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GREEN LEADERSHIP AND GREEN PROJECT PERFORMANCE: THE MEDIATING ROLE OF GREEN EMPLOYEE VOICE BEHAVIOR IN THE PAKISTANI CONSTRUCTION SECTOR

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Abstract

Purpose *This study examines the impact of green leadership (GL) on green project performance (GPP) in Pakistan's organizations, with a focus on the mediating roles of green employee voice behavior (GEVB).*

Design/Methodology *A quantitative, cross-sectional survey was conducted among 200 employees from 50 leading construction firms (C1- Contractors) registered with Pakistan Engineering Council (PEC) and located in Khyber Pakhtunkhwa (KPK), Pakistan. Data was collected via structured questionnaires (5-point Likert scale) distributed both online (Google Forms) and on-site. The study employed PLS-SEM (Smarts 4) for analysis, ensuring robust statistical validation.*

Findings *Green leadership (GL) has a direct influence on green project performance (GPP) and positively affects green employee voice behavior (GEVB), which, in turn, significantly enhances project performance. Notably, GEVB functions as an effective mediating variable, indicating that empowering employees is a crucial mechanism for translating leadership vision into sustainability-oriented practices. These findings demonstrate that the influence of leadership is both immediate and amplified through employee engagement. Consequently, the results contribute to the theoretical understanding of leadership and project sustainability by positioning employees' responses as a natural outcome of effective, ethical, and environmentally conscious leadership.*

Managerial Implications *Organizations are able not only to improve performance on the projects, but also establish lasting competitive advantage as employee-introduced green innovations become a key tool towards achieving environmental and corporate social responsibility goals.*

Introduction

Now a days, society is paying more attention to firms' green actions, the reason behind is the growing concern about the environmental problems they face (D'Angelo, Cappa, & Peruffo, 2023). Companies find it challenging to add sustainability to their core operations because it means competing their environmental efforts with the usual concerns of doing business minimizing costs and aiming for quick earnings (Belhadi, Kamble, Gunasekaran, Zkik, & Touriki, 2023). The construction industry in Pakistan is under increasing sustainability pressure, but with poor leadership practices and involvement of employees, the results of green projects are poor. The issue of the effects of green leadership in promoting project performance by means of employee voice behavior is also a critical problem that is under-investigated (Iqbal et al., 2024). The conflict causes agencies to initiate environmental plans but fail to support them properly, so they are approved only in name and reality, thanks to what scholars refer to as ceremonial adoption (M. Zhang, Fan, Liu, Zhang, & Zeng, 2023). Sustainability projects are different from traditional ones because they call for significant spending beforehand on technology, training and renewing processes, with the payoff usually appearing after a long period (Sobaih, Hasanein, Gharbi, & Abu Elnasr, 2022). The issue is especially tough for SMEs, since they do not have the money or experts in sustainability that bigger organizations do (A. Khan & Khan, 2023). For this reason, green projects get improper funding, achieve poor answers and attract less assistance from the organization, reinforcing doubts about their success (Suliman et al., 2023).

It is commonly difficult to merge risk management, green project management and sustainability since institutions are fragmented and there is not enough interdisciplinary experience (Ikudayisi, Chan, Darko, & Adegun, 2022). Even when projects are green, construction activities can still lead to noise, vibrations and poor air quality and jobsites therefore need efficient strategies to limit these issues (Owusu-Manu et al., 2023). However, the industry faces challenges in implementing these practices due to its project-based nature, which involves multiple stakeholders, temporary teams, and high-pressure deadlines (Mubarak, Khan, Ali, & Pesämaa, 2024). Green leadership can be defined as a leadership style that prioritizes sustainable practices, encouraging employees to adopt eco-friendly behaviors and aligning project goals with environmental standards (Mi et al., 2024). Various studies found that most implementations of corporate sustainability do not succeed because they are poorly linked to main business functions. However, not being able to set KPIs for sustainability regularly causes responsibility and green project direction to be vaguer (Zhong, Shao, Xiao, Yang, & An, 2025). Therefore, an approach to leadership is necessary that ensures sustainability and mobilizes people and resources, a role for which Green Leadership is most effective (Adindu, Ekung, & Ukpong, 2022).

Scholars like Shafait and Huang (2024) stated that there is a dire need of green leadership in construction sector, there remains a notable gap in understanding how to effectively integrate and apply green leadership practices for sustainable outcomes. Prior research that investigate green performance outcomes focus on broad organizational achievements rather than the outcomes of individual projects (Ameer & Khan, 2023). This gap calls for sector-specific studies that assess how green leadership can effectively manage sustainability in construction projects (Khun-anod, Limsawasd, & Athigakunagorn, 2023). Therefore, a deeper investigation into the nuanced relationship between green leadership and green project performance is further needed, particularly in the context of resource constraints and stakeholder pressures inherent in construction projects (Niazi et al., 2023). Understanding how green leadership encourages employees to engage in voice behaviors can provide insights into enhancing sustainability practices within construction projects. Exploring the relationship between supportive green leadership and the propensity for employees to voice environmental concerns can highlight significant avenues for improving project sustainability (Brohi, Majeed, & Hussain, 2023). In addition, scholar like (Aloqaily, 2023) call for future research on the mediating role of employee green voice behavior in the relationship between leadership practices and sustainability outcomes.

