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Servant leadership for hospitality sustainability: green psychological capital as a pathway to environmental citizenship behavior

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Introduction: The hospitality industry is known for its intensive resource operations, making it a critical sector for promoting sustainability. This study empirically examines how environmentally specific servant leadership (ESSL) influences organizational citizenship behavior for the environment (OCBE) by fostering Green Psychological Capital (GPsyCap) as a psychological resource. Specifically, it investigates the direct impact of ESSL on GPsyCap and OCBE, as well as the mediating role of GPsyCap in the ESSL-OCBE relationship within the hospitality industry.

Methods: Data were collected using convenience sampling from 388 full-time employees working in eco-friendly five-star hotels in Egypt. The study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the relationships between ESSL, GPsyCap, and OCBE.

Results: The findings indicate that ESSL positively influences both GPsyCap and OCBE, demonstrating that environmentally responsible leadership fosters voluntary pro-environmental behaviors among employees. Furthermore, GPsyCap significantly predicts OCBE and partially mediates the relationship between ESSL and OCBE, suggesting that GPsyCap serves as a crucial psychological mechanism through which leadership practices are translated into employee-driven sustainability efforts.

Discussion: Building on these empirical insights, the study contributes to theory by extending the Conservation of Resources (COR) Theory, Social Exchange Theory (SET), and the Stimulus-Organism-Response (SOR) Model, integrating green organizational (ESSL) and psychological (GPsyCap) resources within the hospitality sector. By positioning GPsyCap as a mediating construct, this study offers a novel perspective on how leadership-driven sustainability initiatives influence employees' pro-environmental behaviors. Practically, the study highlights the need for organizations to cultivate ESSL qualities in leaders, enhance GPsyCap among employees, and foster a culture of environmental stewardship to promote sustainability in the hospitality industry.

KEYWORDS

extra-role behavior, sustainable leadership, COR, SET, green psychology, ecofriendly

1 Introduction

In recent years, the urgency of addressing environmental sustainability has permeated organizational priorities across industries, with particular importance in the hospitality sector, which relies heavily on natural resources and is closely scrutinized for its ecological footprint (Abdou et al., 2020; Iftikhar et al., 2024; Javed et al., 2024). As societal awareness of environmental issues rises, hospitality organizations are compelled to adopt sustainable

practices and foster environmental responsibility among employees (Afridi et al., 2024; Aboramadan et al., 2021). Achieving this balance requires not only structural changes but also a fundamental shift in employee attitudes and behaviors toward sustainability. Leadership plays a pivotal role in facilitating such a shift by inspiring and empowering employees to adopt and sustain voluntary pro-environmental behaviors (Abdou et al., 2023; Aboramadan et al., 2021).

In this context, the concept of environmentally specific servant leadership (ESSL) has emerged as a leadership approach that inspires and guides employees to contribute positively to environmental sustainability goals, fostering voluntary actions known as organizational citizenship behavior for the environment (OCBE) (Zafar et al., 2022a; Afsar et al., 2018; Iftikhar et al., 2024). The notion of ESSL, a form of servant leadership tailored to sustainability, emphasizes the leader's commitment to environmental stewardship and aims to foster an organizational culture where employees prioritize sustainable actions and values. ESSL leaders typically embody ecological responsibility, serving as role models and motivators for employees to support organizational efforts toward ecological responsibility voluntarily (Afridi et al., 2024; Fatoki, 2021; Luu, 2019).

OCBE refers to voluntary, pro-environmental behaviors that employees adopt without formal obligation, such as conserving energy and water, reducing waste, and promoting sustainability among peers. According to Boiral and Paillé (2012, p. 442), OCBE is classified into three dimensions, namely: Eco-initiative, Eco-civic engagement, and Eco-helping. Eco-initiative is defined as “discretionary behavior involving suggestions to improve environmental practices or performance.” Eco-civic engagement is defined as “voluntary participation in an organization's environmental programs and activities.” Meanwhile, eco-helping refers to “voluntarily assisting colleagues in better integrating environmental concerns in the workplace”.

