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GREEN PSYCHOLOGY: A MEDIATED MODERATION ANALYSIS ON ENVIRONMENTALLY SPECIFIC SERVANT LEADERSHIP AND GREEN RECOVERY PERFORMANCE

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ABSTRACT
Considering the increasing demands to combat climate change, pursuing SDGs 13 and 09, this research study disclosed the antecedents of green recovery performance under the application of stimulus organism response (SOR) and social influence theory (SIT). The link between environmentally specific servant leadership and frontline employees' green recovery performance was analyzed through environmental empathy mediation and co-worker pro-environmental advocacy moderation. This study applied positivism research philosophy, mono quantitative method and deductive research approach. A three-wave time lagged study was conducted by executing purposive sampling on 439 frontline hotel employees in northern of Pakistan. Data was analyzed through structure equation modeling technique under SmartPLS. The results showed that environmentally specific servant leadership positively affects green recovery performance. The mediating role of environmental empathy and coworker pro-environmental advocacy moderation was established in the said positive directional relationship. Theoretical and practical implications are provided for targeted sector in particular and other relevant sectors in general.
Keywords: environmentally specific servant leadership; environmental empathy; coworker pro-environmental advocacy; green recovery performance; SOR theory

1. INTRODUCTION

Climate change is a real problem resulting from unintended economic activities initiated by organizations. The term "climate change" refers to the climatic abnormalities primarily triggered by greenhouse emissions sourced from various sectors and human activities (Fawzy, Osman, Doran, & Rooney, 2020). The tourism and hospitality sectors are graded as major economic contributors but also contribute to climate change (Bhutto, Farooq, Talwar, Awan, & Dhir, 2021). Knowing the intensity of climate change and in compliance with environmentalist's directions, many industries are striving to adopt environmentally sustainable policies (Katz, Rauvola, Rudolph, & Zacher, 2022). The tourism and hospitality sectors of today are also focused on environmental sustainability, where the correction of human behavior is one of the prerequisites to attaining environmental sustainability (Han, 2021). Though in academia, different studies have been conducted to address how the tourism and hospitality sectors can thrive without disturbing nature. Thus, a novel concept of green recovery performance was introduced, where the main purpose is to maintain economic growth in a sustainable way while minimizing unfriendly practices in their operations (Luu, 2018).

In relevant literature few studies try to explore a proper mechanism with justified interventions that positively provoke green recovery performance. As such green recovery performance has been studied as a determinate of green HR practices (Training, empowerment, rewarding) (Luu, 2018), HRM practices (Performance appraisal, training, and recruitment) (Iftikhar, Zaman, Rehmani, Ghias & Islam, 2021), green human resource management, green inclusive leadership (Aboramadan, Crawford, Turkmenoglu & Farao, 2022), environmentally specific servant leadership (Vatankhah, Fejes, Karatepe & Nosrati, 2023). Based on these studies limitation and future directions we have decided to comprehend the overall picture of green recovery performance (GRP) which is the perceived ability and action of frontline employees to resolve hazardous action in a service to the satisfaction of the customers (Luu, 2018). According to Vatankhah et al. (2023) while providing services to the customers organizations need to be more conscious about environmentally-unfriendly activities, as such they can create service excellence in tourism and hospitality.

According to Robertson and Barling (2017), leaders in organizations play as a crucial role in the achievement of environmental goals. In this study, we examine environmentally specific servant leadership (ESSL) as a key determinant for green recovery performance, shouldering on the only study revealing this concept (Vatankhah et al., 2023). Environmentally specific servant leadership is a leadership style which is more concern about environmental benefit as compare to economic benefit while nurturing pro-environmental values across the board (Afsar, Cheema & Javed, 2018). Therefore, in order to clarify the relationship between environmentally specific

servant leadership and green recovery performance, we will further add environmental empathy (EE) as a mediator while backing the support of stimulus organism respond theory of environmental psychology (Yin, Ma, Gong, Chen & Zhang, 2021). Environmental empathy is defined "as the understanding and sharing of an emotional experience of the natural world, mainly referring to the ability to feel and understand issues related to the natural environment" (Tam, 2013). The SOR theory connotes that external stimuli (environmentally specific servant leadership) operate individual internal state of emotion and cognitions (environmental empathy), which ultimately shape an individual behavioural response (green recovery performance) (Mehrabian & Russell, 1974). Moreover, on call of Shah, Cheema, Al-Ghazali, Ali & Rafiq (2021), coworker pro-environmental advocacy (CPA) placed as a social influencer in a mediated moderation manner to clarify the relationship between environmental empathy and green recovery performance. CPA denotes to which "coworkers openly discuss environmental sustainability, share relevant knowledge, and communicate their various views in order to encourage others to engage in eco-friendly behavior" (Kim, Kim, Han, Jackson & Ployhart, 2017). According to Yang, Tang, Men & Zheng (2021), internal environmental psychological stage and individual responses are contingent upon on supportive social context, where the individual behavior is determined by their surrounding and deeply shaped by the thoughts and actions of others (Smith, Louis & Schultz, 2011).

To uncover above acknowledged gaps, this study intended to contribute in environmental management literature in several ways. Fist this study held in hospitality sector of northern Pakistan while examining the effects of environmentally specific servant leadership on frontline employee's green recovery performance. Seconds, by adding environmental empathy as intervening mechanism, the research is first to explore the nexus between environmentally specific servant leadership and green recovery performance with the help of stimulus organism response (SOR) theory. Third, with the support of social influence theory this study explores the role of CPA as a moderator between enviromental empathy and green recovery performance, expanding the application of SOR theory in a unique context with adding a new concept to comprehend a novel idea that there is something in form of social influence that effect the relationship of organism and response.

2. LITERATURE REVIEW

2.1. Environmentally specific servant leadership and green recovery performance

Servant leadership is the best choice to implant conservation practices in the hospitality sector due to its stewardship, persistency, and resistive power against the status quo (Darvishmotevali & Altinay, 2022). In the same vein, Ying, Faraz, Ahmed, and Raza (2020) also stated that among constructive leadership styles, the environmental-oriented nature of servant leadership could be an appropriate option to shape green behavior. On the suggestion of Robertson and Barling (2017), servant leadership was expanded in an environmental context by Luu (2018) and conceptualized as environmentally specific servant leadership, where the purpose of the leadership behavior is to bring excellence in environmental-related actions via bestowing autonomy, encouragement, and support to the followers (Tuan, 2020).