Displaying green employee voice behavior means companies are making changes in how they focus on environmental matters (Raouf & Al-Ghamdi, 2023). At first, sustainability actions were decided by senior management, who would then require compliance from all the employees (M. Asghar, Ullah, & Bangash, 2025). Even so, this straightforward model ordinarily does not recognize the great insights and new ideas from the team who deals with processes, systems and customers every day (Yue, Lin, & Tan, 2025). Green employee voice behavior experts have studied employee voice for many years (Katsaros, 2025). It mainly describes what employees say beyond their work duties, trying to boost the company's performance through offering helpful ideas, criticisms or suggestions (A. Asghar, Asif, Akhtar, & Islam, 2023). As a result, green employee voice behavior mainly concerns matters related to the environment. (Arzoo, ur Rehman, Latif, & Ullah, 2025). Environmental initiatives and organizational citizenship are often shown by behaviors that are forward-thinking, lend to progress and indicate that an employee is committed to helping nature (Aloqaily, 2023). Green employee voice behavior makes a major and constantly evolving difference in sustainably developing organizations (Memon, Ghani, & Han, 2025).

Research Objectives

Following are the aims of this research:

1. To examine the direct effects of Green Leadership on Green Project Performance.
2. The aim of the research will be to investigate the correlation between Green Leadership and Green Employee Voice Behavior.
3. To assess how Green Employee Voice Behavior influences the performance of Green Projects.
4. The purpose of the study was to establish the mediating effect of Green Employee Voice Behavior in the nature of the relationships among Green Leadership and Green Project Performance.

Literature Review and Theory Development

Social Exchange Theory (SET)

This paper employs Social Exchange Theory (SET) to look at how green leadership is related to employee outcomes. According to SET, cooperation between employers and employees is based on mutual and complementary activity, in which the green leaders stimulate staff with common vision and professionalism (Mehmood, Hasan, Ali, Nawaz, & Amjad, 2024). This back and forth movement fosters GPP, particularly in a resource limited environment such as Pakistan which requires sustainable practices to facilitate their operations (Muldoon, Gould, & Joullié, 2024). Although extensive endorsement of SET theory has been used to evaluate various leader-follower relationships, a considerable research defect subsists on the relationship between the mechanism of GL, and any specific employee behaviors that enhance performance outcome (Marquina, Le Dain, Joly, & Zwolinski, 2024).

The green practice of GL encourages the employees to be involved thus creating a sense of commitment and empowerment to deliver GPP (Hyder, Malik, Hussain, & Saqib, 2024). This enhancement fosters increased involvement because workers take pride in the work allocated to them (Bilal, Raza, & Khan, 2024). GL practices also promote GEVB in which the personnel feel free to express creative ideas, which will further boost project compliance and performance (Shahzad, Rasheed, Faisal, & Hassan, 2024). To consider how GL influences the performance of green projects, to establish the mediating effect of GEVB between GL and GPP, as well as the extent to which GL is practiced in the construction sector of Pakistan (N. A. Khan, Bahaudur, Akhtar, Maialeh, & Pravdina, 2024).

The Social Exchange Theory indicates that workplace interactions are based on reciprocity, trust and mutual obligations. Green leadership also instills trust and two-way respect, which motivates employees to show green voice behavior. This proactive contribution helps to reinforce working together and innovativeness, which builds mutual value that directly leads to better performance results of green projects.

Green Leadership (GL)

GL can be defined as the ability in the hands of leaders to convince people and institutions to a long term ecological sustainability vision. It entails the regulation of environmental friendly policies and influencing organizations in order to promote environment-friendly measures (Shafait & Huang,

2024). Additionally, the challenges of GL now becomes important because environmental challenges have been increasing and leaders need to lead their organizations into acting in a more environmentally responsible manner. According to Berniak-Woźny and Rataj (2023) studies, leaders who focus on environment-friendly initiatives challenge their associates to behave in an environmentally friendly way, a fact that promotes transfer of communication dealing with environmental responsibility. In addition, GL is also a requisite of a sustainable building, particularly in such a country as Pakistan (Abid, Al-Wathinani, & Goniewicz, 2025). Moreover, the principle of GL as applied in Pakistan involves not only environmental sensitivity but also professional project management, which is relevant in this country where 36 % of the overall industrial waste belongs to the sphere of construction Abbas, Khalid, Maqsood, and Rehman (2025). In Pakistan, construction leaders become role models of the environment, demonstrate a viable vision of sustainability and promote green ideas (R. U. Khan, Saqib, Abbasi, Mikhaylov, & Pinter, 2023).