In the context of the hospitality setting, research suggests that leaders who actively demonstrate environmental concern can profoundly influence employees' attitudes and behaviors toward sustainability, fostering a culture of OCBE (Iftikhar et al., 2024; Luu, 2019; Aboramadan et al., 2021). However, while research has investigated the direct association between ESSL and OCBE, the mechanisms through which ESSL fosters OCBE are not yet fully understood. One pivotal construct that may play a crucial mediating role in this relationship is Green Psychological Capital (GPsyCap).

Green Psychological Capital (GPsyCap), an adaptation of traditional psychological capital focused on a pro-environmental orientation, includes four constructs, namely: green self-efficacy, green optimism, green hope, and green resilience (Chen and Yan, 2022; Chen et al., 2023). Employees with high GPsyCap tend to feel well-equipped and encouraged to engage in OCBE, as they believe their efforts will meaningfully contribute to environmental sustainability (Chen et al., 2023). This study posits that GPsyCap plays a crucial role in clarifying how ESSL influences OCBE. Specifically, GPsyCap is proposed to act as a mediator in the relationship between ESSL and OCBE, highlighting its role in strengthening this connection.

Despite the expanding body of literature on green leadership and pro-environmental behaviors in organizational contexts,

several critical gaps remain. First, the hospitality industry has been relatively underexplored regarding ESSL and its effect on GPsyCap, despite its unique reliance on natural resources and high visibility in environmental issues. Second, while ESSL has shown potential in promoting sustainable behaviors, the exact processes through which ESSL influences employees' OCBE, particularly the roles of green psychological capital, have not been thoroughly investigated. Furthermore, this study addresses scholarly calls from Luu (2019), Aboramadan et al. (2021), and Iftikhar et al. (2024) to explore OCBE and its relationship with ESSL through different mediating mechanisms. Consequently, the current study addresses these research gaps by examining the unique interactions between ESSL and OCBE within hospitality settings, employing GPsyCap as a mediator. Specifically, in line with the lens of social exchange theory (SET), conservation of resources (COR) theory, and Stimulus-Organism-Response (SOR) model, the current study aims to examine the direct influence of ESSL on Green Psychological Capital (GPsyCap) and OCBE, while also assessing the direct relationship between GPsyCap and OCBE. Additionally, it seeks to investigate the mediating role of GPsyCap in the link between ESSL and OCBE.

To achieve these objectives, the study is guided by several key research questions. It explores how ESSL motivates employees to actively participate in OCBE within the hospitality sector and examines its role in fostering the development of GPsyCap among employees in eco-conscious hospitality organizations. Further, what is the nature of the relationship between GPsyCap and OCBE? In addition, does GPsyCap mediate the relationship between ESSL and OCBE, and if so, how does this mediation occur?

In terms of its contribution, this study advances the understanding of leadership's impact on environmental behavior in hospitality by providing empirical evidence of the mechanisms linking ESSL and OCBE through GPsyCap. By highlighting the importance of positive psychological resources in fostering pro-environmental behaviors, this study offers practical insights for hospitality managers aiming to develop a sustainable organizational culture. Additionally, the findings have implications for leadership development programs, suggesting that training leaders to support employees' GPsyCap may significantly enhance OCBE in hospitality settings. In summary, this study introduces a nuanced perspective on ESSL and its effects on OCBE, mediated by GPsyCap. The insights gained contribute to both academic literature and practical applications within the hospitality industry, emphasizing the need for leadership approaches that not only inspire environmental responsibility but also empower employees to actively contribute to sustainability through psychologically supportive engagement.

2 Theoretical background and hypotheses development

2.1 The impact of ESSL on OCBE

Servant leadership (SL), first conceptualized by Greenleaf (1977), is grounded in the leader's commitment to serving followers and prioritizing their growth, wellbeing, and development. Building on Spears (1995) and van Dierendonck (2011, p.

1232) outlined 10 specific traits commonly recognized as the foundational features of SL, including: listening, empathy, healing, awareness, persuasion, conceptualization, foresight, stewardship, commitment to the growth of people, and building community.

In recent years, scholars have extended this model to include a specific focus on environmental responsibility, giving rise to ESSL. In this approach, leaders demonstrate a commitment to sustainability by modeling environmentally responsible behaviors, promoting ecological values, and empowering employees to engage in eco-friendly actions.