According to Luu (2018), green recovery performance is an offshoot of service recovery performance that is derived from Babakus, Yavas, Karatepe, and Avci's (2003) attempt to operationalize that in a green context while defining "frontline service employees' perceptions of their own abilities and actions to resolve an environmentally unfriendly activity in a service to the satisfaction of the customer" (Luu, 2018). The literature provides a significant direct relationship between green HR practices utilizing attribution theory (Luu, 2018), green HRM using attribution theory (Iftikhar, Zaman, Rehmani, Ghias, & Islam, 2021), green inclusive leadership underpinning social identity theory (Aboramadan, Crawford, Turkmenoglu, & Farao, 2022), and green recovery performance. Despite the confirmation of green recovery performance in the service-oriented sector, little is known about the nexus between environmentally specific servant leadership and green recovery performance among the hotel sector frontline employees of northern Pakistan. As what we postulated overlaps the result of an aviation-based study on cabin crews (Vatankhah, Fejes, Karatepe, & Nosrati, 2023), which has aimed to justify the said nexus using social learning theory but found an insignificant result.

Based on the review of existing literature, environmentally specific servant leadership positively impacts employees' green recovery performance by fostering supportive, empowering, and eco-centric values that inspire and equip frontline employees to implement eco-friendly recovery techniques efficiently.

H1. Environmentally specific servant leadership is positively related to frontline employee green recovery performance.

2.2. Environmentally specific servant leadership and environmental empathy

Among other leadership styles, a distinctive nature of environmentally specific servant leadership holds a genuine concern for environmental needs without expecting any instrumental rewards from the organization, thus inspiring followers to comprehend their true selves, paying attention to the conservation of the environment and benefiting others. (Mughal, Cai, Faraz & Ahmed, 2022). It is explicitly grounded that servant leadership is a complete package that potentially influences followers by means of cognitive and emotional channels (Van Dierendonck, 2011). Empathy is considered a dual-aspect construct based on cognitive and emotional components, where the former works to recognizeother feelings and the latter denotes sharing affective responses of others (Tam, 2013), and introduced the concept into environmental context. According to Wang, Sheng, She & Xu (2023), environmental empathy established a mutual connection between humans and nature via steering their emotional

experiences toward nature. As such, this novel concept is defined as "the recognition and sharing of an affective experience of the natural world, logically a merger of situational empathy and dispositional empathy (Tam, 2013). Elche, Ruiz-Palomino, and Linuesa-Langreo (2020) explicitly stated that employees with supervisors high on servant leadership experienced more empathy because they imitate the empathetic language perceived in the servant leader. A China-based study in a manufacturing context confirmed that corporate social responsibility perception is a positive determinant of environmental empathy while showing the reason that it increases employee sensitivity for environmental conservation and deepens their nature-related values and emotional experiences (Yin, Ma, Gong, Chen, & Zhang, 2021).

According to emotional contagion theory, leader and follower convergence of emotions happened due to similar emotional experiences (Clarkson, Wagstaff, Arthur & Thelwell, 2020). There are limited studies on determinants of employee empathy, but a few relevant ones that align with the scope of our study are cited above. Based on these studies, we can imply that environmentally specific servant leaders are intrinsically empathetic toward environmental protection, which synchronizes employees' attention to nature and strengthens their connection to the care of nature. Ultimately, employees respond with parallel showings of empathy with nature.

H2. Environmentally specific servant leadership is positively related to frontline employee environmental empathy.

2.3. Environmental empathy and green recovery performance

According to Tam (2013), as compared to interpersonal empathy, environmental empathy is distinctive in its approach, which is a crucial factor to boost individual pro-environmental behavior because it has an ability to feel and understand the hazards that disrupt the natural environment. Empathy with the environment is a bipolar construct of cognitive and emotional ability that increases human connection with nature (Fido & Richardson, 2019). Environmental empathy stimulates environmental-related attitudes, which have a positive effect on employees' pro-environmental behavior (Wang et al., 2023). Another study proved that environmental empathy is a positive determinant of pro-environmental behavior of tourists and stated that individuals with an empathetic approach toward the environment exhibit green behavior, such as trying to reduce waste production and carbon emissions and buying environmentally friendly products (Chen, Zou, Ran, Yan & Li, 2023). Empathy tightens the relationship between an individual and nature with the activation of their intrinsic environmental concerns, which ultimately work as a motivator to perform a green behavior (Young, Khalil & Wharton, 2018).

Literature on environmental empathy and environmental-related behavior about conservation exists; the specific relation of environmental empathy and green recovery performance has not been studied. As such, we can articulate that appointing environmentally empathetic employees in front desk jobs could benefit hotels by retaining their customers as well as caring for the environment by exhibiting green recovery performance at the time of provision of services. It implies that when front-line employees face environmental sustainability issues in their services, their ability to exhibit green recovery performance will be determined by the level of their empathetic concern toward nature.

H3. Environmental empathy was positively related to green recovery performance.

2.4. Mediating role of environmental empathy

Considering emerging environmental challenges caused by business sectors, all stakeholders around the world are under serious pressure and trying to cope with the resultant issues by devising environmentally oriented policies, such as implementing environmental-specific servant leadership (Khan, Saqib, Abbasi, Mikhaylov & Pinter, 2023). Environmentally specific servant leadership triggers employees' positive emotions (Yang, Shao & Jiang, 2023) and empowers their cognitive abilities (Vatankhah et al., 2023). According to Tuan (2021), this leadership style has more influential power in collectivist Asian culture, which mainly excels in humanitarian subjects related to environmental sustainability with the help of role modeling, altruism, carrying, humility, stewardship, showing empathy, and collective mental approaches. Thus, in his intrinsically empathetic approach, such leaders influence their coworker's environmental empathy through the path of emotional contagion (Barsade, Coutifaris & Pillemer, 2018). A generic concept of servant leadership has been testified as a positive determinant of employee empathy (Elche et al., 2020).