Green Employee Voice Behavior (GEVB)

The universal definition of the GEVB in the literature is the active and positive engagement in environmental sustainability at the workplace (M. Asghar et al., 2025). GEVB has a critical role to play in fostering environmental sustainability in organizations because it offers employees an opportunity to share their ideas and give input on the sustainability-related decisions (Ajmal, Sareet, & Islam, 2025). Additionally, it is vital in directing the environmental orientation in an organization, as well as, inculcating a spirit of innovation (M. Asghar et al., 2025). GEVB deals with workers sharing ideas on how they can make any actions of the company more sustainable, the areas need improvements, mistakes, or the variety of options the company should do to improve sustainability (Yue et al., 2025). Moreover, sustainability-focused organization and the presence of considerable employee support facilitates the growth of any organization and gives it a competitive edge (Atiq, 2023). Based on areas of the organization where the resources are not utilized in the best way, GEVB also offers greener options as well as proposes the principles of the circular economy (Liu, Ahmad, Lho, & Han, 2024). By aligning environmental attitudes of employees with those of the organization, GEVB enhances active participation in the organization and job satisfaction eventually boosting innovation (Amrutha & Geetha, 2024).

Green Project performance (GPP)

A very important indicator of the achievement of the environmentally sustainable performance of the company is the GPP. It integrates the environmental, social and financial aspects, and grants firms long-term benefits (Raouf & Al-Ghamdi, 2023). The performance of the green project is critical in the construction management, as it is taking center focus to develop a green and socially responsible project (Ghafari & Samaei, 2025). Additionally, it has efficiency, effectiveness, and the ecological outcomes in its projects, which employ sustainability concepts on all the project levels by (Mubarak et al., 2024). The better GPP enhance the perception on the environmental front and make a firm more competitive. Moreover, yhe main factors to help to achieve better results are green leaders, green creativity, and employee skills (Komurlu, Kalkan Ceceloglu, & Arditi, 2024). Green projects employ the expertise in sustainable management, the circular economy, ecological modernization (Yin & Zhao, 2024). Similarly, they employ the newest re-friendly green technologies and materials to construct buildings, and apply building information modeling (BIM) to construct an actual environmental verification (Tamimi, Arshad, Haq, & Chughtai, 2024). Consequently, developing the ability of sustainability construction strategies in groups is quite favorable (Al-Hakimi et al., 2024).

Hypothesis Development

Green Leadership and Green Project performance

GL plays a key role in improving the performance of the GPP in terms of allocating resources and assisting the employees, fostering the idea of sustainability and ensuring that there is a mutual learning process amongst employees (Mubarak et al., 2024).Based on Social Exchange Theory, GL incorporate environmental issues into green projects and decision making that promote environmental responsibility, and espouse environmental obligations (Chen, Chen, Zhang, & He, 2025).In

return, GL brings culture of communicating, cooperating, and openness among the stakeholder reducing challenges and delivering green projects on time (S. Zhang, Ren, & Tang, 2024). Furthermore, GL plays a pivotal role in the performance of green project in facilitating environmental involvement and consequent accomplishments in organizations sustainability (Chen et al., 2025). GL helps team members to take action toward the environment regarding green project practices and the ability to establish an environment that is conducive to learning and flexibility (Iqbal et al., 2024). Additionally, different works reveal that GL can support GPP by instilling green self-belief in the employees and the green project participants. GL can lead by example by performing green actions, in front of others, and the ability to learn new things about the environment drives practice into GPP (Malik, Ali, Latan, & Chiappetta Jabbour, 2023). Moreover, environmental knowledge is developed through coaching, mentoring and environmental opportunities that help an individual develop a sense of responsibility and the ability to manage environmental issues with an effort to ensure GPP remains (Niazi et al., 2023). Hence, we hypothesize that:

H1: GL significantly impacts GPP.

Green Leadership and Green Employee Voice Behavior

GL promotes the participation of employees in terms of giving their views and ideas about the environmental matters, which may result in enhanced performance within companies (Dua, Farooq, & Rai, 2023). Based on Social Exchange Theory, GL apply the social learning and the green transformational leadership theories to formulate a mindset that promotes reporting of environmental issues and engagement in GEVB (Aloqaily, 2023). In return, Promoting green voice is also favored by the fact that GL encourage an atmosphere of openness, learning, and mutual respect, which is an essential ingredient of psychological safety (Tabrizi, Karatepe, Rezapouraghdam, Rescalvo-Martin, & Enea, 2023). In addition, empowerment, rewards, and meaningful tasks are also a part of green leadership as they can enhance an employee voice behavior (Sharif, Tongkachok, Akbar, Iqbal, & Lodhi, 2024). GL enhances confidence and willingness to speak out their environmental views, promote new environmental concepts and sustainable performance (Yue et al., 2025). Furthermore, the academic study indicates that GL leads to the preservation of the green voice in the sense that it is environmentally conscious. Besides, GL encourages open GEVB by enhancing trust and commitment among team members (Begum, Ashfaq, Xia, & Awan, 2022). Additionally, GL mental, interpersonal and cultural environments to define openness of communication on environmental issues organization (Ajmal, Sareet, & Islam, 2024). Hence, we hypothesize that:

H2: GL significantly impacts GEVB.

