



## Leading the Green Revolution: How Transformational and Green Servant Leadership Drive Employee Sustainability in Hospitality and Tourism Industry

Osama Ahmed<sup>1</sup>, Sadia Javed<sup>2</sup>, Einas Azher<sup>3</sup>, Bushra Jabbar<sup>4</sup> & Farrukh Zafar<sup>5</sup>

<sup>1</sup>Faculty of Business and Management Studies, Nazeer Hussain University, Karachi, Pakistan,  
Email: [Osama.ahmed@nhu.edu.pk](mailto:Osama.ahmed@nhu.edu.pk)

<sup>2</sup>Faculty of Education and Diversity, school of education, University of Iceland, Reykjavik Iceland,  
Email: [saj66@hi.is](mailto:saj66@hi.is)

<sup>3</sup>Faculty of Business and Management Studies, Nazeer Hussain University, Karachi, Pakistan,  
Email: [Einas.azhar@nhu.edu.pk](mailto:Einas.azhar@nhu.edu.pk)

<sup>4</sup>Lecturer, Faculty of Business and Management, Nazeer Hussain University, Karachi, Pakistan,  
Email: [bushra.jabbar@nhu.edu.pk](mailto:bushra.jabbar@nhu.edu.pk)

<sup>5</sup>Faculty of Business and Management Studies, Nazeer Hussain University, Karachi, Pakistan,  
Email: [farrukh.zafar@nhu.edu.pk](mailto:farrukh.zafar@nhu.edu.pk)

ARTICLE INFO	ABSTRACT
<p><b>Article History:</b>            Received: January 12, 2025            Revised: February 14, 2025            Accepted: February 16, 2025            Available: February 18, 2025            Online:</p>	<p>The worldwide organizational focus on sustainability requires leadership methods that encourage employees to adopt environmentally responsible behaviors. The research investigates how Green Transformational Leadership (GTFL) combined with Green Servant Leadership (GSL) affects Employee Green Performance (EGP) through Green Work Engagement (GWE) mediation and Environmental Awareness (EA) moderation. This study collected data from hospitality and tourism sector employees in Karachi, Pakistan through a quantitative research method and then analyzed it using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS. The analysis demonstrates that Green Transformational Leadership together with Green Servant Leadership positively influences Employee Green Performance via Green Work Engagement which serves as a critical mediator. The research demonstrates Environmental Awareness enhances the connection between Green Work Engagement and Employee Green Performance which shows sustainability knowledge is vital for promoting green behaviors at work. The research enriches the current body of work by merging leadership principles, employee engagement methods and environmental awareness into a comprehensive sustainability framework which delivers significant knowledge for executives, HR specialists and government officials. Research findings recommend organizations implement dual leadership methods alongside Green HRM practices and environmental awareness training while taking advantage of technology-based sustainability initiatives to improve sustainability results. The research points out that including sustainability within corporate leadership strategies and employee programs can build an environmentally responsible workforce. Upcoming investigations need to evaluate supplementary mediating and moderating factors while performing cross-industry studies and longitudinal research to strengthen insights into sustainability-focused leadership and environmentally responsible employee behavior.</p>
<p><b>Keywords:</b>            Green Revolution, Transformational, Green Servant Leadership, Employee Sustainability, Hospitality &amp; Tourism Industry</p>	
<p><b>Corresponding Author:</b>            Osama Ahmed  <b>Email:</b>  <a href="mailto:Osama.ahmed@nhu.edu.pk">Osama.ahmed@nhu.edu.pk</a></p>	
<p><b>OPEN ACCESS</b></p>	

## **Introduction**

Organizations face heightened demands to incorporate sustainable methods into their operational activities because environmental sustainability has become more pressing in recent years. Organizations must work to reduce their environmental impact while creating a company culture that motivates employees to participate in sustainable activities. The success of sustainability strategies developed through corporate policies and regulations relies heavily on how leadership engages employees to participate and commit to these initiatives. Leaders shape employee understanding of sustainability goals and motivate them to adopt eco-friendly practices and contribute to environmental initiatives. Leadership approaches focused on sustainability like Green Transformational Leadership (GTFL) and Green Servant Leadership (GSL) have become essential elements for fostering employee engagement and environmental performance. Green Transformational Leadership (GTFL) builds upon traditional transformational leadership by integrating a major focus on environmental responsibility. Green transformational leaders motivate employees to support organizational sustainability goals by inspiring their actions and presenting challenges. Green transformational leaders build long-term conservation goals while urging employees to adopt innovative ecological solutions and develop a meaningful connection to sustainability tasks. Despite its ability to motivate employees and develop pro-environmental mindsets, GTFL lacks direct support and guidance for employees implementing green initiatives. The limitation illustrates why organizations should adopt a leadership style that delivers practical guidance to reinforce sustainable behaviors throughout daily operations. Green Servant Leadership (GSL) embraces a service-oriented and people-focused model to achieve environmental sustainability. Green servant leaders focus on nurturing employee well-being and ethical choices while actively supporting sustainability programs. Servant leaders enable employee participation in sustainability programs by providing mentorship support and resources while transformational leaders primarily inspire them through visionary leadership. Organizations promote corporate social responsibility together with environmental ethics and long-term ecological well-being which empowers employees to take meaningful actions in green practices. GTFL aims to develop sustainability-driven mental frameworks among employees while GSL provides practical assistance and direction for them to apply these frameworks into concrete workplace initiatives. Even though they utilize different methods both leadership styles significantly affect employees' eco-friendly behaviors and their sustainability achievements. Green Work Engagement (GWE) stands as the main method by which green leadership drives employee sustainability performance. Green work engagement means employees dedicate their emotions, thoughts and actions to sustainability-focused tasks. Engaged employees show greater initiative in finding opportunities to apply green practices while making sustainability a regular part of their work activities and choosing to take part in pro-environmental efforts. Even though many employees participate in sustainability initiatives they do not necessarily display superior green performance levels. The transformation of employee engagement into sustainable performance operates through multiple organizational and individual elements including Environmental Awareness (EA). Environmental Awareness (EA) represents employees' comprehension of ecological difficulties and sustainable practices while emphasizing the need for green actions. Employees who possess extensive environmental awareness tend to integrate sustainability values deeply into their mindset and demonstrate green behaviors throughout their work responsibilities. They acknowledge their actions' long-term consequences and value environmental conservation while actively supporting sustainable performance through their professional duties. Employees who exhibit low environmental awareness find it difficult to turn their work engagement into effective sustainability-oriented behaviors. Motivated employees who want to support green initiatives might still fail to make informed sustainability decisions because they lack essential knowledge and understanding. The connection between green work engagement and employee green

performance is influenced by environmental awareness as it either amplifies or diminishes this relationship based on how aware the employee is. This research investigates the effects of Green Transformational Leadership and Green Servant Leadership on Employee Green Performance through the mediating role of Green Work Engagement and the moderating role of Environmental Awareness. Existing research has examined leadership roles in sustainability but lacks substantial empirical proof about how Green Transformational Leadership and Green Servant Leadership work together to boost employee green performance. The moderating function of environmental awareness needs further investigation which leads to questions about the impact of employee sustainability knowledge on their performance translation abilities. This study fills existing research voids and advances sustainability-oriented leadership knowledge while offering actionable advice for organizations striving to build robust green performance cultures. Business leaders, HR professionals, and policymakers can use the findings to develop leadership training programs and employee engagement strategies that encourage sustainability and environmentally responsible behavior in workplaces.

## **Background**

Organizations are now required to embed green initiatives into their corporate strategies because of growing environmental sustainability demands which necessitate active employee involvement in sustainability activities. Leadership emerges as a crucial element that influences employees' environmental behaviors and attitudes beyond the regulatory frameworks and corporate policies that establish sustainability foundations (Daud et al., 2023). The leadership methods Green Transformational Leadership (GTFL) and Green Servant Leadership (GSL) stand out as key influences that drive pro-environmental behaviors within organizations according to Farao et al (2023). The Green Transformational Leadership model builds upon traditional transformational leadership principles to motivate employees to adopt sustainable practices and develop innovative eco-friendly solutions that support environmental objectives (Chaudhary, 2020). Leaders who use a green transformational approach articulate strong sustainability visions while fostering environmental responsibility and motivating employees to adopt green practices in their jobs (Le et al., 2024). Although GTFL excels at motivating employees it often fails to deliver the practical guidance employees need to convert environmental values into actionable behaviors (Patrick, 2023). SGL adopts an employee-focused strategy that stresses ethical responsibility and mentorship to empower workers in sustainability initiatives as per Sudirman (2020). Green servant leaders balance environmental stewardship with employee development by directly assisting employees to implement sustainable workplace practices (Luu et al., 2020). GSL utilizes practical interventions to strengthen sustainable behaviors at the operational level while GTFL concentrates on long-term inspiration and vision. The literature has yet to fully explore how GTFL and GSL leadership styles together affect employees' green performance despite their combined contribution to creating a sustainable organizational culture. Green Work Engagement (GWE) serves as a vital mechanism by which leadership drives sustainable behaviors through employees' psychological commitment and enthusiasm towards sustainability tasks (Rasheed, 2025; Zhu et al., 2024; Sibte-Ali et al., 2024; Rauf et al., 2023). Employees with strong green engagement show greater adoption of sustainability goals and active participation in eco-friendly practices while advancing their organization's environmental objectives (Abdou et al., 2023). Even though employees show green engagement levels they still may not reach high Employee Green Performance (EGP) scores because several variables determine how they convert motivation into significant environmental actions (Mehak et al., 2024). Environmental Awareness (EA) functions as a critical moderator between engagement and performance because it encompasses an employee's comprehension of sustainability topics as well as corporate environmental strategies (Qu et al., 2015). High environmental awareness allows employees to make better sustainability decisions while

recognizing their environmental impact and achieving green performance outcomes (Saeed et al., 2019).

Employees who lack environmental awareness find it difficult to implement sustainability principles successfully regardless of their high levels of engagement. Environmental awareness serves as a moderating variable between green work engagement and employee green performance by either amplifying or diminishing its impact based on the employee's understanding of sustainability issues (Raza, 2022). Sustainability leadership research has yet to thoroughly examine this important moderating role which leads to a significant deficiency in our comprehension of how employee awareness affects leadership-driven sustainability initiatives (Imran et al., 2024). Previous research has looked at the separate impacts of GTFL and GSL leadership styles on sustainability while empirical studies about their combined effects on employee green performance continue to be insufficient according to Farao et al. (2023). The function of green work engagement as a mediator between leadership-driven sustainability actions has been scarcely examined in workplace sustainability research according to Yan et al (2024). The moderating role of environmental awareness in leadership sustainability studies is still largely unexplored which creates a research gap about employee knowledge effects on green performance through engagement (Haldorai et al, 2022). This research addresses previously identified gaps by examining how Green Transformational Leadership and Green Servant Leadership together affect Employee Green Performance through Green Work Engagement mediation and Environmental Awareness moderation. This research combines these elements within one framework to demonstrate effective leadership strategies for promoting sustainability behaviors within organizations. The study results will deliver hands-on recommendations for corporate sustainability planning along with leadership development and employee engagement activities which will help organizations create leadership approaches that both encourage sustainable efforts and prepare employees to carry out those efforts successfully.