OCBE, a subset of organizational citizenship behavior (OCB), is defined as “discretionary acts by employees within the organization that are not rewarded or required and are directed toward environmental improvement” (Daily et al., 2009, p. 246). OCBE also represents a voluntary effort by employees to address and support the ecological needs of their organizations. In the context of the hospitality industry, common forms of OCBE include conserving resources, reducing waste, promoting sustainable practices among colleagues, voluntarily participating in organizational green activities, and assisting colleagues in meeting environmental targets within the organization (Fayyad et al., 2025; Aboramadan et al., 2021; Luu, 2017, 2019). Scholars such as Daily et al. (2009) and Han et al. (2019) have argued that OCBE is crucial in advancing organizational sustainability goals because it extends beyond mandated practices, fostering a proactive and engaged workforce committed to environmental objectives.

Regarding the interplay between ESSL and OCBE, numerous studies have explored the significant positive association between them across diverse settings (Zafar et al., 2022a; Wengang et al., 2023; Luu, 2019). For example, in the context of Vietnamese hotel resorts, research has shown that ESSL significantly enhances employees’ OCBE by reinforcing pro-environmental attitudes and values through a consistent emphasis on sustainability (Luu, 2019). The findings demonstrated that leaders who model and promote eco-friendly values enable employees to internalize these principles, making them more likely to engage in OCBE. Additionally, in the context of the textile sector, Zafar et al. (2022b) found that ESSL plays a pivotal role in fostering employees’ voluntary pro-environmental behaviors. Their findings confirm that ESSL, by embedding environmental values within leadership practices, motivates employees to adopt eco-friendly behaviors beyond their formal job requirements.

Moreover, according to Social Exchange Theory (SET) (Homans, 1958), relationships are built on reciprocal exchanges, where individuals feel obligated to return favorable actions they receive from others. Grounded in SET, the leaders who prioritize and support environmental values create a positive exchange relationship with their employees. By demonstrating care for both the environment and employees’ roles in achieving sustainable goals, ESSL leaders foster a sense of trust, respect, and obligation in their teams. Employees, in turn, reciprocate by engaging in OCBE, going beyond their required duties to support the organization’s environmental goals. Hence, we propose that:

H1: ESSL significantly promotes employees’ OCBE.

2.2 The impact of ESSL on GPsyCap

Following traditional PsyCap, originated by Luthans et al. (2007), GPsyCap was described as “an individual’s positive psychological state during environmental activities” (Chen and Yan, 2022; Chen et al., 2023). This concept represents a set of positive psychological resources that empower employees to engage in sustainable behaviors within their organizations, including green self-efficacy, green optimism, green hope, and green resilience (Chen et al., 2023). Green self-efficacy is defined as “the belief in individuals’ capabilities to organize and execute courses of action required to achieve environmental goals” (Chen et al., 2015, p. 2). Furthermore, green optimism is recognized as a positive outlook on the future of environmental efforts, with the belief that individual and collective actions will lead to successful sustainability outcomes (Chen and Yan, 2022). In addition, green/environmental hope reflects “individuals’ belief in their own capability to generate different workable routes leading to their goal of protecting the environment as well as their motivation to use these routes to achieve that goal” (Kerret et al., 2020, p. 1). Green resilience is identified as the ability to persist in environmentally friendly behaviors despite challenges, setbacks, or limited resources (Elshaer et al., 2024).

Reviewing the existing literature, no prior studies have addressed the effect of ESSL on GPsyCap. However, in non-green contexts, earlier scholars (i.e., Grobler and Flotman, 2021; Clarence et al., 2021; Brohi et al., 2021) have demonstrated that SL significantly contributes to boosting employee PsyCap. For example, Grobler and Flotman (2021) proposed that when employees perceive their leaders as servant leaders, they develop a more positive outlook, becoming especially hopeful and optimistic about the future. In addition, various studies have confirmed that SL positively impacts employees’ psychological capital by fostering a supportive and empowering environment. Servant leaders focus on employees’ wellbeing and development, building self-efficacy by offering guidance, resources, and encouragement that help employees feel capable of succeeding in their roles. They cultivate hope by setting clear goals and empowering employees to find pathways to achieve them, instilling motivation and direction. Resilience is strengthened as servant leaders provide a psychologically safe space where challenges are seen as growth opportunities, while optimism is enhanced through a positive vision and regular recognition, which inspires a positive outlook toward future outcomes (Abedi et al., 2023; Gao and Huang, 2024; Brohi et al., 2021; Baykal, 2020).