Green Employee Voice Behavior and Green Project performance

GEVB is essential in enhancing GPP of sustainable organizations. Employees who communicate their opinions on the topics of the project sustainability are also contributing to the openness, and they can thus enhance the green project result, and this is prerequisite of the success of green projects (Iqbal et al., 2024). Based on Social Exchange Theory, maintaining GEVB in a company enhances effective communication, response and feedback on the green ideas and results into green project demands, befits to anticipations and tracks according to the current green project prescriptions (S. Zhang et al., 2024). Furthermore, active measures assist the organization to learn faster, making green projects more effective and responsive that translate into improved environmental outcomes, adherence to budgets, on schedule execution of green projects, and stakeholder's satisfaction (Murillo-Ramos, Huertas-Valdivia, & García-Muiña, 2024). In addition, promotion of environmentally-responsible speech among employees fosters teamwork and the intermingling of departments required to complete intricate projects in the green sector (Zheng, Jiang, Cui, & Shen, 2023). Similarly, strong measures and vigilance may be exercised when there is an employee green voice, which is considered in decision making. Moreover, the actions of employees that are green are central to the performance of green projects (Sharif et al., 2024). In addition, with a little effort to get employees to offer great input, identify

shortcomings and adhere to new methodologies, environmentally oriented projects can be completed successfully and have a tangible impact (Katsaros, 2025). Hence, we hypothesize that:

H3: GEVB significantly impacts GPP.

Green Employee Voice Behavior mediates between Green Leadership and Green Project performance

GEVB is a crucial aspect of GL, where employees express their ideas and concerns about the environment. This behavior helps create a workplace where everyone feels comfortable talking about environmental matters and contributes to the success of sustainability projects and its performance (Ajmal et al., 2024). Based on Social Exchange Theory, GEVB is essential for enhancing GPP outcomes, especially under ethical GL which encourages original ideas, passes on information, and solves obstacles related to sustainability (Yue et al., 2025). Additionally, employees who share their views about sustainability help the organization meet environmental requirements, respond well to expectations, and follow the latest guidelines for sustainability which results in better GPP (Nguyen & Macchion, 2023). Similarly, active green leader actions help the organization learn better, making green projects more capable and quick to respond, leading to better environmental results, sticking to budgets, completing green projects on time, and pleasing stakeholders (M. Asghar et al., 2025). Moreover, GL and employee actions are key to the success of green projects, as they encourage input, notice issues, and support new approaches to improve green project outcomes (Mubarak et al., 2024). In addition, employee voice greatly influences an organization's sustainability and plays a big role in determining how well green projects perform led by green leaders (Ajmal et al., 2025). Hence, we hypothesize that:

H4: GEVB significantly mediates between GL and GPP.

Conceptual Framework

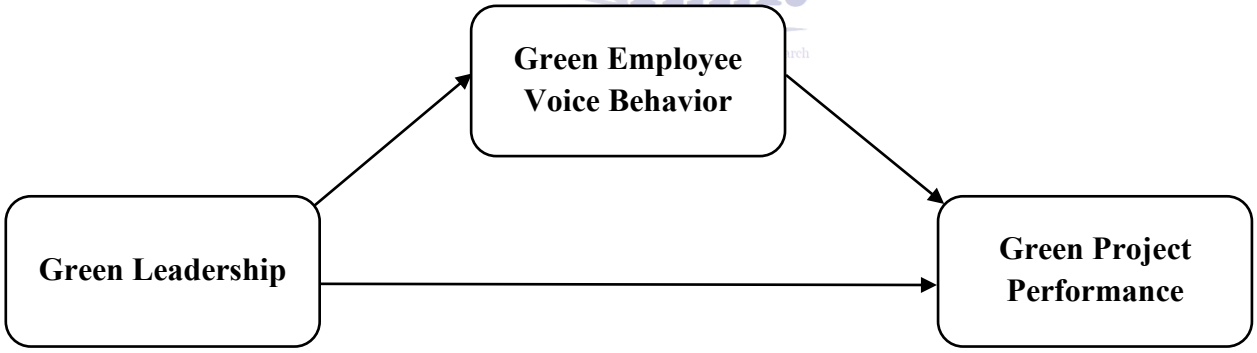

Figure 1: ***Conceptual Framework***

Methodology

This study adopted a quantitative, cross-sectional, and survey-based research design, underpinned by a positivist philosophy that emphasized objectivity, empirical testing, and statistical analysis. The approach was appropriate for examining hypothesized relationships in a real-world setting without requiring a long-term timeframe. The research targeted individual employees working in 50 leading construction firms (C1- Contractors) registered with the Pakistan Engineering Council (PEC) in Khyber Pakhtunkhwa (KPK), Pakistan. These firms were selected based on their relevance and accessibility. The participants included a diverse group of professionals project managers, site engineers, technical, and administrative staff who were strategically involved in project execution and