### **Problem Statement**

Companies throughout the world now give environmental sustainability a higher priority but they face challenges in turning sustainability policies into practical green actions performed by their employees. Research shows leadership drives sustainability engagement but separately analyzes Green Transformational Leadership (GTFL) and Green Servant Leadership (GSL) without fully understanding their combined effects on employee green performance according to Luu (2020). This research gap indicates a requirement to investigate how both leadership styles influence employee sustainability activities together. Green Work Engagement (GWE) which captures employee commitment and energy toward green initiatives connects leadership to sustainability outcomes (Eladawi, 2024). Employee green performance does not necessarily follow from engagement because many employees do not possess the essential knowledge or awareness to properly execute sustainability actions (Ababneh et al., 2021). Employee engagement leads to meaningful green performance when there is Environmental Awareness (EA)—a comprehensive understanding of environmental issues and sustainable work practices—according to Sharma et al. (2021). High environmental awareness enables employees to translate their engagement into actions whereas employees lacking awareness encounter barriers implementing effective green behaviors. GTFL drives employee inspiration for sustainable innovation while GSL supports employees through ethical leadership and mentorship for green initiatives. The combination of these leadership styles could enhance both the motivational aspects and practical execution of sustainability behaviors. Research has not thoroughly explored the combined effects of these two leadership methods on green engagement and performance outcomes. Research into their combined effect could yield new understanding about using leadership practices to establish

stronger sustainability culture in organizations. Environmental Awareness has not yet been fully investigated as a moderating factor in the connection between engagement and performance according to Orazbayeva et al. (2021). This study seeks to address these gaps by investigating: This research examines the effects of GTFL and GSL on Employee Green Performance (EGP) alongside the intermediary function of Green Work Engagement and the shaping influence of Environmental Awareness on the engagement-performance association. The study examines these relationships to deliver actionable insights for organizations on using leadership styles together with employee engagement and environmental awareness to improve sustainability efforts in the workplace. The results will support sustainability-focused leadership studies and enable organizations to improve their leadership development programs and employee engagement plans for achieving lasting environmental responsibility.

### **Research Questions**

- Q1: What is the impact of Green servant leadership on employee green performance?
- Q2: What is the impact of Green transformational leadership on employee green performance?
- Q3: What is the mediating impact of Green work engagement in relation between Green servant leadership on employee green performance?
- Q4: What is the mediating impact of Green work engagement in relation between Green transformational leadership on employee green performance?
- Q5: What is the moderating impact of Environmental Awareness between Green Work Engagement (GWE) and Employee Green Performance?

### **Research Objectives**

- 1: To find out the impact of Green servant leadership on employee green performance.
- 2: To find out the impact of Green transformational leadership on employee green performance.
- 3: To find out the mediating impact of Green work engagement in relation between Green servant leadership on employee green performance?
- 4: To find out the mediating impact of Green work engagement in relation between Green transformational leadership on employee green performance?
- 5: To find out the moderating impact of Environmental Awareness (EA) between Green Work Engagement and Employee Green Performance?

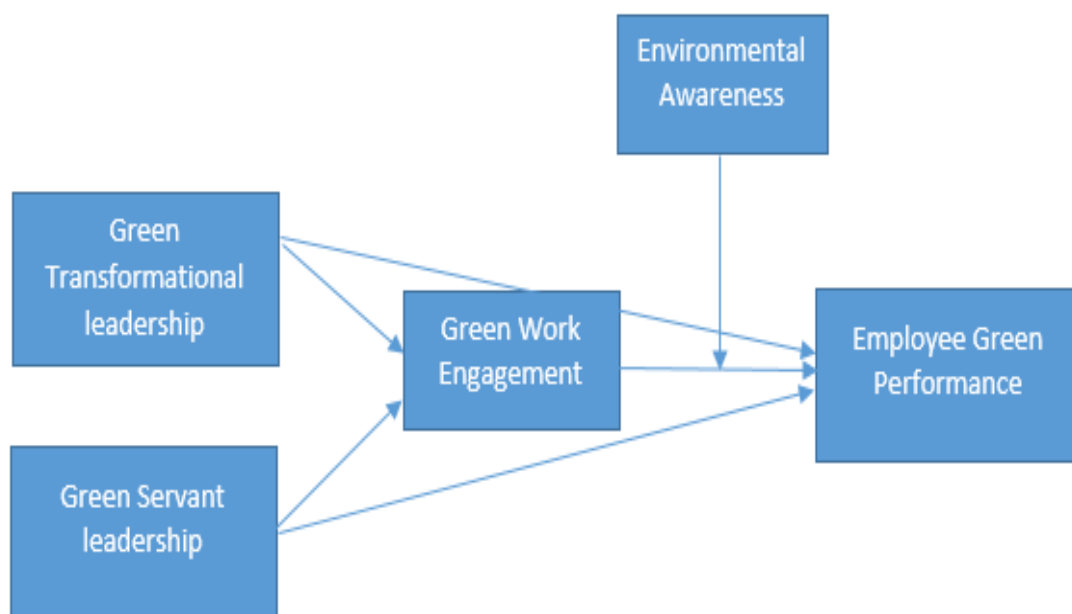
### **Theoretical Foundations**

This research holds importance because it examines how Green Transformational Leadership (GTFL) and Green Servant Leadership (GSL) influence employee green performance which stands as a vital component of corporate sustainability efforts. Environmental policies implemented by organizations achieve success when their leaders effectively inspire and engage employees in sustainability initiatives. Despite the significance of GTFL and GSL in sustainability initiatives existing research has mainly studied these leadership styles separately without exploring their combined impact on employee engagement and green performance outcomes. This research addresses an existing research deficiency to deliver important findings about the role of leadership styles in promoting sustainable employee behaviors. This study demonstrates how leadership boosts sustainability initiatives by examining Green Work Engagement (GWE) as the mediating psychological factor which supports existing theories of leadership and employee engagement within corporate environmental responsibility. This study offers practical value to organizations aiming to boost sustainability initiatives driven by their employees. The alignment of businesses with Environmental, Social, and Governance (ESG) standards depends on effective leadership

strategies that drive employee involvement in sustainability initiatives for sustained success. Organizations can design leadership training programs that merge transformational and servant leadership by utilizing study findings to create leaders who both inspire employees and offer practical support with ethical sustainability guidance. HR managers should use Green Work Engagement as a foundation to create sustainability programs that focus on employee engagement through activities like eco-friendly training programs and incentive-based green initiatives along with environmental task forces.

The study presents Environmental Awareness (EA) as a moderating factor which reinforces the connection between employee engagement and green performance. Workers who show strong environmental awareness convert their sustainable enthusiasm into real workplace actions whereas employees with limited awareness face challenges when trying to put sustainability principles into practice. The research findings indicate that corporate sustainability training programs must be developed to improve employees' environmental knowledge and enable their engagement to produce substantial green performance results. These findings provide important insights for policy development because they help governmental entities and corporate regulators establish sustainability leadership guidelines and workplace environmental policies that prioritize employee engagement and awareness as key factors for achieving sustainability objectives. This research establishes a comprehensive framework to understand leadership impact on sustainability performance through combined GTFL and GSL effects and GWE mediation with EA moderation. This research supports sustainability leadership studies and enables organizations to boost employee engagement while enhancing sustainable performance and meeting international environmental standards. The research demonstrates how sustainability-oriented leadership affects employee motivation and job satisfaction through the enhanced purpose and engagement employees discover in environmentally responsible organizations while also improving their overall well-being. This research will deliver organizations data-backed methods to combine leadership practices and employee engagement with environmental consciousness within their sustainability ventures to establish sustainability as a core part of corporate culture and long-term business achievements.

### **Conceptual Framework**



## **Literature Review**

### **Green Transformational Leadership and Employee Green Performance**

According to Transformational Leadership Theory organizations benefit when leaders motivate their teams because they inspire positive change (Givens, 2008). Green Transformational Leadership (GTFL) represents a leadership approach within sustainability that blends environmental values with transformational leadership behaviors (Nduneseokwu, 2023). The Green Transformational Leadership model requires leaders to establish a sustainability vision while promoting innovative green practices and motivating employees to practice eco-friendly work behaviors. Studies show that transformational leaders boost Employee Green Performance because their employees develop pro-environmental behaviors (Nisar et al, 2021). Leaders who demonstrate sustainable practices motivate employees to adopt environmental responsibility through waste reduction and resource conservation activities according to Miao et al, 2025.

Hypothesis 1: Green Transformational Leadership has a significant positive impact on Employee Green Performance.

### **Green Servant Leadership and Employee Green Performance**

Servant leadership requires leaders to dedicate themselves to employee needs while promoting ethical standards and sustainable workplace practices according to Gotsis (2016). Green Servant Leadership (GSL) builds upon traditional servant leadership principles through strong environmental responsibility and ethical leadership that supports sustainable employee development (Salama, 2024). Studies indicate leaders who emphasize environmental stewardship cause their employees to adopt sustainability practices into their routine work activities (Darvishmoteval, 2022). Green servant leaders motivate employees to adopt voluntary environmental behaviors that exceed job requirements thereby enhancing Employee Green Performance (Darvishmotevali al., 2022). Green Servant Leadership promotes a sustainability-focused work culture yet delivers a weaker direct performance impact compared to Green Transformational Leadership because servant leadership relies mainly on supportive engagement mechanisms instead of direct motivational strategies (Paul, 2024).

Hypothesis 2: Green Servant Leadership has a significant positive impact on Employee Green Performance.

### **The Mediating Role of Green Work Engagement**

Research identifies work engagement as employees' emotional and cognitive investment in their job which drives sustainability-oriented performance (Saratun., 2016). Green Work Engagement (GWE) builds on traditional work engagement models by adding sustainability motivation as a key component in employee engagement assessments (Aboramadan, 2022). Research indicates that when leaders prioritize sustainability they establish work environments which motivate employees to actively participate in green projects (Umair et al., 2024). Highly committed employees to sustainability work demonstrate enhanced dedication to environmental-friendly practices along with advanced green innovation and environmentally supportive behaviors (Alherimi et al., 2024). Green Work Engagement benefits from Green Transformational Leadership through vision-driven motivation and Green Servant Leadership through direct sustainability support (Luu, 2020). Employees who show higher levels of engagement demonstrate stronger tendencies to adopt sustainable behaviors which connects leadership to engagement and Employee Green Performance through a mediational relationship. Thus, it is hypothesized that:

Hypothesis 3: Green Servant Leadership positively influences Employee Green Performance through Green Work Engagement.