Employees who have a true sense of empathy with the environment are more interested in exhibiting pro-environmental behavior in the private sector (Wang et al., 2023). For environmental conservation, environmental empathy is considered a critical factor that has a positive nexus with employee pro-environmental behavior (Kim et al., 2021). As such, other studies also disclosed the effectiveness of environmental empathy in relation to employees' environmental-related behaviors (Dolby, 2019; Yin et al., 2021). Despite all these sustainable practices, a novel concept of green recovery performance has been introduced in the services industry to balance economic and environmental activities while handling environmental problems pointed out by the customers (Luu, 2018; Vatankhah et al., 2023).

A study on the hospitality sector confirmed the mediating role of employee empathy with the relationship of servant leadership and organizational citizenship behavior (Elche et al., 2020). This is the only study on the said relationship, but later in the manufacturing sector, employee environmental empathy was proven as a mediator between environmental CSR and environmental citizenship behavior (Yin et al., 2021). In the formation of pro-environmental behavior, an employee with environmental empathy reacts in a more effective way due to its deep attention toward nature (Chen et al., 2023). As such, only the study by Vatankhah et al. (2023), conducted in the airline sector targeting cabin crews, confirmed the complete mediation of green creativity between

environmentally specific servant leadership and green recovery performance. This study tries to justify the mediating role of environmental empathy between environmentally specific servant leadership and green recovery performance of frontline employees in the hotel sector via using SOR theory (Mehrabian & Russell, 1974). According to this theory, individual responses are determined by the internal organisms that are provoked by the environmental stimulus. The theory acknowledged that employee internal psychological states (emotional experience & cognition) mediate the relationship of environmental stimuli and employee behavior (Yin et al., 2021; Vatankhah et al., 2023).

In this study, in a hotel setting, environmental-specific servant leadership performs as a stimulus (S) that provokes environmental empathy in the organism (O), which in turn influences green recovery performance as a response (R).

H4. Environmental empathy mediates the relationship between environmentally specific servant leadership and green recovery performance.

2.5. Moderating role of coworker pro-environmental advocacy

Social context and situations play a vital role in the development of individual attitudes and behaviors, which is the main assumption of social influence theory (Salancik & Pfeffer, 1978). Yin et al. (2021) verified that the nexus between environmental empathy and environmental citizenship behavior is positively moderated by CSR directed toward employees acting as a controlled motivator. Another study has also proven coworker pro-environmental advocacy as a contextual factor that positively moderates the relationship between employees' green role identity and their environmentally friendly behavior in the workplace (Zheng, Jiang, Cai, Xu & Gao, 2021). Environmental advocacy is considered a voluntary type of proactive behavior that has the power to apprehend environmental issues by taking green initiatives (Zhang, Ren & Tang, 2023).

Keeping more concentration on the same track, this study places coworker pro-environmental advocacy as a potential moderator in a positive emotion-behavior relationship. Coworker pro-environmental advocacy shows pro-environmental ambience cues, which trigger individual environmentally friendly behaviors (Kim, Kim, Han, Jackson & Ployhart, 2017). According to Kim et al. (2017), coworker pro-environmental advocacy is "the extent to which work coworkers openly discuss environmental sustainability, share relevant knowledge, and communicate their various views in order to encourage others to engage in eco-friendly behavior." When employees perceive that their colleagues have an environmental sensitivity and showcase positive advocacy related to environmental conservation, they incline to perform parallel behavior (Zheng et al., 2021).

Based on these studies, we consider coworkers as social influencers who can collectively influence others behavior that could be the channel of advocacy. When employees observe other colleagues purposively in their surroundings with positive emotion and cognition, they strive to imitate their particular set of behavior to fit in the social connection.

H5. Coworker pro-environmental advocacy moderates the relationship between environmental empathy and green recovery performance such that the positive relationship is stronger when coworker advocacy is high compared to when it is low.

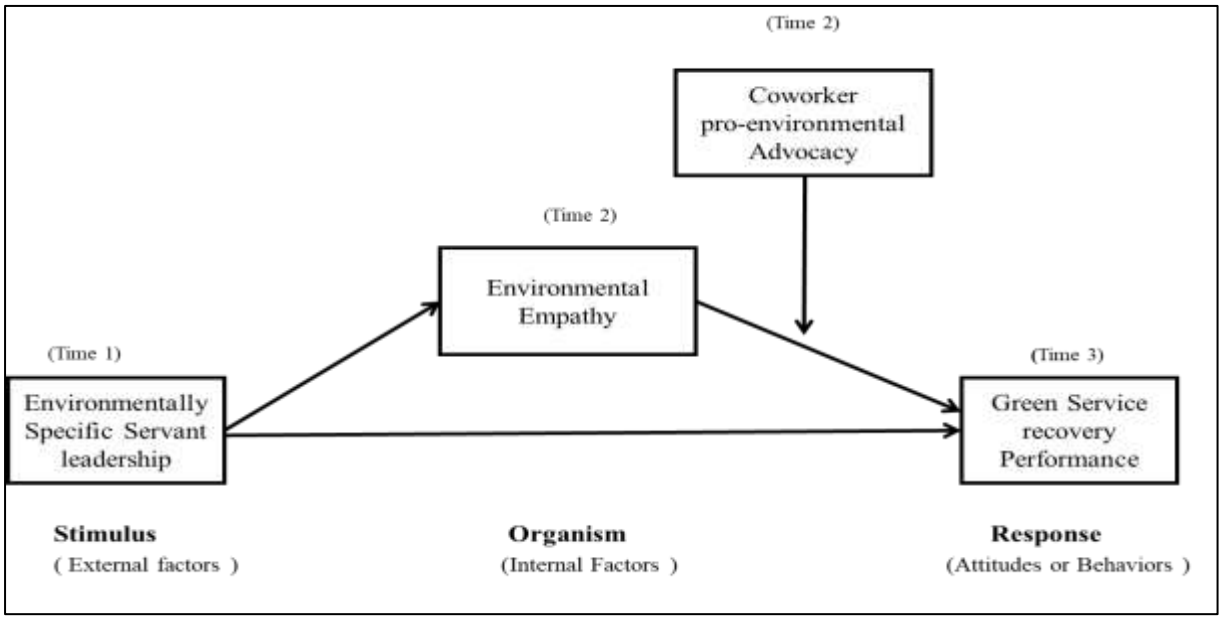

Figure. 1. Theoretical Model

3. METHODOLOGY

3.1. Research Design and Procedure

This study is based on positivist philosophy and is mono-quantitative, empirical, and deductive in nature. The hypothesized relationship was justified using the survey-based collected data while adopting the predetermined validated scales. In northern Pakistan, individual hotel frontline workers were targeted as the unit of analysis. A