green leadership practices. Due to the lack of a comprehensive sampling frame and the fragmented nature of the construction sector, convenience sampling was used to access knowledgeable respondents efficiently. A total of 200 participants were surveyed, with the sample size determined based on Roscoe's rule, Krejcie and Morgan's table, the 10-times rule, and G*Power analysis to ensure statistical robustness. Data were collected using a structured, self-administered questionnaire consisting of closed-ended items adapted from validated scales in prior research. The instrument was pilot-tested for clarity and contextual relevance. Data collection was conducted both in person and electronically, ensuring voluntary participation and maintaining respondent confidentiality. Descriptive statistics, reliability and validity tests, and structural equation modeling (SEM) were used for data analysis. Ethical considerations, including informed consent and secure data handling, were fully observed throughout the research process.

Measures and Instruments

The instruments consisted of close-ended questions regarding the research variables, and using a questionnaire helped to gather a relatively large sample. It also indicated clauses to ensure the confidentiality of the information collected. The survey items were adapted from past validated measures to make sure the reliability and content validity are genuine (Hair et al., 2014). All items within the questionnaire were measured using a **five-point Likert scale,** ranging from **1 (Strongly Disagree)** to **5 (Strongly Agree).** This format enhances clarity, eases respondent decision-making, and contributes to higher response rates (Rasheed & Rashid,2024).

Table 1: ***Instrument***

S.No.	Constructs	No. of Items	Sources
1.	Green Project Performance	4	(Chen & Chang, 2013; Khan & Khan, 2023)
2.	Green Employee Voice Behavior	4	(Tabrizi et al., 2023)
3.	Green Leadership	4	(Begum et al., 2022)

Table 2: ***Sample characteristics***

	Frequency	Percentage
N=200	200	100%
Gender		
Male	128	64%
Female	72	36%
Work position		
Senior management & support employees	30	15%
Technical & planning employees	68	34%
Office & administrative employees	54	27%
Field operators	48	24%
Company size (employees)		
Less than 50	48	24%
50 - 250	78	39%

More than 250	74	37%
Employee work experience		
5-10 years	84	42%
10-15 years	56	28%
20+ years	60	30%

Analysis and Results

This section presents the overview of the results obtained after running the Smart PLS software. It includes analysis through measurement and structural modeling.

Measurement Model

The measurement model in Figure 2 suggests that while Green Leadership (GL) has direct impact on green project performance (GPP). GPP exert more influence, particularly when channeled through green employee voice behavior (GEVB).

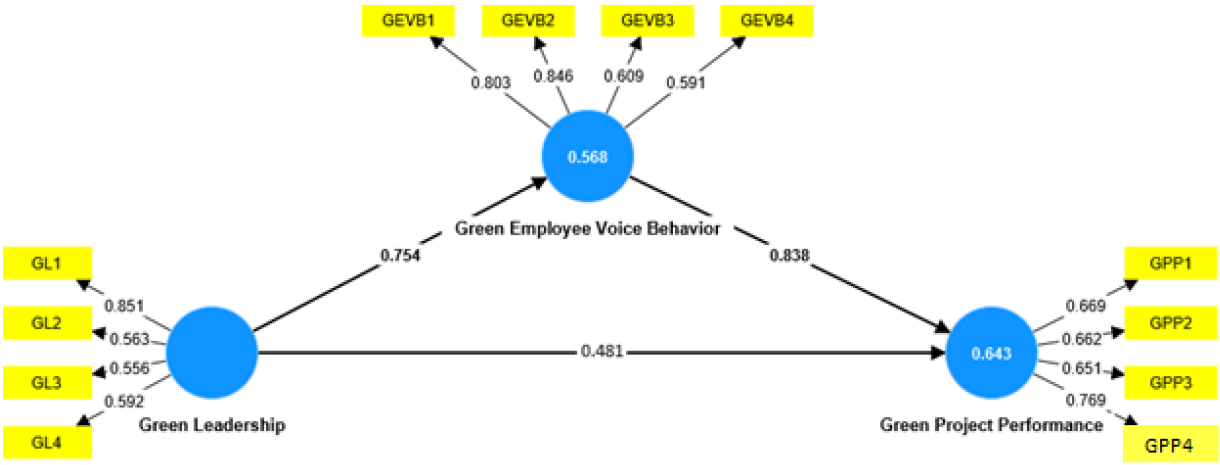

Figure 2: ***Measurement Model***

Confirmatory Factor Analysis (CFA)