Hypothesis 4: Green Transformational Leadership positively influences Employee Green Performance through Green Work Engagement.

### **The Moderating Role of Environmental Awareness**

Environmental awareness describes how well individuals understand and care about environmental challenges including climate change and sustainable business practices. Blok et al. (2015) identify environmental awareness as an employee's understanding of ecological challenges paired with their sense of responsibility for sustainability alongside their readiness to address environmental concerns. The recognition of long-term environmental consequences drives employees with strong environmental awareness to participate in sustainability-focused behaviors like energy reduction and recycling along with supporting green workplace programs (Viterouli et al., 2023). Environmental awareness strengthens the link between work engagement and employee green behavior because employees who understand environmental issues integrate sustainable values into their work and participate in green initiatives (Saifulina et al., 2023). Professionals who recognize how environmental damage affects the world tend to follow organizational sustainability guidelines and exceed expectations through active participation in voluntary eco-friendly actions according to Saeed et al. (2019). Environmentally conscious employees typically show greater commitment to minimizing waste, transitioning to paperless operations and motivating their peers toward sustainable practices which enhances the connection between employee engagement and green performance. Even when employees demonstrate motivation and active work involvement, those lacking environmental awareness face difficulties in turning their engagement into specific green actions. Employees who do not possess sufficient knowledge about sustainability best practices fail to effectively implement green behaviors according to Post (2017). An employee who shows interest in company sustainability programs will only make real green contributions if they understand how to properly dispose of waste and conserve energy (Veleva et al., 2017). This study investigates if Green Work Engagement leads to better Employee Green Performance when Environmental Awareness serves as a moderating variable among employees with extensive sustainability knowledge. Employees with high Environmental Awareness create a stronger connection between Green Work Engagement and Employee Green Performance because they understand sustainability practices well. When Environmental Awareness levels are low there will be a decline in the relationship because employees who are engaged lack essential skills and environmental understanding to carry out sustainability actions effectively.

Hypothesis 5: Environmental Awareness moderates the relationship between Green Work Engagement and Employee Green Performance, such that the relationship is stronger when Environmental Awareness is high.

Hypothesis 5: Environmental Awareness moderates the relationship between Green Work Engagement and Employee Green Performance, such that the relationship is stronger when Environmental Awareness is high.

### **Methodology**

The research philosophy of this study follows a positivist framework by assuming objective reality through measurable empirical data. This study benefits from positivism because it provides a structured scientific method to investigate the quantifiable connections between leadership practices and green performance outcomes with employee engagement (Saunders et al., 2019). The study uses deductive reasoning to create hypotheses from existing theories which are then

examined through empirical data analysis. The research methodology matches previous findings on sustainability leadership and employee engagement according to Codagnone (2021). The study utilizes a mono-method quantitative approach which limits analysis to numerical data gathered from structured surveys for statistical analysis (Saunders et al, 2024). The researchers use a survey methodology to collect extensive primary data from employees in organizations focused on sustainability to understand how leadership impacts engagement and performance (Hair et al., 2019). Data for the study was gathered at one moment in time to analyze current employee perceptions related to leadership, engagement, and green performance (Sekaran & Bougie, 2024). The research uses a non-probability convenience sampling method which selects participants according to their readiness to participate and their availability. This method contains generalizability limitations but remains a widely applied approach in leadership and behavioral research to understand employee perspectives in sustainability-focused companies (Salama et al., 2016). The research draws from a sample of 306 employees to achieve valid statistical reliability for the hypothesis testing process. The main research tool used to gather data is a structured questionnaire organized into sections that match the study variables. The study measures Green Transformational Leadership (GTFL) through adapted leadership research scales (Mittal & Dhar, 2016) and evaluates Green Servant Leadership (GSL) with validated servant leadership measures that emphasize sustainability (Luu, 2019). The Utrecht Work Engagement Scale by Schaufeli et al. (2006) provides the template for assessing Green Work Engagement (GWE) after adapting it to measure sustainability-related behaviors. Researchers evaluate Environmental Awareness (EA) through knowledge-based items about ecological issues according to Norton et al. (2017) while Employee Green Performance (EGP) relies on employees' self-reported pro-environmental work behaviors as per Chaudhary (2020). The study uses a 5-point Likert scale ranging from 1 to 5 (Strongly Disagree to Strongly Agree) to collect measurable and standardized participant responses as described by Creswell & Creswell (2018). Data collection happens through online platforms as well as face-to-face methods which leads to greater response rates and better organizational representation. Data collection begins after participants give informed consent, and their confidentiality and anonymity are protected. This research study follows the institutional research ethics guidelines to maintain compliance with ethical research standards according to Resnik's 2020 findings. The SmartPLS 4.0 software performs Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze complex relationships between latent variables according to Hair et al. (2019). Descriptive statistics and reliability testing with Cronbach's Alpha combined with confirmatory factor analysis and structural equation modeling serve to evaluate hypothesis validity and variable relationship significance (Kline, 2016). Through moderation analysis the research aims to identify if Environmental Awareness acts as a factor that strengthens or weakens the connection between Green Work Engagement and Employee Green Performance. The study benefits from using PLS-SEM because it enables the analysis of direct and indirect effects in complex models and manages non-normal data and limited sample sizes effectively as discussed by Hair et al. (2019). The scientific study design reveals structured data-driven insights into the effects of Green Transformational Leadership and Green Servant Leadership on Employee Green Performance. The study presents theoretical insights and actionable guidance for organizations that want to strengthen employee-led sustainability efforts by examining Green Work Engagement as a mediating factor and Environmental Awareness as a moderating element. Leadership teams along with HR experts and policymakers will find these findings useful for creating leadership strategies and employee engagement programs that boost sustainability performance in organizations.

### **Measurement instrument**

**Green transformational leadership (GTFL):** We employed the six-item GTFL scale created by Chen and Chang (2013). One sample item states that organizational leadership prioritizes the

accomplishment of environmental objectives. The research incorporated a twelve-item scale created by Liden et al. The study employed a twelve-item scale by Liden et al. (2008) to measure employees' perceptions of green SL. Luu (2020b) adapted this measurement scale. A scale composed of four items derived from Paille et al. (2014) served to measure organizational green performance. The study used a four-item scale developed by Paille et al. (2014) to assess organizational green performance. The evaluation of environmental awareness used four items adapted from Han and Yoon (2015) and Ryan and Spash (2008) which Rezapouraghdam, Alipour, and Darvishmotevali (2018) also employed. Green work engagement. The measurement for green work engagement used six-items from Schaufeli et al. (2006). The original development of this scale focused on work engagement before its six items were adapted to measure green employee engagement. A representative example of the measurement scale states "I feel enthusiastic when performing my job duties related to the environment."

## **Findings**

### **Measurement Model**

The assessment of the measurement model verifies that the constructs demonstrate appropriate reliability and validity while maintaining clear discriminant properties. The model must reflect the theoretical framework precisely while enabling meaningful hypothesis testing as per Hair et al. (2019). The measurement model evaluation involves assessing construct reliability and validity through measures such as Cronbach's Alpha, Composite Reliability (CR), Average Variance Extracted (AVE), the Fornell-Larcker Criterion and the Heterotrait-Monotrait Ratio (HTMT). These evaluations demonstrate that the constructs maintain internal consistency and accuracy while remaining distinct from one another. A Cronbach's Alpha score that exceeds 0.7 indicates acceptable reliability and Composite Reliability scores above 0.8 demonstrate high internal consistency according to Hair et al. (2019). The Employee Green Performance (EGP) construct shows strong reliability with a Cronbach's Alpha of 0.818 and a Composite Reliability score of 0.880. Green Transformational Leadership (GTFL) shows a Cronbach's Alpha of 0.834 and a CR of 0.883 while Green Servant Leadership (GSL) presents a Cronbach's Alpha of 0.779 and a CR of 0.849 both achieving acceptable reliability standards. Green Work Engagement (GWE) demonstrates a Cronbach's Alpha value of 0.847 and a CR value of 0.887 which verifies its reliable measurement. The metrics demonstrate that every construct maintains strong internal consistency and reliability and can therefore be applied with confidence in subsequent analysis (Creswell & Creswell, 2018). The assessment of convergent validity involves Average Variance Extracted (AVE) which evaluates how well the items of a construct account for the variance within that construct. When a construct achieves a threshold value of 0.5 or higher it demonstrates that it explains in excess of half of the variance accounted for by its indicators (Fornell & Larcker, 1981). AVE measures confirm that each construct meets the convergent validity threshold with EGP at 0.649 and GTFL at 0.601 followed by GWE at 0.568 and GSL at 0.529. The measurement items effectively represent the core constructs according to these outcomes which show adequate convergent validity as Hair et al. (2019) demonstrate in table 1.

**Table 1: Construct Reliability and Validity**

<b>Variables</b>	<b>Cronbach's Alpha</b>	<b>rho_A</b>	<b>Composite Reliability</b>	<b>Average Variance Extracted (AVE)</b>
Employee Green performance	<b>0.818</b>	<b>0.827</b>	<b>0.880</b>	<b>0.649</b>
Green Servant leadership	<b>0.779</b>	<b>0.788</b>	<b>0.849</b>	<b>0.529</b>
Green Transformational leadership	<b>0.834</b>	<b>0.840</b>	<b>0.883</b>	<b>0.601</b>
Green Work Engagement	<b>0.847</b>	<b>0.849</b>	<b>0.887</b>	<b>0.568</b>

The Fornell-Larcker criterion establishes discriminant validity by showing that a construct's AVE square root exceeds its correlations with other constructs (see Fornell & Larcker, 1981 table 2). The diagonal values in the Fornell-Larcker table show that the square root of the AVE for each construct exceeds its correlations with other constructs thereby confirming discriminant validity. The square root of the AVE for EGP measures 0.805 which exceeds its correlations with GSL at 0.388, GTFL at 0.608 and GWE at 0.523. GTFL demonstrates an AVE square root result of 0.775 which stands above its correlations with GSL at 0.422 and GWE at 0.619. The findings demonstrate that every construct remains distinct while measuring unique concepts which prevent multicollinearity problems in the model (Hair et al., 2019).