According to COR theory, individuals are motivated to acquire, protect, and build valuable resources to manage stress and pursue goals (Hobfoll, 1989). In the context of the ESSL-GPsyCap relationship, environmentally servant leaders provide essential psychological resources, such as empowerment, encouragement, and recognition, which employees can draw upon to build green self-efficacy, optimism, hope, and resilience. These resources mitigate the stress associated with environmental challenges, enabling employees to remain committed to eco-friendly actions and resilient in the face of ecological setbacks. By applying COR Theory, this study suggests that ESSL strengthens GPsyCap by equipping employees with essential psychological

resources, reinforcing their engagement in sustainability initiatives. Consequently, a positive relationship between ESSL and GPsyCap is suggested. Hence, we propose that:

H2: ESSL is significantly associated with employees' green psychological capital.

2.3 The impact of GPsyCap on OCBE

The link between PsyCap and OCBs has been investigated in various contexts. The findings of previous studies emphasized that positive PsyCap, including hope, resilience, self-efficacy, and optimism, plays a pivotal role in fostering employees' OCB (Bogler and Somech, 2022; Sri Ramalu and Janadari, 2022; Waseem, 2025; Yuwono et al., 2023; Su and Hahn, 2023; Jung and Yoon, 2015). In the construction industry context, Su and Hahn (2023) concluded that PsyCap is a crucial predictor of OCB, implying that employees who demonstrate elevated PsyCap tend to engage more in citizenship behaviors. Moreover, the findings of an empirical investigation involving 324 employees from luxury hotels illustrated that hope and resilience significantly foster OCB (Jung and Yoon, 2015). More specifically, hopeful employees are more inclined to assist colleagues with their workloads, show high levels of responsibility, and contribute to initiatives that strengthen the organization's success. In addition, resilient employees can effectively handle challenges and recover quickly from setbacks, which helps them stay motivated and not easily discouraged. This strength allows them to maintain extra helpful behaviors, like supporting others, even when work is overloaded or resources are limited (Yuwono et al., 2023; Su and Hahn, 2023; Gupta et al., 2017).

Grounded in Conservation of Resources (COR) Theory (Hobfoll, 1989), it can be proposed that employees with high GPsyCap possess valuable internal psychological resources—such as green self-efficacy, green hope, green resilience, and green optimism—that empower them to engage in voluntary pro-environmental behaviors (OCBE). According to COR Theory, individuals are motivated to accumulate and leverage resources to cope with challenges and sustain their engagement in meaningful actions. In this context, employees with strong GPsyCap feel more capable (self-efficacy), hopeful (green hope), optimistic (green optimism), and resilient (green resilience) in their ability to support environmental sustainability, leading to a greater likelihood of voluntarily contributing to OCBE. Hence, it could be assumed that:

H3: GPsyCap significantly predicts employees' OCBE.

2.4 The mediating role of GPsyCap in the association amid ESSL and OCBE

In the current study, the indirect effect of ESSL on employees' OCBE will be examined using the SOR model (Mehrabian and Russell, 1974). The model, originally developed in environmental psychology and consumer behavior research, is widely used to explain how external factors (stimuli) influence internal psychological states (organisms), which in turn lead to observable behaviors (responses). This model offers a structured way to

understand how specific environmental leadership practices can impact individual attitudes, emotions, and ultimately actions within organizations (Mehrabian and Russell, 1974).

In the context of the ESSL-OCBE relationship, the SOR model provides a framework to explore how ESSL can lead employees to voluntarily adopt environmentally sustainable practices, with GPsyCap acting as a key mediating internal state. In this setting, ESSL serves as the primary stimulus, with leaders who model and emphasize environmental values and sustainable practices fostering an organizational climate that promotes eco-friendly behaviors. ESSL leaders support and empower employees to be environmentally conscious, fostering a work environment where sustainability is highly valued.