This study evaluated the internal consistency of the components using Cronbach's alpha, composite reliability (CR), factor loadings and average variance extracted (AVE) with the findings presented in Table 3. Constructs such as GL, GEVB and GPP demonstrate strong reliability, with Cronbach's alpha values exceeding 0.7, indicating effective measurement (Chin, 2009). Moreover, the Average Variance Extracted (AVE) values highlight that most constructs explain a substantial amount of variance (Hair, Hollingsworth, Randolph, & Chong, 2017). These findings suggest to improve sustainability outcomes, organizations should prioritize green leadership through green employee voice behavior, as they are essential for encouraging green project performance.

Table 3: ***Confirmatory Factor Analysis***

Construct Name	Items	Loading	Cronbach's alpha	CR	AVE
Green Employee Voice Behavior	GEVB1	0.803	0.702	0.753	0.520

	GEVB2	0.846			
	GEVB3	0.609			
	GEVB4	0.591			
Green Leadership	GL1	0.851	0.719	0.907	0.525
	GL2	0.563			
	GL3	0.556			
	GL4	0.592			
Green Project Performance	GPP1	0.669	0.782	0.740	0.575
	GPP2	0.662			
	GPP3	0.651			
	GPP4	0.769			

Discriminant Validity

a) Heterotrait-monotrait ratio (HTMT)

Table 4 presents discriminant validity is tested based on the Heterotrait-Monotrait Ration (HTMT) table and satisfies the requirement that constructs in a research model GEVB, GL and GPP are significantly correlated among sustainability constructs. The values in the table 0.617, 0.520 and 0.572 indicate the HTMT of ratios of each pair of constructs. The standard established in determining whether there is a discriminant validity is an HTMT value less than 0.90 (Seidu, Chan, Edwards, & Owusu-Manu, 2025). All values in this table are far below 0.90 and therefore these are strong indications that each construct is distinct and measures a phenomenon (Heydari, 2024). The finding of the HTMT suggest that to achieve better GPP, GL of the organization must concentrate on empowering the green voice of employees because that is what influences the improved performance of green projects.

Table 4 : ***Heterotrait-monotrait ratio (HTMT)***

	GEVB	GL	GPP
Green Employee Voice Behavior			
Green Leadership	0.617		
Green Project Performance	0.520	0.572	

b) Fornell and Larcker Criterion

Table 5 uses the Fornell-Larcker Criterion to validate discriminant validity, indicating that all the square roots of the AVE exceed the correlations between variables. This confirms the discriminant validity of the constructs (Fornell & Larcker, 1981). The strong value on the table GEVB 0.721 outperforms among all correlations. The lowest is GL 0.652, demonstrating that each construct is statistically different and consistently assessed. Organization should establish specific initiatives for each area to improve their own contributions to sustainability project performance.

Table 5: ***Fornell and Larcker Criterion***

	GEVB	GL	GPP
Green Employee Voice Behavior	**0.721**		
Green Leadership	0.539	**0.652**	
Green Project Performance	0.601	0.583	**0.689**

Cross-loading for Correlation

The items in Table 6 have larger loadings inside their respective constructs compared to other constructs, as indicated by their cross-loading differences beyond the required threshold of 0.01, which verifies the discriminant validity (Gefen & Straub, 2005). Items which are successfully loaded to their target construct are GEVB1 0.803 and GEMV2 0.846. More

critically, items such as GPP4 0.769 have a high cross-loading to other constructs with significant loadings, a fact that shows that they are of significant importance in the conceptualization of the sustainable projects within the organization.

Table 6 : ***Cross loadings***

	GEVB	GL	GPP
GEVB1	**0.803**	0.605	0.715
GEVB2	**0.846**	0.851	0.581
GEVB3	**0.609**	0.272	0.508
GEVB4	**0.591**	0.239	0.511
GL1	0.846	**0.851**	0.581
GL2	0.194	**0.563**	0.272
GL3	0.167	**0.556**	0.174
GL4	0.182	**0.592**	0.233
GPP1	0.391	0.300	**0.669**
GPP2	0.361	0.221	**0.662**
GPP3	0.360	0.284	**0.651**
GPP4	0.829	0.605	**0.769**

Structural model

The study created a structural model by using bootstrapping techniques on 5,000 subsets. The structural model was investigated by analyzing the standardized paths to determine the result. This investigation evaluated all paths related to the hypothesis.