**Table 2: Fornell and Larcker, 1981**

<b>Variables</b>	<b>Employee Green performance</b>	<b>Green Servant leadership</b>	<b>Green Transformational leadership</b>	<b>Green Work Engagement</b>
Employee Green performance	0.805			
Green Servant leadership	0.388	0.727		
Green Transformational leadership	0.608	0.422	0.775	
Green Work Engagement	0.523	0.457	0.619	0.753

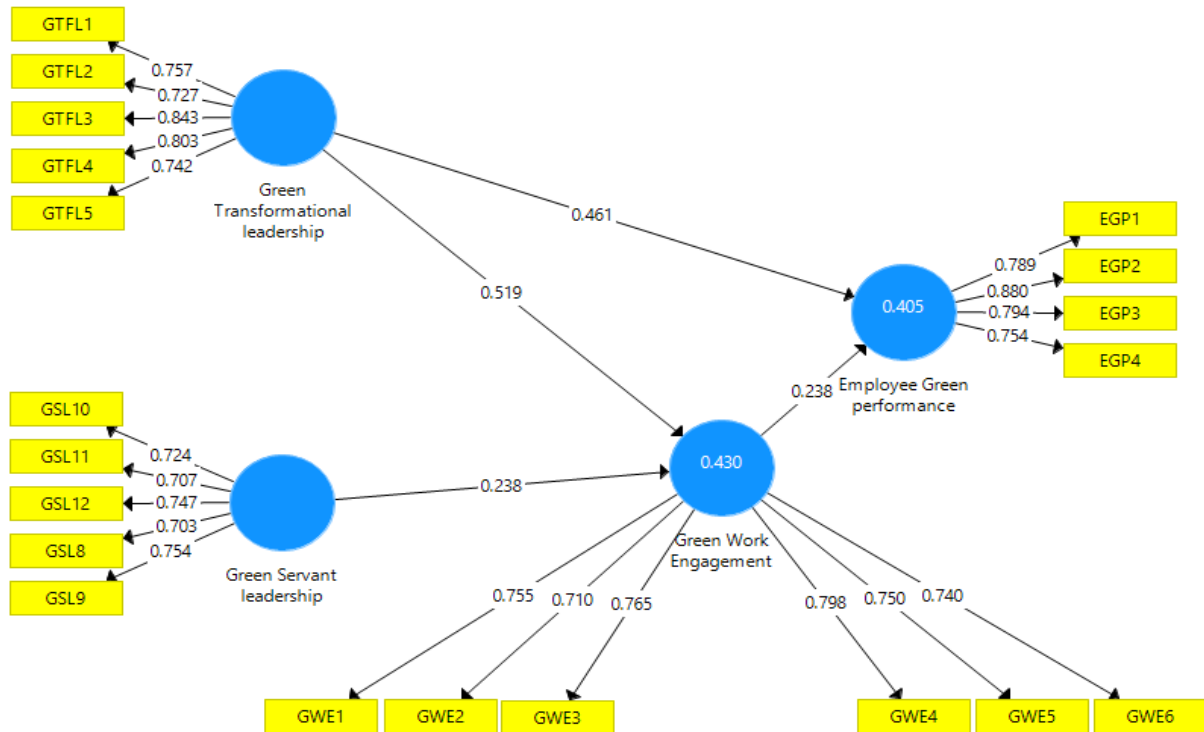
Discriminant validity assessment utilizes the Heterotrait-Monotrait Ratio (HTMT) criterion as a stricter evaluation method. According to Henseler et al. (2016) table 3 HTMT values below 0.85 demonstrate that constructs maintain sufficient distinction from each other. The study supports construct distinction since all HTMT scores remain under 0.85 both theoretically and statistically. The HTMT measure between GWE and EGP stands at 0.624 while GTFL and GWE have a value of 0.730 and GSL and GTFL show a value of 0.516 with all of these values being in the acceptable range. The results confirm that the study's constructs evaluate distinct yet interconnected aspects of green leadership together with work engagement and performance outcomes (Henseler et al., 2016).

**Table 3: Heterotrait-Monotrait Ratio (HTMT)**

<b>Variables</b>	<b>Employee Green performance</b>	<b>Green Servant leadership</b>	<b>Green Transformational leadership</b>	<b>Green Work Engagement</b>
Employee Green performance				
Green Servant leadership	<b>0.474</b>			
Green Transformational leadership	<b>0.731</b>	<b>0.516</b>		
Green Work Engagement	<b>0.624</b>	<b>0.551</b>	<b>0.730</b>	

The measurement model demonstrates sufficient reliability and validity standards which confirm its statistical validity for testing hypotheses. Results demonstrate internal consistency among constructs through high reliability values while AVE values verify convergent validity and Fornell-Larcker criterion alongside HTMT results establish discriminant validity. The study advances to structural model assessment because all reliability and validity criteria have been

achieved and this assessment tests construct relationships through PLS-SEM analysis with SmartPLS (Hair et al., 2019). The measurement model validation establishes precise representation of latent constructs according to the theoretical framework which enables strong and significant interpretation of research outcomes in sustainability leadership studies.



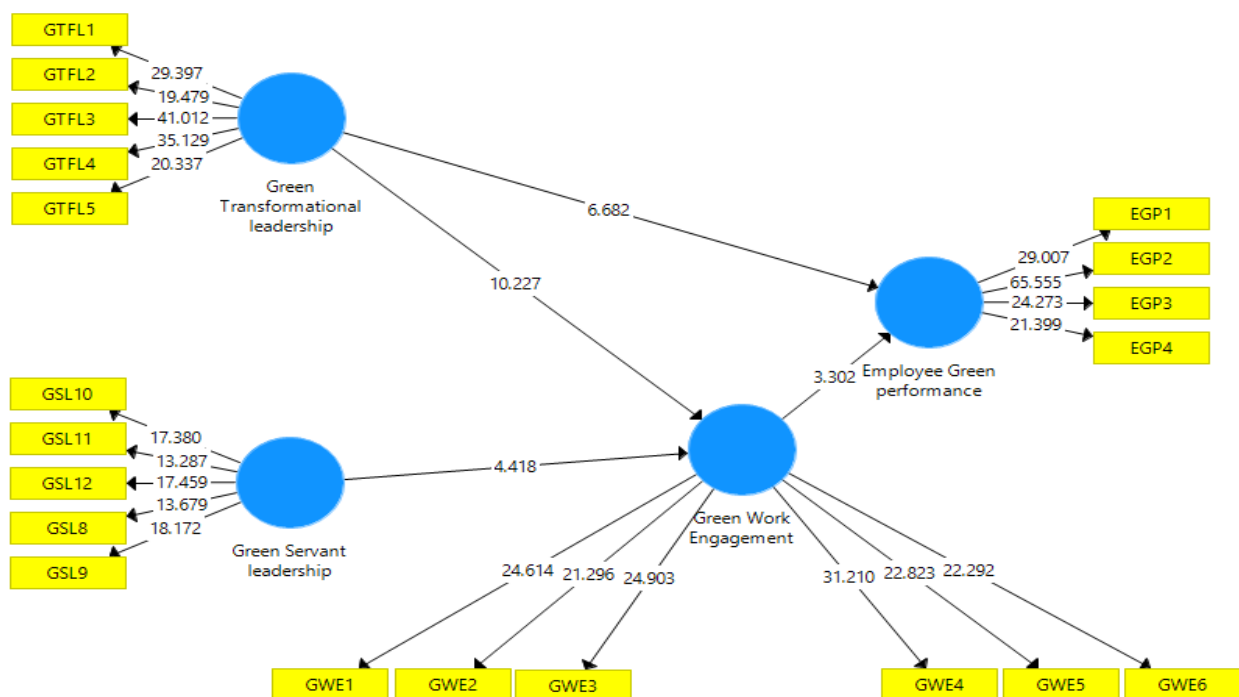
**Figure 2: Factor Loadings**

### Structural Model

The analysis of the structural model provides insights into how Green Transformational Leadership (GTFL), Green Servant Leadership (GSL), Green Work Engagement (GWE), Environmental Awareness (EA), and Employee Green Performance (EGP) are causally linked through Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS. This study evaluates the hypothesized relationships by analyzing path coefficients ( $\beta$  values) alongside standard deviations (STDEV), t-statistics, and p-values which measure strength and statistical significance. The research evaluates the model's explanatory power ( $R^2$ ) and predictive relevance ( $Q^2$ ) to assess how well the independent variables account for variations in employee green performance and engagement. The study findings demonstrate significant contributions of leadership styles, employee engagement, and environmental awareness to sustainability behaviors and validate the theoretical framework as established by Hair et al. (2019).

The hypothesis testing outcomes show that every proposed relationship shows statistical significance because their p-values remain less than 0.05 and t-statistics exceed 1.96 which strongly supports the hypothesized paths (Henseler et al., 2015). Research shows that Green Transformational Leadership leads to significant improvements in Employee Green Performance ( $\beta = 0.466$ ,  $t = 6.682$ ,  $p < 0.001$ ) by motivating employees to actively participate in sustainability initiatives. Research has already shown that leaders who create a sustainability vision lead to greater employee commitment toward environmental actions as shown by Afsar et al (2020). Green Servant Leadership establishes a notable yet weaker direct connection with Employee Green

Performance ( $\beta = 0.056$ ,  $t = 2.695$ ,  $p = 0.007$ ) indicating that servant leadership encourages sustainability culture through ethical responsibility and mentorship yet mostly impacts performance indirectly (Luu, 2019). The analysis of mediation demonstrates that Green Servant Leadership significantly affects Employee Green Performance indirectly via Green Work Engagement ( $\beta = 0.056$ ,  $t = 2.695$ ,  $p = 0.007$ ). Through heightened engagement levels servant leaders promote employee green performance which then results in better sustainability behaviors. The findings show Green Transformational Leadership improves Employee Green Performance indirectly via Green Work Engagement ( $\beta = 0.122$ ,  $t = 3.04$ ,  $p = 0.002$ ) according to figure 3. Transformational leadership strengthens employee engagement which results in more sustainability-focused behaviors. Leaders who inspire their employees and make them feel empowered and valued help those employees to adopt sustainability goals and undertake green performance actions (Tim et al, 2011). According to engagement theories and research by Tian et al. (2019), employees who show psychological and emotional involvement in their work display voluntary behaviors such as pro-environmental actions.



**Figure 3: Mediating Effect**

Furthermore, the moderating role of Environmental Awareness in the Green Work Engagement–Employee Green Performance relationship is statistically significant ( $\beta = 0.097$ ,  $t = 2.026$ ,  $p = 0.043$ ) as shown in table 4 and Figure 4. The findings indicate that employees with higher environmental awareness are better able to translate their engagement into tangible green performance, whereas employees with lower awareness may struggle to implement sustainability behaviors effectively (Malik et al., 2021). This suggests that awareness programs and sustainability education can amplify the impact of employee engagement on green performance, reinforcing the need for corporate environmental training initiatives (Saeed et al, 2019).