traditional form of printed questionnaire was operated and distributed among these defined employees at different intervals of time to maintain the integrity of the study, reducing the role of common method biases. Due to the lack of a sampling frame, a non-probability purposive sampling technique was used in accordance with ethical procedures of anonymity and confidentiality. Apart from this, we approached the hotel association of northern Pakistan through social contacts to convince them to disseminate messages to all hotel owners through their WhatsApp group to ensure maximum participation.

To enhance confidence in causality and deepen theoretical understanding while avoiding misinterpretation, the study conducts a longitudinal time-lag analysis, repeatedly assessing the same individuals and variables across multiple time points to explore developmental changes and potential causal relationships. As a procedural remedy, the data was assembled in three stages to avoid CMV (Podsakoff et al., 2012). In the very first stage, (Time 1) we collect demographic details of front-line employees and collect data about their manager's environmentally specific servant leadership. Respondents were requested to grade their environmental empathy and coworker pro-environmental advocacy in stage two (Time 2), and in the final stage at third stage (Time 3), we measured green recovery performance. Each event was organized over a period of one week and uniquely coded for identification at the time of merging the questionnaires (Karatepe, Hsieh, & Aboramadan, 2022). Secondly, we have clear instructions to ensure confidentiality, anonymity, and voluntary participation at the time of answering the items. Finally, we would like to clarify that the research was conducted after obtaining ethical approval from the competent authority of the university of the corresponding author.

3.2. **Measures**

Considering the English literacy level of the target audience, to prevent misinterpretation and omission of information, the English-developed questionnaire was translated into the local language, Urdu, with the assistance of two bilingual academic translators. The ethical process of back translation was carried out to address any ambiguity through discussion. The team of authors also carefully compares each translation with the original scale and discusses the relevance of the instruments in the Pakistani context. To assess all variables, 5-point Likert scales were used, ranging from 1 (strongly disagree) to 5 (strongly agree), except for environmental empathy, which ranged from 1 (not at all) to 5 (extremely).

To measure environmentally specific servant leadership, the scale of 12 items was adopted from Luu (2018), which was adapted from Liden, Wayne, Zhao, and Henderson's (2008) servant leadership scale. Sample items include "My manager is involved in environmental activities." (Cronbach $\alpha = 0.91$). To measure environmental empathy, the scale of 3 items was adopted from the study of Yin et al. (2021), which was slightly adapted from Kim and Cooke (2021), to measure employee environmental empathy. A sample item is "How sympathetic do you feel about the environment's current condition?" (Cronbach's $\alpha = 0.93$). To measure coworker pro-environmental advocacy, we adopted the 3-item scale developed by Kim et al. (2017) to measure co-worker pro-environmental advocacy. A sample item is "My coworkers work with other group members to create a more environmentally friendly workplace" (Cronbach $\alpha = 0.78$). We adopted the 5-item scale developed and validated by Karatepe (2022) in a green context, which was adapted from Babakus et al. (2003), to measure employees' green recovery performance. A sample item is "Satisfying customers who complain about environmentally unfriendly activities is a great thrill to me." (Cronbach $\alpha = 0.82$).

4. RESULTS

4.1. Analytical strategy

Two statistical software programs, SPSS 26 and Smart PLS 4, were used to analyze the data. The former was used to assess the descriptive profile, while the latter was employed to evaluate the remaining model. PLS-SEM is chosen because of its prediction-oriented approach, ability to handle measurement and structural models simultaneously, accuracy, effectiveness with small sample sizes and non-normal data, and suitability for modeling complex structures (Hair et al., 2021). Structural equation modeling (SEM) is typically a two-phase technique involving a measurement model and a structural model. To ensure the reliability and validity of the reflective measurement model, these aspects were assessed, while the structural model was used to test the significance of the hypotheses (Hair et al., 2021).

4.2. Respondent profile

As per the criteria of Memon et al. (2020), a sample-to-item ratio of 15 to 1 is employed for sample determination. Thus, 345 responses were needed for 23 items in this study, although we gathered as many as we could. The overall sample size of 439 respondents pertains to the third wave of data gathering. The data gathered from three separate intervals over three weeks. As recommended by Podsakoff et al. (2012), questionnaires were administered at each wave utilizing a printed survey approach by assigning code to assure data quality and reduce common method bias. The sample was obtained through paper-and-pencil surveys administered by self and trained research assistants while approaching each respondent at their present assignment places who gave them an explanation of the study and got their permission on ethical grounds. After 510 responses in first wave, 495 responses in second wave, 439 responses were left, indicating an attrition rate of about 11.32 %. Reminders were sent out to reduce dropout rates, and respondents were matched across waves using distinct codes.

The proportion of male participants in a gender category was 92.3%, while females constituted 7.7%. Among these, 39.6% were single, while 60.4% were married. The most prevalent age group is 25-31, representing 30.8%,

whereas the least represented group, those over 44, accounts for only 7.10%. The majority of participants, 53.3%, hold a two-year BA education, while the fewest, 9.6%, hold a master's degree. All these respondents' work status was depicted as private because most hotels in northern Pakistan are owned and operated by local citizens, including the large ones. The total sample size was recorded as 439. The dominance of private ownership in Pakistan's hotel sector is grounded in Pakistan's tourism privatization and entrepreneurial policies. All these numbers are showed in the below table 1.

