.

5 Conclusions

While the outcomes of this study could have significant repercussions for both practitioners and researchers, potentially enabling the creation of a more comprehensive understanding of how organizations can implement environmentally friendly HR practices, leadership, and culture that encourage green conduct in staff. From an industry standpoint, this research is pertinent to businesses like manufacturing, energy, and transportation that have an enormous environmental impact since these sectors are under increasing pressure to minimize their ecological footprint via environmental sustainability. In conclusion, while this study focused on Green Transformational Leadership (GTFL), Green Organizational Culture (GOC), Green Human Resource Management (GHRM), and Organizational Citizenship Behavior towards the Environment (OCBE) as central factors influencing organizational sustainability, future research could expand the model by including additional variables such as environmental innovation and corporate social responsibility (CSR) to examine their further effects on employee behaviors and organizational performance. Exploring employee well-being as a potential mediator between GHRM and OCBE could provide valuable insights, as psychological and emotional factors may significantly influence participation in sustainability initiatives. Finally, investigating the link between GHRM and organizational performance metrics, including financial outcomes and operational efficiency, could offer a more comprehensive understanding of the overall impact of green practices on sustainability and organizational success.

5.1 Limitations and Future Study

Even though the current research provides significant contributions to the existing literature with emphasis on leadership, culture and HR practices, there are numerous limitations. Firstly, the study employed a research design that was cross-sectional, indicating that data were collected at a specific time. Consequently, causality cannot be properly defined. The constructs of the model have a great deal of relationship with each other, but the results obtained are only based using correlational information and do not consider the possibility of behavior or attitude change with time. A longitudinal design would be a better option in the future as this type of research would enable the researcher to trace the variations in GHRM practices, GTFL, GOC, and OCBE across time. This would give a better insight into the future prospects between green

practices and leadership with respect to employees' behaviors and issues concerning sustainability of the organizations.

The other weakness of the research is the sample size of the population which is only representative of a particular geographical region, which is Pakistan. Although the respondents were selected based on multinational and national corporations, the results might not be generalizable to other organizations in different parts and sectors.

The study can be done in the future with a larger sample size and scope encompassing a wider variety of organizations in varying regions and sectors. A broader and more varied sample would contribute to the higher external validity of the results and a more holistic view of the applicability of the GHRM practices all over the world and their effect on the OCBE.

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