The explanatory power of the model is assessed using  $R^2$  values, which measure how well the independent variables explain the variance in the dependent variables. The results indicate that 40.5% of the variance in Employee Green Performance ( $R^2 = 0.405$ ) is explained by Green Transformational Leadership, Green Servant Leadership, Green Work Engagement, and

Environmental Awareness, suggesting a moderate to strong explanatory power (Hair et al., 2019). This means that leadership styles, employee engagement, and environmental awareness play a crucial role in shaping employee sustainability behaviors. Similarly, 43.0% of the variance in Green Work Engagement ( $R^2 = 0.430$ ) is explained by Green Transformational Leadership and Green Servant Leadership, confirming that leadership is a key driver of employee engagement in sustainability initiatives (Schaufeli et al., 2006). These  $R^2$  values demonstrate that the model is effective in explaining leadership-driven sustainability behaviors in the workplace.

In addition to explanatory power, the predictive relevance of the model is evaluated using  $Q^2$  values, which measure how well the model predicts omitted cases (Henseler et al., 2015). The results show that the model has high predictive relevance for Employee Green Performance ( $Q^2 = 0.255$ ) and Green Work Engagement ( $Q^2 = 0.239$ ). Since  $Q^2$  values are positive, this confirms that the model has strong predictive validity, meaning that leadership, engagement, and environmental awareness are reliable predictors of sustainability outcomes. The positive  $Q^2$  values indicate that the model can effectively predict employee green behaviors across different organizational settings, strengthening its applicability in sustainability leadership research.

The study provides several theoretical and managerial implications. From a theoretical perspective, the findings expand sustainability leadership research by integrating both Green Transformational Leadership and Green Servant Leadership into a unified framework, demonstrating their direct and indirect effects on Employee Green Performance. The confirmation of Green Work Engagement as a mediator supports engagement theories, showing that leaders influence sustainability behaviors by fostering engagement among employees (Ashfaq, 2024). The moderating role of Environmental Awareness further enriches the sustainability literature by highlighting that awareness is a key enabler in translating engagement into workplace green performance (Abdou et al., 2023). From a managerial perspective, the findings suggest that organizations should integrate both transformational and servant leadership approaches to enhance sustainability outcomes. Transformational leaders should focus on inspiring employees with a clear vision for sustainability, while servant leaders should offer direct support and ethical mentorship to facilitate the implementation of green initiatives (Luu, 2019). Additionally, HR managers should design employee engagement programs tailored to sustainability, including incentive programs, eco-friendly workplace initiatives, and training on sustainability practices (Chanana, 2024).

Since environmental awareness strengthens the impact of engagement on performance, companies should invest in educational programs and sustainability workshops to ensure that employees possess the necessary knowledge to implement green behaviors effectively (Mishra, 2017).

So the structural model results confirm that leadership, engagement, and environmental awareness are key drivers of employee sustainability behaviors. The validated model exhibits moderate to strong explanatory power ( $R^2$  values) and significant predictive relevance ( $Q^2$  values), confirming its robustness. These findings provide valuable insights for corporate sustainability strategies, leadership development programs, and HRM policies. By leveraging the combined strengths of transformational and servant leadership, enhancing employee engagement, and increasing environmental awareness, organizations can foster a workforce that actively contributes to sustainability goals. The study's outcomes offer practical recommendations for HR professionals, corporate sustainability officers, and policymakers looking to design effective leadership-driven sustainability programs that drive long-term environmental and business success.

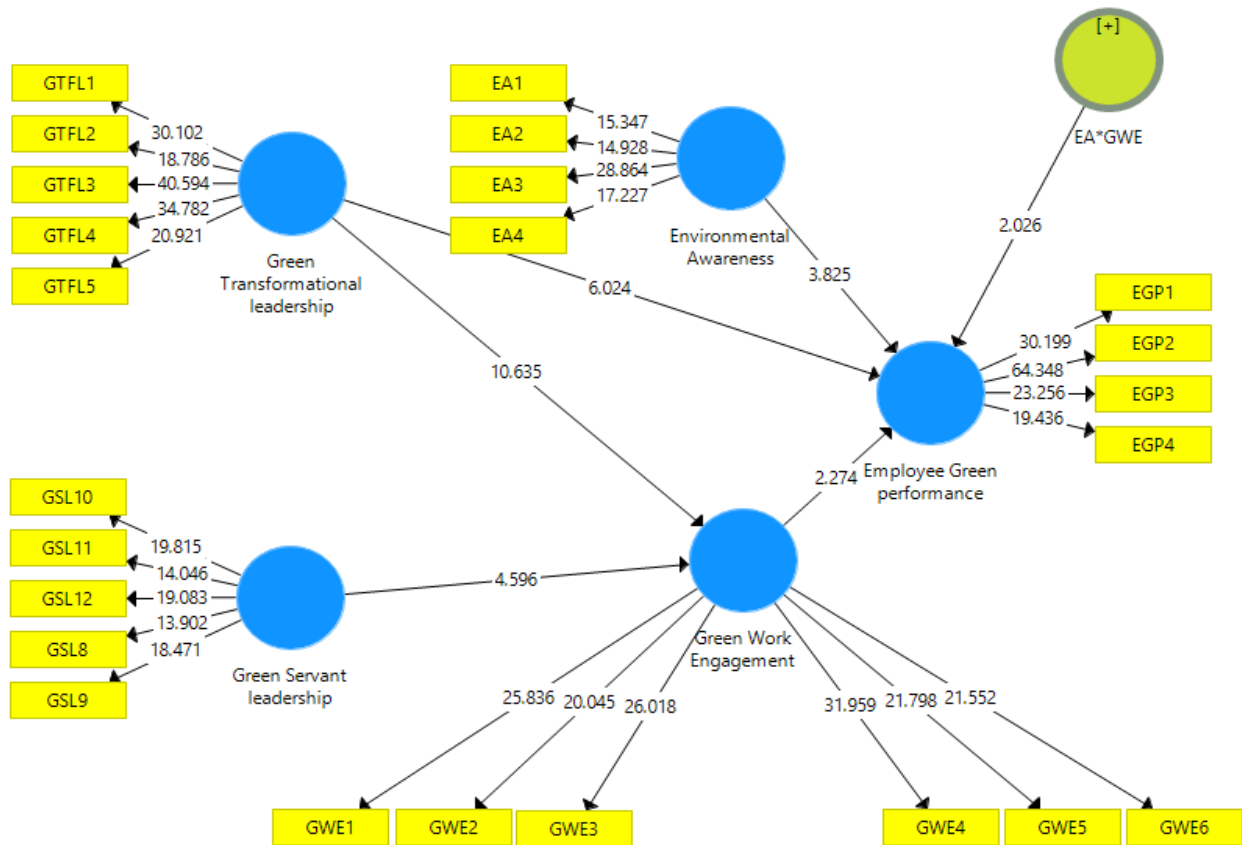


Figure 4: Moderation Effect

Table 4: Direct and Indirect Effect

Hypothesis	Pathways	$\beta$	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	Decision
H1	Green Transformational leadership -> Employee Green performance	0.466	0.069	6.682	0.000	Accepted
H2	Green Servant leadership -> Employee Green performance	0.056	0.021	2.695	0.007	Accepted
H3	Green Servant leadership -> Green Work Engagement -> Employee Green performance	0.056	0.021	2.695	0.007	Accepted
H4	Green Transformational leadership -> Green Work Engagement -> Employee Green performance	0.122	0.041	3.04	0.002	Accepted
H5	EA * GWE -> Employee Green performance	0.097	0.046	2.026	0.043	Accepted

**Table 5: R2**

	<b>R Square</b>	<b>R Square Adjusted</b>
Employee Green performance	0.405	0.401
Green Work Engagement	0.430	0.427

**Table 6: Q2**

	<b>SSO</b>	<b>SSE</b>	<b>Q<sup>2</sup> (=1-SSE/SSO)</b>
Employee Green performance	1224	912.235	0.255
Green Servant leadership	1530	1530	
Green Transformational leadership	1530	1530	
Green Work Engagement	1836	1397.103	0.239

## **Conclusion**

The research investigated how Green Transformational Leadership (GTFL) and Green Servant Leadership (GSL) affect Employee Green Performance (EGP) through Green Work Engagement (GWE) as a mediating factor and Environmental Awareness (EA) as a moderating factor. The research applied Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS to confirm its hypotheses and identify meaningful connections between leadership styles, engagement levels, environmental awareness, and sustainable employee behavior patterns. Both Green Transformational Leadership and Green Servant Leadership improve Employee Green Performance through direct and indirect paths involving Employee Engagement while Environmental Awareness enhances the relationship between Engagement and Performance. The research findings add value to current sustainability leadership studies and employee engagement research by offering theoretical knowledge and practical guidance for organizations working to improve sustainability results with efficient leadership practices.

Green Transformational Leadership emerges as the most effective approach to improving Employee Green Performance because leaders who build shared sustainable visions and motivate their teams establish essential conditions for stronger green employee behaviors. Transformational leaders establish enduring sustainability objectives, stimulate eco-friendly innovation and develop a workplace atmosphere that incorporates sustainability into everyday tasks (Omarova, 2022). Under transformational leadership employees show stronger voluntary participation in sustainability practices along with increased environmental dedication and innovation. Green Servant Leadership shows notable yet indirect effects on Employee Green Performance where its influence operates through employee engagement despite its focus on ethical responsibility and environmental awareness (Luu, 2019). The research demonstrates how transformational and servant leadership styles work together to promote sustainable actions where GTFL supplies vision and motivation and GSL delivers necessary support and ethical direction for employees to carry out green practices.

The study reveals that Green Work Engagement functions as a mediator between leadership and performance outcomes. Green Transformational Leadership and Green Servant Leadership have significant effects on Employee Green Performance by way of Green Work Engagement which shows that effective leaders need to inspire sustainability initiatives and build work environments that motivate employees towards green objectives. Higher levels of employee engagement result in stronger internalization of environmental values while fostering proactive pursuit of green initiatives and integration of sustainability into daily work activities (Cheema et al, 2020).

Employee engagement stands out as an essential tool to achieve leadership sustainability objectives through real green performance results. To strengthen leadership sustainability initiatives organizations need to focus on employee engagement tactics through green rewards systems workplace sustainability programs and ecological task groups.