Table 1 Respondent information

Demographics	**Categories**	**Frequencies**	**Percentages %**
Gender	Male	405	92.3
	Female	34	7.70
Marital Status	Single	174	39.6
	Married	265	60.4
Age	18 - 24	135	30.8
	25-31	166	37.8
	32-37 38-43	80 31	18.2 7.10
	Above 44	27	6.20
Education	Diploma / 12th	110	25.1
	BA 2 Years	234	53.3
	BS 4 Years	53	12.1
	Master	42	9.6
Work Status	Private	439	100
Sample size = 439			

4.3. Common method variance

One of the major concerns in behavior-related studies is common method variance (CMV), which refers to the bias that arises in cross-sectional studies and potentially distorts the actual research findings (Podsakoff, MacKenzie & Podsakoff, 2012). To address this issue, a priori procedural remedies and post hoc statistical remedies are recommended (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). In accordance with these recommendations, the researcher used both techniques, guaranteeing confidentiality and anonymity via a consent form and carrying out a three-wave time-lagged study with a one-week break to guarantee temporal separation and lessen common method bias.

Harman's single-factor test in SPSS was also performed to identify issues in the data, while the Variance Inflation Factor (VIF) from SmartPLS was utilized to reveal multicollinearity among constructs. The findings from Harman's single-factor test indicated that the variance percentage was 22.308, falling below the threshold of 50%, as shown in Table 2. Secondly, the full collinearity test by Kock (2015) assessed the Variance Inflation Factor (VIF), which was also below the threshold of 3.3, as mentioned in below Table 6.

Table 2 Common Method Variance (CMV)

Total Variance Explained							
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	5.829	25.343	25.343	5.131	22.308	22.308	
2	3.193	13.881	39.224				
3	2.408	10.469	49.693				
4	1.509	6.561	56.253				
5	1.286	5.589	61.843				
6	0.916	3.981	65.824				
7	0.752	3.270	69.094				
8	0.725	3.151	72.245				
9	0.658	2.861	75.106				

10	0.571	2.481	77.587				
11	0.552	2.398	79.985				
12	0.540	2.350	82.335				

4.4. Measurement model (outer model)

Before proceeding to the structural model in structural equation modeling (SEM), it is crucial to ensure the reliability and validity of the measurement model, wherein we aim to justify the abstract concept based on its observed variables. This confirmation verifies that the indicators accurately and consistently represent the underlying constructs. In this study, the PLS-SEM approach is utilized alongside the Smart PLS Algorithm to evaluate the suitability of reflective measurement model convergent validity by applying standard reliability and validity criteria, guided by specified parameters such as factor loadings, Cronbach's alpha, composite reliability, and average variance extracted (Hair et al., 2021). To confirm the construct's internal consistency and validity, outer loadings, Cronbach's alpha (α), composite reliability (CR), and average variance extracted (AVE) are presented in Table 3 in their respective columns.

Although Cronbach's alpha (α) is a conservative measure of internal consistency, composite reliability (CR) is often recommended for a more precise and robust assessment in PLS-SEM. Both measures demonstrated values above the 0.70 criterion, indicating that this study possesses good internal consistency (Henseler, Ringle, & Sarstedt, 2015). Subsequently,

Table 3 Constructs Validity and Reliability

Latent Variables	**Items**	**Loadings (≥ 0.6)**	**Cα (≥ 0.7)**	**CR rho_c (≥ 0.7)**	**AVE (≥ 0.50)**
Coworker Pro-Environmental Advocacy	CPEA1	0.906	0.905	0.940	0.840
	CPEA2	0.944			
	CPEA3	0.898			
Environmental Empathy	EE1	0.839	0.811	0.888	0.725
	EE2	0.857			
	EE3	0.858			
Environmentally Specific Servant Leadership	ESSL1	0.721	0.860	0.890	0.537
	ESSL2	0.784			
	ESSL3	0.738			
	ESSL4	0.705			
	ESSL5	0.697			
	ESSL6	0.732			
	ESSL7	0.748			
Green Recovery Performance	GRP1	0.700	0.785	0.852	0.536
	GRP2	0.801			
	GRP3	0.776			
	GRP4	0.684			
	GRP5	0.692			

Notes: Cα, Cronbach's alpha; CR rho_c Composite Reliability; AVE, average variance extracted

convergent validity was also established through factor outer loadings and average variance extracted (AVE). All item values exceed the recommended threshold of 0.6 (Chin, Peterson & Brown, 2008), except a few that were removed to enhance AVE (Hair, Hult, Ringle, & Sarstedt, 2014). Among the twelve total items of environmentally specific servant leadership (ESSL), items ESSL8 to ESSL12 were excluded due to their lower loadings, positively

impacting AVE to meet the threshold criterion of 0.5. All these results are confirmed in Table 3 above, along with their respective orders.

4.5. Discriminate validity

Another major aspect of validity assessment involves establishing discriminant validity, which ensures that each concept is empirically distinct and represents a phenomenon not captured by other constructs within a statistical model (Hair et al., 2021). More recent research indicates that the heterotrait-monotrait (HTMT) criterion should be the preferred option, despite the Fornell–Larcker criterion having long served as the primary standard for evaluating discriminant validity (Hair et al., 2021). According to the Fornell–Larcker approach, the square root (diagonal values) of the AVE for each latent variable must exceed its correlation with any other latent variable. The diagonal values shown in Table 4 can be used to verify the Fornell–Larcker criteria.

Table 4 Discriminant validity (Fornell–Larcker criterion)

Constructs	**CPEA**	**EE**	**ESSL**	**GRP**
CPEA	**0.916**			
EE	0.351	**0.851**		
ESSL	0.006	0.177	**0.733**	
GRP	0.021	0.334	0.307	**0.732**

Values that are bolded in the diagonal indicate the average square root of AVE (average variance extracted)

Table 5 HTMT (Heterotrait–monotrait Ratio)

Constructs	**CPEA**	**EE**	**ESSL**	**GRP**
CPEA				
EE	0.414			
ESSL	0.052	0.184		
GRP	0.054	0.409	0.338	
CPEA*EE	0.212	0.593	0.112	0.031

The contemporary HTMT approach was also introduced due to significant criticism of the Fornell-Larcker technique. According to Henseler et al. (2015), the most common Fornell-Larcker approach is outdated and lacks reliable detection power. There are two recommended threshold values of 0.85 or 0.90 for HTMT interpretation, which were fully met in our investigation, while all values less than 0.85 are depicted in above table 5.