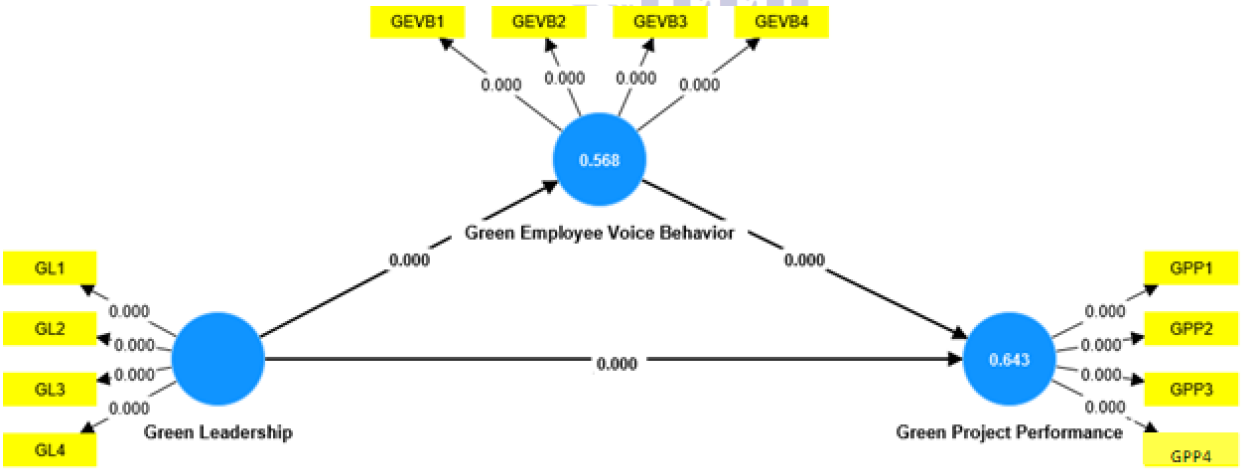

Figure 3 : ***Structural Model***

Common Bias Method

Table 7 provides the overall VIF values which suggest that most constructs demonstrate low to moderate levels of multicollinearity. The VIF values for various constructs related to GEVB, GL and GPP indicate minimal multicollinearity, with values ranging from 1.039 to 2.013. Overall, the findings confirm the constructs' reliability for future study, stressing the necessity of distinct green leadership techniques for firms seeking to improve green project performance.

Table 7 : ***Common Bias Variance***

Constructs	VIF
GEVB1	1.693
GEVB2	1.775
GEVB3	1.585
GEVB4	1.548
GL1	1.039
GL2	1.911
GL3	1.586
GL4	2.013
GPP1	1.580
GPP2	1.476
GPP3	1.469
GPP4	1.069

Predictability of the model

The model demonstrates sufficient predictive power, as the adjusted R-squared values exceed 0.10. Table 8 shows the path coefficients and significance of the structural model for the complete dataset. The predictability of the model reveals that the variables investigated can explain approximately 5.68% of the variance in GEVB and 6.43% in GPP, respectively. The slightly higher R-squared value for GPP shows that the model may be able to better predict it. Both variables show acceptable predictability, as evidenced by their adjusted R-squared values (Iqbal et al., 2024).

Table 8: ***Predictability of the Model***

	R-square	R-square adjusted
Green Employee Voice Behavior	0.568	0.566
Green Project Performance	0.643	0.640

Hypothesis Results

The findings of the hypothesis testing of Green Leadership in improving Green Project Performance assert that it is a decisive and multi-faceted role that Green Leadership plays in the sustainable organization. All hypotheses are strongly supported as the analysis indicates that Green Leadership is not only a very important positive direct factor that contributes to Green Project Performance (H1; $\beta = 0.481$, $p < 0.001$), but also a very strong influence that spurs the Green Employee Voice Behavior (H2: $\beta = 0.754$, $p < 0.001$). Finally, it is revealed that Green Employee Voice Behavior alone is a strong source driver to Green Project Performance (H3: $\beta = 0.838$, $p < 0.001$). Importantly, the findings in relation to H4: $\beta = 0.632$, $p < 0.001$ show the findings that the Green Employee Voice Behavior is a strong partial mediator in the bond between Green Leadership and Green Project Performance. This implies that the positive effect that Green Leadership has on green project success becomes even stronger when employees are empowered and are made to participate in sustainability campaigns, making the engagement of employees imperative in connection with reaping the benefits of leadership vision on the ground by translating into environmental performance.

Table 9: ***Hypothesis testing***

S.no	Regression path	Beta values	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Results
H1	Green Leadership ->	0.481	0.114	4.211	0.000	Accepted

	Green Project Performance					
H2	Green Leadership -> Green Employee Voice Behavior	0.754	0.039	9.226	0.000	Accepted
H3	Green Employee Voice Behavior -> Green Project Performance	0.838	0.091	9.180	0.000	Accepted
H4	Green Leadership -> Green Employee Voice Behavior -> Green Project Performance	0.632	0.100	6.317	0.000	Accepted

Discussion

H1 holds since Green Leadership has a positive and statistically significant influence on Green Project Performance with path coefficient value, beta = 0.481, t = 4.211, p = 0.000. This paper proves that Green Leadership (GL) has a tremendous positive impact on Green Project Performance (GPP) directly and indirectly through the mediating crucial factor, Green Employee Voice Behavior (GEVB). These results can be interpreted according to the Social Exchange Theory (SET), which shows that there is a reciprocity cycle: leaders who model and champion sustainability (GL) are viewed as investing in their employees, which makes them feel obligated to reciprocate (Malik et al., 2023).