The study significantly shows Environmental Awareness functions as a key moderator between Green Work Engagement and Employee Green Performance. Research demonstrates that employee environmental awareness strengthens the relationship between engagement and green performance outcomes. Environmental awareness plays a critical role in converting engagement efforts into measurable sustainability results according to Roscoe et al. (2019).

Workers with knowledge about environmental challenges alongside corporate sustainability policies and green work practices achieve better implementation of sustainability initiatives. Employees who possess limited environmental awareness face difficulties in turning their engagement into measurable green performance because they lack sufficient knowledge and guidance. The study shows that organizations must implement environmental awareness training because such programs improve employees' sustainability knowledge which leads to better green behavior implementation. To achieve corporate sustainability goals businesses must provide sustainability education along with awareness workshops and environmental training initiatives so that employees become knowledgeable and skilled enough to make meaningful contributions to sustainability objectives.

The combination of strong explanatory power and predictive relevance proves the model's robustness and relevance for sustainability research. Green Transformational Leadership, Green Servant Leadership, Green Work Engagement, and Environmental Awareness explain 40.5% of Employee Green Performance variance as shown by an  $R^2$  value of 0.405 which demonstrates moderate to strong explanatory power (Hair et al., 2019). Leadership proves essential for promoting workplace sustainability initiatives as Green Work Engagement displays an  $R^2$  of 0.430. The model's predictive relevance was solidified by  $Q^2$  values showing Employee Green Performance ( $Q^2 = 0.255$ ) and Green Work Engagement ( $Q^2 = 0.239$ ) provided strong predictive power. High positive  $Q^2$  values show that the model successfully predicts organizational sustainability behaviors which strengthen its usefulness for research and practical corporate use (Henseler et al., 2016).

The study advances theoretical knowledge within sustainability leadership and employee engagement by presenting a combined model of Green Transformational Leadership and Green Servant Leadership that reveals their direct and indirect impacts on employee sustainability performance. Research findings validate Green Work Engagement as a mediating factor which supports employee engagement models by showing that motivated staff engage in voluntary green actions (Aboramadan et al., 2002). Environmental Awareness serves as a moderating factor that enriches sustainability leadership research by demonstrating how awareness functions as an essential driver for turning engagement into green performance (Darvishmoteval et al., 2022). The study expands the current understanding by presenting a comprehensive framework that demonstrates the interplay between leadership, engagement, and awareness in determining organizational sustainability practices.

The study supplies crucial information to business leaders and HR professionals, and policymakers who aim to boost corporate sustainability initiatives. To achieve better sustainability results organizations must implement dual leadership approaches that combine transformational and servant leadership styles. Transformational leaders need to motivate their teams with transparent sustainability objectives while servant leaders should give direct guidance, ethical guidance and

support to achieve successful sustainability results (Luu, 2019). HR professionals need to create employee engagement strategies that align with sustainability goals, which can include programs for recognizing green behavior as well as incentives for sustainable performance alongside leadership training for environmental responsibility (Chaudhary, 2020). Organizations need to invest in sustainability education and knowledge-sharing programs alongside corporate environmental policies because environmental awareness boosts engagement which improves performance by enabling employees to implement green behaviors effectively (Dangelico, 2015).

## **Recommendations**

This study delivers several strategic recommendations to organizations, HR professionals, and business leaders focused on improving employee sustainability behaviors through strong leadership and engagement strategies along with awareness programs. By applying these strategic recommendations organizations can create environmental responsibility cultures while boosting employee green performance and achieving long-term sustainability results.

Organizations must implement dual leadership by combining Green Transformational Leadership and Green Servant Leadership within their sustainability initiatives. Transformational leaders should work to motivate their employees through a sustainability-focused vision for the future while promoting innovative green practices and building a workplace culture that emphasizes environmental accountability. Servant leaders need to deliver direct guidance and mentorship while maintaining ethical leadership standards to help employees acquire essential support for implementing sustainability practices. Leadership training programs need to develop managers with skills in transformational and servant leadership to enhance their effectiveness in promoting employee engagement and environmental performance.

Organizations need to create formal employee engagement programs that inspire workers to actively engage in sustainability initiatives. The programs need to feature green reward systems and recognition programs which honor employees who show dedication to environmental objectives. Performance incentives that drive sustainability including bonuses for green innovations and promotions based on environmental achievements along with team-based green challenges can substantially boost employee participation in sustainability initiatives. Companies need to build green engagement responsibilities into job roles to make sustainability tasks an essential part of employee daily work.

Organizations need to prioritize environmental awareness programs because they act as fundamental drivers of employee green performance. Workers who understand environmental matters better can turn their involvement into concrete sustainability initiatives. Businesses need to invest in environmental training workshops and sustainability platforms as well as interactive campaigns to teach employees about company environmental regulations and best green practices while showing how their actions affect sustainability. Embedding green awareness initiatives into new employee onboarding programs along with continuous professional development courses and leadership training sessions helps integrate sustainability knowledge within corporate culture.

Organizations need to establish workspaces dedicated to sustainability which encourage eco-friendly practices throughout every organizational level. Organizations need to develop green workplace policies which cover paperless operations together with energy-efficient workspaces and initiatives for waste reduction and carbon footprint tracking. Department green committees create space for employees to own sustainability projects and develop new solutions for corporate environmental objectives. Companies must equip staff members with essential resources to join sustainability programs by supplying eco-friendly office materials and introducing flexible

telecommuting to lower transportation emissions alongside establishing recycling systems in the workplace.

HR professionals need to embed sustainability-focused competencies into evaluations of employee performance and leadership assessments. Performance management systems need to evolve by embedding sustainability metrics so evaluations include both job performance and environmental impact contributions from employees and managers. Businesses can implement green key performance indicators (KPIs) which evaluate how employees participate in environmental initiatives and practices that reduce waste and save energy. HR teams need to embed sustainability objectives within organizational mission statements as well as annual goal-setting processes and corporate values to demonstrate enduring dedication to environmental responsibility.

Organizations should work with industry associations and government agencies to improve corporate sustainability by strengthening their collaborative efforts. Business entities should establish partnerships with NGOs focused on sustainability as well as environmental agencies and academic research institutions to remain informed about best practices and resources while contributing to larger environmental projects. Cross-sector sustainability collaborations enable organizations to access industry-wide green innovations while benchmark sustainability performance and join global environmental projects like carbon reduction and circular economy models.

Organizations need to utilize technology in order to boost their sustainability performance and enhance employee participation in environmental initiatives. Through the use of digital platforms and artificial intelligence tools companies are empowered to monitor carbon emissions and energy consumption while analyzing sustainability data which allows them to make informed decisions based on environmental performance metrics. AI-powered sustainability chatbots alongside virtual sustainability training programs and gamification techniques can boost employee commitment to eco-friendly practices. Organizations can adopt block chain technology to achieve transparent sustainability reporting which assures accountability in environmental performance.

Companies need to integrate sustainability strategies into their long-term business vision and core business model. Organizations need to treat sustainability as an integral part of their business model which drives long-term success and competitive positioning. Leadership teams must maintain regular communication about sustainability goals and integrate environmental considerations into their strategic decision-making while cultivating a corporate culture that supports sustainability as a collective duty. Through continuous sustainability audits along with yearly environmental reports and stakeholder transparency organizations demonstrate their dedication to sustainable practices and social responsibility.

Adopting these recommendations enables organizations to boost employee green performance while establishing a workplace culture focused on sustainability and aligning corporate operations with global environmental objectives. The implementation of these strategies will deliver enhanced business sustainability results while building a workforce that values environmental responsibility and strengthening corporate standing in the green economy.

### **Limitations of the Study**

The research targets only the hospitality and tourism sector in Karachi and does not apply to other industries or areas with distinct environmental challenges. The cross-sectional research design collected data at one point in time which limited the study's ability to identify causal links between leadership qualities, employee engagement levels, and green performance outcomes. Future research should employ a longitudinal approach to enhance understanding. The utilization of

employee surveys introduces common method bias because of the tendency for respondents to provide socially desirable answers or subjective feedback. Future research must include multiple data sources including supervisor evaluations and sustainability reports. The research utilized non-probability convenience sampling which may not capture the full diversity of the hospitality workforce. The representation of various employee categories could be enhanced through the implementation of random or stratified sampling techniques. The research investigates environmental awareness while neglecting additional moderating elements like organizational sustainability culture, government policies, and employee motivation. Future research should integrate these external influences. The research measures individual employee green behavior but fails to examine wider organizational sustainability metrics including energy use efficiency or waste management systems. The research fails to address how cultural differences impact leaders' effectiveness and their sustainability engagement practices. Understanding green leadership's effectiveness across various socio-economic settings requires cross-cultural comparisons. The study fails to distinguish between small businesses and large hotel chains which could implement different sustainability strategies. Subsequent studies must explore the relationship between organizational scale and resource availability and their effects on green leadership success.

### **Managerial Implications**

The research provides essential knowledge for business leaders alongside HR professionals and policymakers aiming to incorporate sustainability into leadership principles and environmental management strategies. To encourage sustainability-driven behaviors organizations need to train managers in Green Transformational Leadership alongside Green Servant Leadership because transformational leaders motivate employees through a sustainability vision while servant leaders give practical support for green projects. The HR departments must apply Green HRM practices by embedding sustainability into performance evaluations along with green KPIs and employee reward programs to increase engagement. Organizations must create environmental education schemes including sustainability workshops and green certifications to equip employees with essential knowledge and capabilities for effective sustainability implementation. Integrating sustainability into corporate culture via workplace green policies along with eco-friendly committees and sustainability projects led by employees will boost employee participation in sustainability initiatives. Organizations need to implement technology solutions and data analytics to monitor carbon emissions and green performance while using AI sustainability tools and block chain reporting systems to improve transparency. Organizations must synchronize their sustainability strategies with worldwide environmental regulations and carbon taxation policies together with industry standards and work with government bodies, NGOs and sustainability experts to improve green leadership programs for regulatory compliance. Effective stakeholder engagement demands businesses to broaden their sustainability initiatives to encompass suppliers, customers and local communities via ethical sourcing practices and responsible supply chain management. Long-term corporate planning must incorporate sustainability to maintain its position as a fundamental business priority instead of treating it as an ephemeral initiative. Businesses need to incorporate sustainability principles into their mission statements and corporate goals while also documenting their environmental dedication in annual reports. Businesses that embrace sustainability strategies enhance their brand reputation while gaining a competitive edge and supporting worldwide sustainability initiatives.