4.6. Structural model (inner model)

The structural model was assessed using important measurements, such as path coefficients (β), t-values (t-V), coefficient of determination (R^2), effect sizes (f^2), predictive relevance (Q^2), and variance inflation factor (VIF). To evaluate the directionality and strength of the hypothesized relationships, path coefficients were examined (Hair et al., 2021). The t-values were then tested to establish their significance, with a t-value larger than 1.96 usually deemed significant at the 0.05 level and a t-value greater than 2.58 considered significant at the 0.01 level. R^2 measures a model's explanatory power by determining the extent to which the variance in the dependent variable is explained by the independent variables. According to Cohen (1988), R^2 values of 0.26, 0.13, and 0.02 are regarded as substantial, moderate, and weak, respectively. The model's predictive power was assessed using f^2, and Q^2 verified the model's predictive relevance (Henseler et al., 2015). F-square represents the change in R^2 when an independent variable is removed from the model, where the cutoff values of 0.35, 0.15, and 0.02 are considered large, medium, and small, respectively (Cohen, 1988). When the Q-squared value exceeds 0, it indicates that the model is predictively relevant and the values are well-reconstructed. Finally, the VIF values were tabulated to identify multicollinearity issues, with a recommended threshold of less than 3 (Kock, 2015). All of these parameters were met by our model, as shown in Table 6 in their respective columns.

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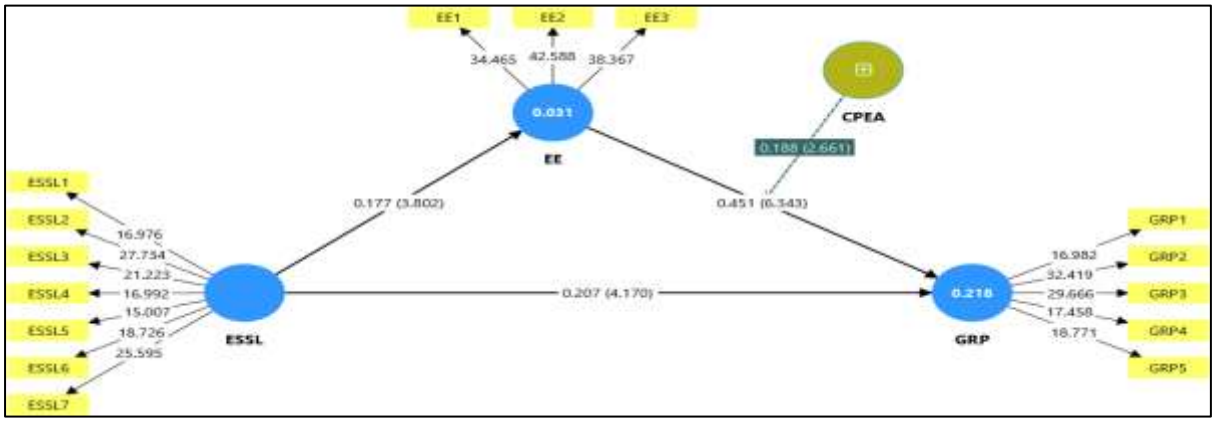

Figure. 2. Structural Model

The findings show that environmentally specific servant leadership is positively related to green recovery performance (β = 0.207, t = 4.170, p < 0.000, f^2 = 0.050) and environmental empathy (β = 0.177, t = 3.802, p < 0.001, f^2 = 0.032) and is substantiated by an R^2 value of 0.031, which implies that the 3.1% variance of environmentally specific servant leadership on environmental empathy is weak (Cohen, 1988). The relationship between enviromental empathy and green recovery performance was positively significant (β = 0.451, t = 6.343, p < 0.001, f^2 = 0.157), and an R^2 value of 0.218 indicates a moderate variance of 21.8% of enviromental empathy on green recovery performance. Thus, H1, H2, and H3 are supported. Finally, the blindfolding method was used to check the model's predictive relevance in Q2, where the value exceeded 0, indicating that there were no issues with predictive relevance. The results are presented in below Table 6.

Table 6 Hypotheses Testing

Hypothesis	**Relationship**	**β**	**t-V**	**R^2**	**f^2**	**Q^2**	**VIF**	**Result**
H1	ESSL → GRP	0.207	4.170***		0.050		1.092	Supported
H2	ESSL → EE	0.177	3.802***	0.031	0.032	0.024	1.000	Supported
H3	EE → GRP	0.451	6.343***	0.218	0.157	0.061	1.658	Supported
	Indirect Mediation Moderation							
H4	ESSL → EE → GRP	0.080	3.523***					Supported
H5	CPEA x EE → GRP	0.188	2.645**		0.044		1.476	Supported

4.7. Mediation analysis

Based on the criteria proposed by Hair et al. (2021), our findings demonstrate that environmental empathy serves as a partial mediator in the relationship between environmentally specific servant leadership and the green recovery performance of frontline employees. The indirect effect of environmentally specific servant leadership on green recovery performance through environmental empathy was significant (β = 0.080, t = 3.523, p < 0.001), with a 95% bootstrap confidence interval of (0.091, 0.233) that excluded zero, signifying substantial mediation. The total effect of environmentally specific servant leadership on environmental empathy was significant (β = 0.287, t = 5.691, p < 0.001), and with the inclusion of the mediator, the direct effect of environmentally specific servant leadership on green recovery performance remained significant (β = 0.207, t = 4.170, p < 0.000). According to Hair et al. (2021), complementary (partial mediation) exists because both the direct and indirect paths are positive and significant. The variance accounted for (VAF) method was used to assess the strength of mediation, where the threshold was < 20% for no mediation, between 20 and 80% for partial mediation, and > 80% for complete mediation. The VAF formula is the indirect effect 0.080 / total effect 0.287 = 27%. Thus, it fulfills the criteria for partial mediation. The results are presented in Figure 2 and Table 7. Hence, H4 is supported.