As a result of ESSL's supportive and green-focused leadership, employees develop GPsyCap (organism), which includes green self-efficacy, optimism, hope, and resilience. Consequently, with enhanced GPsyCap, employees are expected to take part in voluntary, pro-environmental behaviors (response), such as helping colleagues with sustainability initiatives, reducing waste, or suggesting eco-friendly practices (OCBE). As a result, the following hypothesis is proposed.

H4: GPsyCap significantly mediates the association between ESSL and OCBE.

The theoretical structure of the study is depicted in Figure 1.

3 Materials and methods

3.1 Measures and instrument development

The current study adopts a quantitative research design to empirically examine the relationship between ESSL, GPsyCap, and employees' OCBE. The data collection was cross-sectional and based on a structured online questionnaire. A thorough literature review was conducted to identify robust and widely accepted measures for developing the study's questionnaire, focusing on scales that have demonstrated reliability and validity in similar research contexts.

The survey instrument consists of four sections, each designed to capture responses for the primary constructs of the study. The first section collects respondents' demographic information. The second section assesses respondents' perceptions of environmentally specific servant leadership behavior. Respondents' perceptions of GPsyCap and OCBE are measured in the third and fourth sections, respectively.

ESSL: Assessed through a seven-item scale based on Aboramadan et al. (2021), focusing on the leader's environmental stewardship and encouragement of eco-friendly behaviors. One item from this scale is, "My leader emphasizes the importance of contributing to environmental improvement".

GPsyCap: Measured using a 12-item scale based on Chen and Yan (2022) and employed by Chen et al. (2023) to assess the dimensions of green self-efficacy (three items), green optimism (three items), green hope (three items), and green resilience (three items). One item within this scale is, "If I should find myself in a jam while engaging in green activities, I could think of many ways to get out of it".

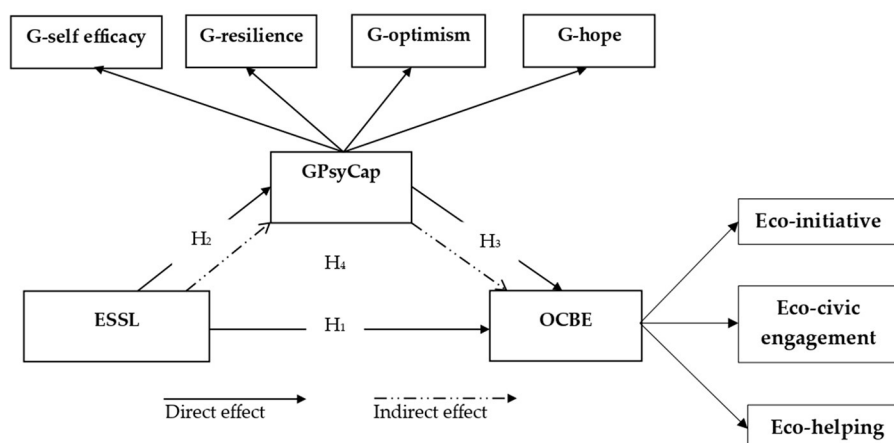


FIGURE 1
The study's theoretical framework.

OCBE: Evaluated with a 10-item scale focusing on eco-civic engagement (four items), eco-initiative (three items), and eco-helping behaviors (three items) (Boiral and Paillé, 2012; Abdou et al., 2023). An example from these items includes, “I voluntarily carry out environmental actions and initiatives in my daily work activities.” The study’s constructs were rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to gauge the extent to which participants agreed with each statement.

The survey instrument was originally developed in English and then translated into Arabic by a bilingual expert to ensure clarity and suitability for the target participants. Subsequently, another bilingual translator, who had not seen the original English version, translated the Arabic text back into English. This back-translated version was compared with the original to identify any discrepancies or misunderstandings, refining the Arabic version to ensure it accurately reflected the intent of the original questions.

3.2 Sampling and data collection procedures

The study targeted full-time employees working in eco-friendly five-star hotels in Egypt. This category of hotels was selected due to their recognized efforts in adopting eco-friendly initiatives (Abdou et al., 2020). Convenience sampling, a non-probability technique, was utilized for several reasons. First, Stratton (2021) highlights that this approach is efficient in terms of simplicity, cost-effectiveness, and time-saving. Second, the participants were not easily accessible. Third, it has been frequently employed in similar sustainable hospitality research (i.e., Abdou et al., 2023; Aboramadan et al., 2021; Luu, 2019).