### **Future Research Recommendations**

The research offers important findings about how leadership connects with engagement and sustainability practices yet requires further study to improve the existing model through analysis of more mediating variables and moderating effects. Upcoming research should investigate whether

Psychological Empowerment and Green Organizational Citizenship Behavior along with Perceived Organizational Support for Sustainability serve as mediators to clarify leadership's effect on employee green performance. The relationship between leadership and green performance can be affected by moderators like Green HRM practices, Pro-Environmental Personality Traits of employees, Corporate Sustainability Culture, and Regulatory Pressure. Research that extends across multiple industries and geographical areas and utilizes longitudinal studies will enhance the generalizability of findings. Analyzing digital transformation in green leadership alongside objective sustainability performance metrics improves our understanding of organizational behavior focused on sustainability.

## **References**

1. Ababneh, O. M. A. (2021). How do green HRM practices affect employees' green behaviors? The role of employee engagement and personality attributes. *Journal of Environmental Planning and Management*, 64(7), 1204-1226
2. Abdou, A. H., Al Abdulathim, M. A., Hussni Hasan, N. R., Salah, M. H. A., Ali, H. S. A. M., & Kamel, N. J. (2023). From green inclusive leadership to green organizational citizenship: Exploring the mediating role of green work engagement and green organizational identification in the hotel industry context. *Sustainability*, 15(20), 14979.
3. Aboramadan, M. (2022). The effect of green HRM on employee green behaviors in higher education: the mediating mechanism of green work engagement. *International Journal of Organizational Analysis*, 30(1), 7-23.
4. Afsar, B., Maqsoom, A., Shahjehan, A., Afridi, S. A., Nawaz, A., & Fazliani, H. (2020). Responsible leadership and employee's proenvironmental behavior: The role of organizational commitment, green shared vision, and internal environmental locus of control. *Corporate Social Responsibility and Environmental Management*, 27(1), 297-312.
5. Alherimi, N., Marva, Z., Hamarsheh, K., & Alzaatreh, A. (2024). Employees' pro-environmental behavior in an organization: a case study in the UAE. *Scientific reports*, 14(1), 15371.
6. Ashfaq, F., Abid, G., Ilyas, S., & Elahi, A. R. (2024). Sustainable leadership and work engagement: Exploring sequential mediation of organizational support and gratitude. *Public Organization Review*, 1-22.
7. Blok, V., Wesselink, R., Studynka, O., & Kemp, R. (2015). Encouraging sustainability in the workplace: A survey on the pro-environmental behaviour of university employees. *Journal of cleaner production*, 106, 55-67.
8. Chanana, N., & Singh, M. Y. (2024). Green HRM: Boosting Employee Engagement with Digital Tools for Sustainability. *Socio-Economic Relevance in Science, Social Science, and Commerce toward Sustainability*.
9. Cheema, S., Afsar, B., Al-Ghazali, B. M., & Maqsoom, A. (2020). Retracted: How employee's perceived corporate social responsibility affects employee's pro-environmental behaviour? The influence of organizational identification, corporate entrepreneurship, and environmental consciousness. *Corporate Social Responsibility and Environmental Management*, 27(2), 616-629.
10. Chen, Y. S., & Chang, C. H. (2013). The determinants of green product development performance: Green dynamic capabilities, green transformational leadership, and green creativity. *Journal of business ethics*, 116, 107-119.
11. Codagnone, R. A. (2021). Perspectives of leadership styles prediction of employee engagement in a lean manufacturing environment (Doctoral dissertation, Grand Canyon University).

12. Darvishmotevali, M., & Altinay, L. (2022). Green HRM, environmental awareness and green behaviors: The moderating role of servant leadership. *Tourism Management*, 88, 104401.
13. Daud, S. R., Suhaime, I. L., Sehat, N. S., Jogeran, J., & Mukapit, M. (2023). Leadership Style that Influences Employees' Green Behavior: A Literature Review. *International Journal of Academic Reserach in Economics and Management Sciences*, 12(3).
14. Einas Azher, Sadia Javed, Hafiz Muhammad Ahmed Siddiqui, Farrukh Zafar, Osama Ahmed. Exploring the Impact of Digital Supply Chain Integration on the Firm's Performance with Mediation and Moderation Role of Knowledge Sharing and Environmental Turbulence - Vol. 3 No. 1 (2025): ISSN Online: 3006-4708, ISSN Print: 3006-4694. <https://policyjournalofms.com/index.php/6/article/view/341> Social Science Review Archives
15. Eladawi, F. M. I., Elnaggar, M. K., Hashad, M. E., Awad, A. H. I., & Abd, A. A. E. K. G. (2024). EFFECT OF GREEN INCLUSIVE LEADERSHIP ON EMPLOYEES'GREEN WORK ENGAGEMENT IN HOTELS AND TRAVEL AGENCIES: THE ROLE OF GREEN INTRINSIC MOTIVATION. *Geo Journal of Tourism and Geosites*, 54, 885-895.
16. Farao, C., Bernuzzi, C., & Ronchetti, C. (2023). The Crucial Role of Green Soft Skills and Leadership for Sustainability: A Case Study of an Italian Small and Medium Enterprise Operating in the Food Sector. *Sustainability*, 15(22), 15841.
17. Farhan Hussain, Hafiz Muhammad Ahmed Siddiqui, Dr. Muhammad Faseeh Ullah, Farrukh Zafar, Fatima Liaquat, Seema Dero .Relevance of Consumer Generated Content in Food Industry Of Pakistan - Vol. 21 NO. S11 (2024): ISSN 1741-8992, 1741-8984. <https://migrationletters.com/index.php/ml/article/view/10896> - Migration Letters.
18. Farrukh Zafar, Rabia Sabri, Hafiz Muhammad Ahmed Siddiqui, Iraj Masood. Emerging Issues in Management Accounting: Digital Technologies, Governance, and Sustainability - - Vol (13) No. 1 (2024)- <https://bbejournal.com/BBE/article/view/711> - Bulletin of Business and Economics (BBE)
19. Fenwick, T. (2007). Developing organizational practices of ecological sustainability: A learning perspective. *Leadership & Organization Development Journal*, 28(7), 632-645.
20. Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, 18(1), 39. <https://doi.org/10.2307/3151312>
21. Goni, K. M., Isa, Y. Z. B. M., & Abdullah, T. B. (2023). Moderating Role of Green Transformational Leadership on the Relationship between Green Human Resource Practices and Environmental Performance of Hotels in Kano, Nigeria. *Journal of Human Resource and Sustainability Studies*, 11(3), 415-440.
22. Gotsis, G., & Grimani, K. (2016). The role of servant leadership in fostering inclusive organizations. *Journal of Management Development*, 35(8), 985-1010.
23. Hafiz Muhammad Ahmed Siddiqui, Farrukh Zafar, Asma Bano. Exploring the Effects of Audit Committee Size, Board Size, Female Directors, and Tax Aggressiveness on Firm Profitability - Vol. (3) No. (3) 2023 - <https://gjmif.com/index.php/GJMIF/article/view/77/44> - GISRAS Journal of Management & Islamic Finance
24. Hafiz Muhammad Ahmed Siddiqui, Farrukh Zafar, M. Faseeh Ullah Khan. A Study on Critical Success Factor, Challenges and Obstacles in Talent Management - Vol. (5) No. (3) 2022 <http://pjia.com.pk/index.php/pjia/article/view/627> - Pakistan Journal of International Affairs, <https://doi.org/10.52337/pjia.v5i3.627>
25. Hafiz Muhammad Ahmed Siddiqui, Farrukh Zafar. Riding the Waves of COVID-19: How the Pandemic Shook Up Financial Assets like Bitcoin, Crude Oil, Gold, and S&P500 - Vol. (16) No. (4) 2023 - <https://kasbitoric.com/index.php/kbj/article/view/358> - Kasbit

Business Journal

26. Hair, J. F., Sarstedt, M., & Ringle, C. M. (2019). Rethinking some of the rethinking of partial least squares. *European Journal of Marketing*, 53(4), 566–584. <https://doi.org/10.1108/EJM-10-2018-0665>
27. Haldorai, K., Kim, W. G., & Garcia, R. F. (2022). Top management green commitment and green intellectual capital as enablers of hotel environmental performance: The mediating role of green human resource management. *Tourism Management*, 88, 104431.
28. Han, H., & Yoon, H. J. (2015). Hotel customers' environmentally responsible behavioral intention: Impact of key constructs on decision in green consumerism. *International Journal of Hospitality Management*, 45, 22-33.
29. Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International Marketing Review*, 33(3), 405–431. <https://doi.org/10.1108/IMR-09-2014-0304>
30. Hussain, F., Siddiqui, H. M. A., Zafar, F., & Ullah, M. F. (2024). Effectiveness of Online shopping characteristics and well-designed website on customer satisfaction to purchase Online: Evidence from Textile industry of Hyderabad. Vol (03) No. 07 (2024) - <https://pjlw.com.pk/index.php/Journal/article/view/v3i7-58-71> - Pakistan Journal of Law, Analysis and Wisdom (PJLAW)
31. Imran, M., Zu, L. J., & Bano, S. (2024). Towards Sustainable Leadership: Investigating Self-serving Leadership's Effect on Employee Green Behavior, Exploring Mediators and Moderated by Organizational Ethical Climate. *International Journal of Organizational Leadership*, 13(First Special Issue 2024), 78-98.
32. Le, T. T., Chau, T. L. Q., Ngoc, L. T. T., & Tieu, T. T. (2024). How green transformational leadership drives environmental performance and firm performance? Empirical evidence from an emerging economy. *Corporate Social Responsibility and Environmental Management*, 31(6), 5504-5523.
33. Liden RC, SJ Wayne, C Liao and JD Meuser (2014) Servant leadership and serving culture: influence on individual and unit performance. *Academy of Management Journal* 57(5), 1434–1452. <https://doi.org/10.5465/amj.2013.0034>
34. Luu TT (2020b) Integrating green strategy and green human resource practices to trigger individual and organizational green performance: the role of environmentally-specific servant leadership. *Journal of Sustainable Tourism* 28(8), 1193–1222. <https://doi.org/10.1080/09669582.2020.1729165>
35. Luu, T. T. (2020). Integrating green strategy and green human resource practices to trigger individual and organizational green performance: The role of environmentally-specific servant leadership. *Journal of Sustainable Tourism*, 28(8), 1193-1222.
36. Malik, S. Y., Hayat Mughal, Y., Azam, T., Cao, Y., Wan, Z., Zhu, H., & Thurasamy, R. (2021). Corporate social responsibility, green human resources management, and sustainable performance: is organizational citizenship behavior towards environment the missing link?. *Sustainability*, 13(3), 1044.
37. Mark N.K. Saunders, Philip Lewis and Adrian Thornhill (2019) *Research Methods for Business Students*. 8th edn. Pearson Education. Available at: <https://www.dawsonera.com/abstract/9781292208794> (Accessed: 13 July 2020)
38. Mavara Siddiqui, Hafiz Muhammad Ahmed Siddiqui, Salman Hussain, Dr. Muhammad Faseeh Ullah Khan, Syed Faraz Ali, Muhammad Ahsan Hayat. Interaction of Financial Literacy In Impulsive Buying Behavior Theory - Vol. 09, NO. (3), pp-780-802, ISSN: 2059-6588(print), ISSN: 2059-6596 (online) 2024 - <https://remittancesreview.com/article-detail/?id=2059> - Remittances Review. <https://doi.org/10.5281/zenodo.13294643>