H2 holds since Green Leadership has a positive and statistically significant influence on Green Employee Voice Behavior at a level of beta = 0.754, t = 9.226, and p = 0.000. This reciprocation is done in two folds. First, employees will be directly compensated by being more committed to project objectives, which will result in an increase in performance. Two, which is more impactful, leaders create psychological safety and empowerment that are reciprocated by employees presenting their ideas and concerns (GEVB); a valuable asset that would not be shared other. This voice behavior in itself is a vital performance driver, since it offers crucial innovative solutions and process optimization to the ornate sustainability problems (Sharif et al., 2024).

In the case of H3, the gathered results reveal that Green Employee Voice Behavior significantly and strongly influences Green Project Performance, as the path coefficient beta = 0.838, the significance level t=9.180 and p =0.000. GEVB is essential in enhancing GPP of sustainable organizations. Employees who communicate their opinions on the topics of the project sustainability are also contributing to the openness, and they can thus enhance the green project result, and this is prerequisite of the success of green projects (Iqbal et al., 2024).

Finally, the mediating role of Green Employee Voice Behavior in the correlation between Green Leadership and Green Project Performance is ascertained, bagging the acceptance of H4. The indirect effect is also significant, beta = 0.632, t = 6.317 and p = 0.000. The most crucial contribution is the entire mediation effects. The findings indicate that employee voice is the major channel between leadership and performance. When the actions of the leaders are able to provide a safe environment this will crystalize the social exchange and the employees would be able to complete the reciprocal exchange by speaking up which will directly lead to better results. This implies that green leadership is a success that is protectively premised upon the ability to release participatory contribution. The implication is obvious in practice: organizational interventions need to build green leadership competencies and at

the same time to build climates actively promoting and valuing employee voice to guarantee high sustainability achievements (Yue et al., 2025).

Theoretical implications

This paper builds on the Social Exchange Theory by establishing Green Employee Voice Behavior as the most important mediating factor which transforms Green Leadership to performance. It goes further to specify the operation of reciprocity in a sustainability situation, going beyond mere correlations to explain the pathway of behavior through which leadership influence is crystallized. Based on the findings on social exchange theory, this paper has shown that green leadership improves the performance of a project by establishing reciprocity among the project leaders and other employees. Based on this view the employee will reciprocate the positive deeds of leaders in an environmentally conscientious manner when leaders are found being environmentally responsible and supportive and the culture of openness is established. In turn the employees do green voice by expressing their ideas and concerns regarding sustainability, which develops stronger project results. The findings support the idea that social exchange cannot be restricted to perceptions of transactional rewards alone but also to other potentially intangible factors, including trust, esteem, and frameworks of mutual environmental regard. The acknowledgement of the mediating component of green employee voice behavior helps further the theoretical knowledge by demonstrating that sustainable performance is achieved through continuous mutual interactions.

Practical implications

The practical implications of this research are the need to develop green leadership practices within institutions that are to be sustainable in producing project results. Managers/leaders ought to be good role models as they can show environmental responsible behaviors, these behaviors encourage the workforce to perform green voice behaviors. It is also essential to establish a culture of psychological safety so that employees would be empowered to present their thoughts, issues, and solutions about sustainability without having the fear of being judged. Depending on the organizational needs, it is possible to establish training processes to help leaders gain the skills to promote open communication, create a trusting environment, and value staff input into the initiatives related to environmental awareness. The employee participation in the objectives of sustainability can also be enhanced more by means of inspirational engagement recognized in the processes, as well as in the way the tasks are meaningful.

Limitations and future research directions

This study is limited to examining the impact of green leadership on the performance of green projects through the mediating role of green employee voice behavior. Due to the cross-sectional nature of the research design, causal inferences cannot be made; therefore, future studies should adopt longitudinal research designs to better capture the temporal dynamics and causal relationships among variables. Moreover, since the data was collected solely from Pakistan's construction industry, the generalizability of the findings is limited. Researchers are encouraged to replicate and extend this model in different sectors (e.g., manufacturing, energy) and across diverse geographical contexts to validate its broader applicability. Finally, this study focuses on a single mediating variable. Future research could explore additional mediators, such as green psychological climate, green self-efficacy, green employee engagement, green knowledge sharing and moderators like organizational culture. Including such variables would enrich the theoretical framework and provide deeper insights into the mechanisms through which green leadership influences green project performance in varied organizational settings.

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