Table 7 Mediation Result

Effect of IV on M (a)	**Effect of M on DV (b)**	**Direct-effect (c')**	**Indirect-Effect (a*b)**	**Total-Effect (c)**	**95% CI**	**VAF**	**Result**
ESSL » EE	EE » GRP	ESSL » GRP	ESSL » EE » GRP				
0.177***	0.451***	0.207 (4.182)	0.080 (3.523) ***	0.287 (5.691) ***	(0.091) (0.233)	0.278	Partial Mediation

4.8 Moderation analysis

The study proved that coworker pro-environmental advocacy (CPEA) had a significant interaction effect (β = 0.188, t = 2.645, p < 0.01) on the relationship between environmental empathy (EE) and frontline employee's green recovery performance (GRP). This shows that the strength of the association between enviromental empathy and green recovery performance relies on the degree of coworker pro-environmental advocacy, with a higher coworker pro-environmental advocacy amplifying environmental empathy positive impact on green recovery performance. Figure 3 clearly demonstrates that as coworker pro-environmental advocacy rises from below average (-1 SD) to above average (+1 SD), the positive correlation between EE and green recovery performance increases. At the minimal degree of coworker pro-environmental advocacy (red line, -1 SD), the slope is rather flat, signifying a little or possibly insignificant influence of enviromental empathy on the green recovery performance. As coworker pro-environmental advocacy attains its average level (blue line), the correlation becomes increasingly evident. When coworker pro-environmental advocacy was elevated (+1 SD, green line), the slope was most pronounced, indicating a more robust positive correlation between enviromental empathy and green recovery performance. The diverging slope across the moderator levels indicates a statistically significant positive interaction term. Thus, H5 is accepted.

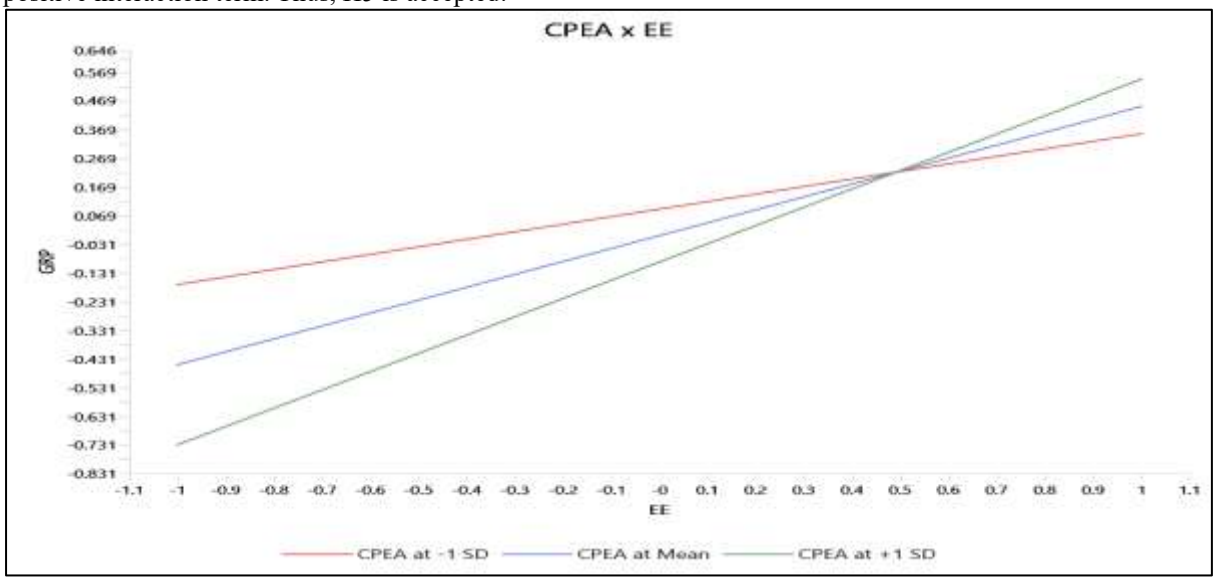

Fig. 3. A simple slope of Moderating Effect.

5. DISCUSSION AND CONCLUSION

5.1 **Conclusion**

Public demand to address climate change is compelling organizations, including hotels, to enhance efficiency and pursue decarbonization (MacAskill, Becken & Coghlan, 2023). Meanwhile, environmental sustainability concerns have created new opportunities and momentum for human resource management (HRM) researchers to enhance the relevant literature (Cooke, 2025). In particular, green-related literature has adopted various leadership styles as potential interventions to effectively address environmental challenges. One such style is environmentally specific servant leadership (ESSL), which has been tested as an antecedent of green-related behavior but has not yet been examined among hotel frontline employees' green recovery performance in Pakistan. The present study further enriches the existing literature by empirically exploring the association of environmentally specific servant leadership and frontline employees' green recovery performance (GRP). To accomplish this objective, we have incorporated enviromental empathy (EE) as a mediator and coworker pro-environmental advocacy (CPEA) as a mediated moderator, which were supported by Stimulus-Organism-Response (SOR) theory and Social Influence Theory (SIT).

As the call of prior studies, there is a dearth of knowledge regarding the underlying mechanism of environmentally specific servant leadership and employee's green recovery performance. The findings prove that environmentally specific servant leadership has a positive determinant of frontline employee's green recovery performance, thereby supporting H1. Although this relationship is contradictory to the prior study where the direct relationship did not exist between environmentally specific servant leadership and cabin crew green recovery performance (Vatankhah et al., 2024). This indicates that the effect of environmentally specific servant leadership on green recovery performance is not straightforward, and there are some other variables that play a mediating role. In addition, the study has proven the unidentified positive relationship of environmentally specific servant leadership and enviromental empathy of the frontline employees of the hospitality sector of northern Pakistan, lending support for H2. This implies that environmentally specific servant leadership with an empathetic approach has a substantial power to reshape their employees enviromental empathy while shaping their ability to perceive, understand, and respond to the natural environment (Yin et al., 2021). The findings of H3 shows that, enviromental empathy fosters employees' green recovery performance. This finding is in line with a prior study where it has

been proven as an antecedent of environmental citizenship behaviors, which justifies the assumption of SOR theory, which argues that cognition and emotions determine the response of an individual (Yin et al., 2021). Furthermore, the unidentified mediating role of enviromental empathy was examined, and it was found that enviromental empathy significantly mediates the association between environmentally specific servant leadership and green recovery performance, conferring support for H4. This study supports the notion that servant leaders may treat all employees uniformly; nonetheless, individual differences and psychological factors may change the results (Tuan, 2020; Javed, Nisar, Awan & Nasir, 2024).