39. Mehak, S. S., & Batcha, H. M. (2024). Analyzing the influence of green human resource practices on organizational sustainability: the role of green attitudes and performance of employees'. *Environment, Development and Sustainability*, 1-34.
40. Mehak, S. S., & Batcha, H. M. (2024). Analyzing the influence of green human resource practices on organizational sustainability: the role of green attitudes and performance of employees'. *Environment, Development and Sustainability*, 1-34.
41. Miao, Q., & Nduneseokwu, C. (2025). Environmental Leadership in Private Organizations. In *Environmental Leadership in a VUCA Era: An Interdisciplinary Handbook* (pp. 317-398). Singapore: Springer Nature Singapore.
42. Mishra, P. (2017). Green human resource management: A framework for sustainable organizational development in an emerging economy. *International Journal of Organizational Analysis*, 25(5), 762-788.
43. Mughal, M. F., Cai, S., Faraz, N. A., Haiying, C., & Poulouva, P. (2024). Green servant leadership and employees' workplace green behavior: Interplay of green self-efficacy, green work engagement, and environmental passion. *Current Psychology*, 43(33), 26806-26822.
44. Muniza Syed, Osama Ahmed, Einas Azher, Shah Salman, Hafiz Muhammad Ahmed Siddiqui, Sadia Javed. The Impact of Influencer Marketing on Consumer Purchase Intention: The Mediating Role of Trust, Content, Consumer Engagement, and Popularity - Vol (03), NO. 1 (2025), Page # 147-166, ISSN Online 3006-2500 & ISSN Print 3006-2497. <https://assajournal.com/index.php/36/article/view/134> Advance Social Science Archives Journal.
45. Nduneseokwu, C. K., & Harder, M. K. (2023). Developing environmental transformational leadership with training: Leaders and subordinates environmental behaviour outcomes. *Journal of Cleaner Production*, 403, 136790.
46. Nisar, Q. A., Haider, S., Ali, F., Jamshed, S., Ryu, K., & Gill, S. S. (2021). Green human resource management practices and environmental performance in Malaysian green hotels: The role of green intellectual capital and pro-environmental behavior. *Journal of cleaner production*, 311, 127504.
47. Orazbayeva, B., van der Sijde, P., & Baaken, T. (2021). Autonomy, competence and relatedness—the facilitators of academic engagement in education-driven university-business cooperation. *Studies in Higher Education*, 46(7), 1406-1420.
48. Paille P, Y Chen, O Boiral and J Jin (2014) The impact of human resource management on environmental performance: an employee-level study. *Journal of Business Ethics* 121(3), 451–466. <https://doi.org/10.1007/s10551-013-1732-0>.
49. Patrick, M. A. (2023). Leadership Behavior in Small Business (Doctoral dissertation, Trident University International).
50. Paul, J. (2024). The Role of Leadership in Driving Sustainable Innovation.
51. Post, J. E., & Altman, B. W. (2017). Managing the Environmental Change Process: Barriers and Opportunities 1. In *Managing green teams* (pp. 84-101). Routledge.
52. Qu, Y., Liu, Y., Nayak, R. R., & Li, M. (2015). Sustainable development of eco-industrial parks in China: effects of managers' environmental awareness on the relationships between practice and performance. *Journal of Cleaner Production*, 87, 328-338.
53. Rasheed, M. (2025). Green at Work: Fostering Employee Engagement in Sustainability. In *Government Influences on Eco-Friendly Practices in Business* (pp. 87-118). IGI Global.
54. Rauf, F., Wanqui, W., Naveed, K., Qadri, S. U., & Ali, M. S. E. (2023). How ESG Reporting Effects on Green Credit, Green Investment: Moderating Role of Growth Sales.
55. Raza, S. A., & Khan, K. A. (2022). Impact of green human resource practices on hotel environmental performance: the moderating effect of environmental knowledge and

- individual green values. *International Journal of Contemporary Hospitality Management*, 34(6), 2154-2175.
56. Rezapouraghdam, H., Alipour, H., & Darvishmotevali, M. (2018). Employee workplace spirituality and pro-environmental behavior in the hotel industry. *Journal of Sustainable Tourism*, 26(5), 740-758.
57. Roscoe, S., Subramanian, N., Jabbour, C. J., & Chong, T. (2019). Green human resource management and the enablers of green organisational culture: Enhancing a firm's environmental performance for sustainable development. *Business Strategy and the Environment*, 28(5), 737-749
58. Rustam, A., Wang, Y., & Zameer, H. (2020). Environmental awareness, firm sustainability exposure and green consumption behaviors. *Journal of Cleaner Production*, 268, 122016.
59. Ryan, A. M., & Spash, C. L. (2008). Measuring "Awareness of environmental consequences": Two scales and two interpretations.
60. Saeed, B. B., Afsar, B., Hafeez, S., Khan, I., Tahir, M., & Afridi, M. A. (2019). Promoting employee's proenvironmental behavior through green human resource management practices. *Corporate Social Responsibility and Environmental Management*, 26(2), 424-438.
61. Saifulina, N., Carballo-Penela, A., & Ruzo-Sanmartín, E. (2023). Effects of personal environmental awareness and environmental concern on employees' voluntary pro-environmental behavior: a mediation analysis in emerging countries. *Baltic Journal of Management*, 18(1), 1-18.
62. Salama, M. E. (2024). Sustainable Leadership and Work Behavior in Hotel Businesses: The Influence of Perceived Environmental Corporate Social Responsibility. *Environment and Social Psychology*, 9(11), 3251.
63. Saratun, M. (2016). Performance management to enhance employee engagement for corporate sustainability. *Asia-Pacific Journal of Business Administration*, 8(1), 84-102.
64. Saunders, M. N., & Darabi, F. (2024). Using multi-and mixed methods research designs. In *Field Guide to Researching Employment and Industrial Relations* (pp. 71-87). Edward Elgar Publishing.
65. Saunders, M. N., & Darabi, F. (2024). Using multi-and mixed methods research designs. In *Field Guide to Researching Employment and Industrial Relations* (pp. 71-87). Edward Elgar Publishing.
66. Schaufeli, W.B., Bakker, A.B. and Salanova, M. (2006), "The measurement of work engagement with a short questionnaire: a cross-national study", *Educational and Psychological Measurement*, Vol. 66 No. 4, pp. 701-716
67. Sekaran U, Bougie R. *Research methods for business: A skill building approach*. John Wiley & sons; 2016.
68. Sh. M. Fakhre Alam Siddiqui, Tureshna Kumari, Hammad Zafar, Hafiz Muhammad Ahmed Siddiqui and Muhammad Faseeh Ullah Khan. Analyzing the Impact of CSR on Corporate Performance Using PLS-SEM: Exploring the Mediating Roles of Human Resource Management and Customer Satisfaction in Pakistan's Food and Beverage Manufacturing Sector - Vol (13), NO. 3 (2024), p-ISSN 2788-452X & e-ISSN 2304-375X - <https://poverty.com.pk/index.php/Journal/article/view/862> - Journal of Asian Development Studies.
69. Sharma, S., Prakash, G., Kumar, A., Mussada, E. K., Antony, J., & Luthra, S. (2021). Analysing the relationship of adaption of green culture, innovation, green performance for achieving sustainability: Mediating role of employee commitment. *Journal of Cleaner Production*, 303, 127039.
70. Sharma, S., Prakash, G., Kumar, A., Mussada, E. K., Antony, J., & Luthra, S. (2021). Analysing the relationship of adaption of green culture, innovation, green performance for

- achieving sustainability: Mediating role of employee commitment. *Journal of Cleaner Production*, 303, 127039.
71. Sibte Ali, M., Faridi, M. Z., Javed, K., & Javaid, M. Q. (2024). Exploring the impact of Green Supply Chain Management Practices on Environmental Performance of Firms: What is the Role Intellectual Capital and Green Information System. *Pakistan JL Analysis & Wisdom*, 3, 83.
  72. Sudirman, A., & Gemilang, A. V. (2020). Promoting work-based learning as a praxis of educational leadership in higher education. *International Journal of Learning, Teaching and Educational Research*, 19(3), 149-173.
  73. Tian, Q., & Robertson, J. L. (2019). How and when does perceived CSR affect employees' engagement in voluntary pro-environmental behavior?. *Journal of Business Ethics*, 155, 399-412.
  74. Tims, M., Bakker, A. B., & Xanthopoulou, D. (2011). Do transformational leaders enhance their followers' daily work engagement?. *The leadership quarterly*, 22(1), 121-131.
  75. Umair, S., Waqas, U., & Mrugalska, B. (2024). Cultivating sustainable environmental performance: The role of green talent management, transformational leadership, and employee engagement with green initiatives. *Work*, 78(4), 1093-1105.
  76. Veleva, V., Bodkin, G., & Todorova, S. (2017). The need for better measurement and employee engagement to advance a circular economy: Lessons from Biogen's "zero waste" journey. *Journal of cleaner production*, 154, 517-529.
  77. Viterouli, M., Belias, D., Koustelios, A., Tsigilis, N., & Bakogiannis, D. (2023). Fostering Sustainability Through the Integration of Green Human Resource Management and Change Management: Nurturing Eco-Conscious Organizational Practices. In *Managing Successful and Ethical Organizational Change* (pp. 241-278). IGI Global.
  78. Yan, L., Ahmed, Z., Khosa, M., Fahmi Omar Faqera, A., Kayode Ibikunle, A., & Rashid Khan, A. (2024). Entrepreneurial leadership and green innovative work behavior: the role of green soft and hard talent management with a dual theoretical lens. *Sustainability*, 16(18), 8136.
  79. Ying, M., Faraz, N. A., Ahmed, F., & Raza, A. (2020). How does servant leadership foster employees' voluntary green behavior? A sequential mediation model. *International journal of environmental research and public health*, 17(5), 1792.
  80. Zhu, Y., Salman, M., Kiran, S., Sajjad, F., Sibte-Ali, M., Sherwani, S., & Wajid Kamran, M. (2024). The CSR perspective: Interplay of technological innovation, ethical leadership and government regulations for sustainable financial performance. *Plos one*, 19(2), e0297559.