Apart from this, the study enriches the sustainability literature by proving the often-overlooked role of coworker pro-environmental advocacy as a mediated moderator between environmental empathy and green recovery performance. This implies that coworker pro-environmental advocacy plays a vital role in changing the enviromental behaviors of others within the workplace via social influence mechanisms such as role modeling, peer support, and social norms. Thus, it supports the previous call made by a researcher to explore how coworker pro-environmental advocacy moderates the relationship on employees' green-related behaviors (Shah et al., 2021). This ensures support for H.5.

5.2. Theoretical implications

Climate threats can present considerable problems and necessitate the development of adaptation policy mechanisms in response (Kim et al., 2025). This research contributes to the sustainable tourism literature in hospitality settings by expanding SOR theory (Mehrabian & Russell, 1974) through the incorporation of social influence perspective (Kelman, 1958), addressing the academic call articulated by Luu (2018). First, the focus was on the green recovery performance of hotel frontline employees in the northern region of Pakistan in the context of environmentally specific servant leadership. We extend the existing research while adding enviromental empathy as a cognitive emotional mechanism that has a significant intervening role between enviromental specific servant leadership and green recovery performance, which has proven the underlying mechanism of SOR theory (Mehrabian & Russell, 1974).

Third, we confirm the significance of social influence while proving coworkers pro enviromental advocacy as a contextual factor in a mediated moderated fashion of SOR theory. Thus, we supported the prior assertion that colleagues and team members, irrespective of their leaders or supervisors, affect employees' relevant behaviors through personal interactions (Zheng et al., 2021). This implies that besides individual psychological states, social context also affects workplace behaviors, where social cues from colleagues act as important norms, encouraging employees to adopt environmentally responsible behaviors. As Johns (2006) argued, the role of context was underappreciated; therefore, incorporating contextual factors (coworker pro-environmental advocacy) in organizational-related studies enriches the depth of comprehension regarding workplace behaviors (Johns, 2006). This theoretical enhancement deepens the contextual understanding within the SOR framework by emphasizing the crucial role of social influence between internal psychological states (organism) and behavioral responses.

Finally, this is the first study to respond to previous calls for a deeper understanding of the psychological and social processes underlying environmentally specific servant leadership and frontline employees' green recovery performance (Shah et al., 2021).

5.3. Practical implications

The study, in the novel context of Pakistan's hospitality sector, provides several practical implications for managers and policymakers aiming to enhance sustainable development practices in the hospitality industry. In today's world, service-oriented organizations demonstrate their competitive advantage by responding to environmental conservation, highlighting the real-world benefits of green recovery efforts. These practices should be integrated among frontline employees through various interventions, including environmentally specific servant leadership. This leadership style can foster hotel frontline employees' green recovery performance, thereby strengthen their sense of environmental responsibility and encourage service excellence. By demonstrating environmentally specific servant leadership, managers can motivate employees to adopt sustainable practices and deliver high-quality service that aligns with the organization's commitment to environmental stewardship. Therefore, hotel management must be mindful of their supervisory roles and mindset. This can be achieved by creating environmentally focused policies that emphasize acquiring, training, apprising, and compensating employees while aligning with the organization's green mission and vision.

Additionally, hospitality firms are encouraged to consistently communicate their environmental initiatives by providing training sessions aimed at increasing employees' ecological awareness. Leaders in hotels can also effectively promote environmental empathy among staff through role modeling and fostering a culture of environmental responsibility. Such constructive approaches complement each leader's and follower's roles. We note that hotels should align their environmentally friendly policies by prioritizing favorable green conditions and appointing leaders capable of generating environmental empathy among employees, which ultimately enhances their green recovery performance.

Finally, regarding coworker pro-environmental advocacy, hotels need to develop collaborative targeted strategies to foster strong relationships among staff through encouragement, knowledge sharing, and supporting colleagues in adopting sustainable behaviors. Therefore, organizations need to focus on team- and group-level interventions to create an environmental ambience where every member of the organization supports each other.

5.4. Limitations and future research directions

Despite rigorous methodological approaches and valuable contributions to the hospitality sector, there are some limitations that highlight opportunities for future research. The study used a three-time-lag design to reduce common method bias; however, reliance on self-reported data creates ambiguity about genuine causal relationships (Podsakoff et al., 2003). Therefore, future studies could consider longitudinal or experimental methods to better determine causality and temporal dynamics. Second, due to resource constraints and a cost-effective approach, a non-probability purposive sampling technique was used to target frontline hotel employees in northern Pakistan. This method limits the generalizability of the findings to larger populations, other geographic areas, sectors, and cultural contexts. To further strengthen the credibility of the findings, the proposed model should be tested with a diverse population and settings outside the hospitality sector (e.g., health, banking, and industries). It could be applied to various hospitality sectors, including airlines, restaurants, small hotels, and accommodation services. Third, despite its objective benefits, the quantitative approach should be utilized with caution when dealing with oversimplified complicated human behavior. Therefore, future studies should incorporate a qualitative part to in-depth understanding of participants experiences and perceptions. Fourth, this study is concerned about the relationship between environmentally specific servant leadership and green recovery performance, whereas future studies need to incorporate different leadership styles and mediating and moderating mechanisms to further enrich the concept of green recovery performance. For example, green inclusive leadership, green empowering leadership with mediation of green self-efficacy, green trust, and moderating role of green mindfulness.

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