Due to the lack of official data from certified establishments on eco-friendly hotels in Egypt, the ETIC Hotels website (ETIC Hotels, 2024) was used to identify hotels for the survey. Consequently, 25 five-star eco-friendly hotels were selected, most of which were located in the Red Sea, Greater Cairo, and South Sinai Governorates. We first reached out to the HR managers of each

hotel to obtain their approval and assistance in gathering the data. A cover letter, including the questionnaire, was sent to the HR managers to explain the study’s aims and objectives and request their involvement. As a result, a total of 11 hotels agreed to participate in the field study.

The survey was developed and made available on the Google Forms platform. A link to the questionnaire, accompanied by a welcome message and a detailed explanation of the research’s aim, was emailed to the HR managers of each hotel to be shared with potential participants. To ensure the validity of the research and protect participants’ rights, ethical considerations were implemented. A consent form was provided to ensure that participants understood the study’s purpose and agreed to participate. Voluntary participation, confidentiality, privacy of personal data and responses, and the freedom to withdraw from the study at any time without penalties were also confirmed.

To increase participation, a follow-up reminder was sent to the HR managers 2 weeks after the original email, encouraging employees to complete the survey. The data collection process was extended to seven weeks, from June to August 2024. The total number of forms received was 397. Upon review, nine forms were excluded due to straight-lining answers, resulting in 388 valid forms for statistical analysis. Data were processed and analyzed using SPSS 25 and SmartPLS 4 version 4.1.0.7. The participants’ demographic data are summarized in Table 1.

4 Results

4.1 Common method variance (CMV) analysis and multicollinearity statistics

To mitigate common method variance (CMV) in this study, we implemented several procedural and statistical measures. First, based on the guidelines suggested by Randall and Fernandes (1991) and Phillips and Clancy (2002), participants were assured of complete anonymity and confidentiality to minimize social desirability bias and encourage honest responses. Second,

TABLE 1 The participants' demographic data.

Characteristic	No.	%
Gender		
Male	269	69.3
Female	119	30.7
Age		
From 20 to 30 years	162	41.8
>30–35 years	112	28.8
>35–40 years	79	20.4
> 40 years	35	9.0
Level of education		
High school degree or equivalent	86	22.2
Bachelor's degree	235	60.5
Postgraduate degree	67	17.3
Department		
Food and beverage	142	36.6
Front office	96	24.7
Housekeeping	111	28.6
Others	39	10.1
Working experience in the hotel		
<5 years	194	50.0
From 5 to 10 years	152	39.2
> 10 years	42	10.8
Total	388	100%

participants were assured that their decision to participate was optional, but their contribution was appreciated. Third, the survey invited participants to share their honest perspectives, emphasizing that there were no predetermined right or wrong answers. Additionally, the statistical technique of Harman's Single Factor Test was used to detect CMV. This test involves conducting an exploratory factor analysis (EFA) on all items to determine whether a single factor accounts for the majority of the variance. If a single factor explains more than 50% of the variance, it suggests that CMV may be a significant concern. In this study, the results of Harman's test indicated that no single factor dominated the variance, with one factor accounting for only 38.2% of the total variance. This confirms that common method bias was not a substantial issue in the data, thereby supporting the validity of the findings.

In this study, the variance inflation factor (VIF) was leveraged to verify multicollinearity issues. A cutoff of three is typically used, with any value above this indicating multicollinearity concerns (Hair et al., 2019). According to the results in Table 2, all constructs' items have VIF values below the established threshold, indicating that the model is free from multicollinearity issues and retains its robustness.

4.2 Measurement model assessment

As mentioned above, PLS-SEM was employed to evaluate the measurement model. According to Hair et al. (2019), four steps were followed to evaluate the measurement model. These steps include (1) assessing the indicator loadings, (2) examining internal consistency reliability, (3) addressing convergent validity, and (4) assessing discriminant validity. Loadings exceeding 0.708 are recommended, as they indicate that over 50% of the variance associated with the indicator is explained by the variable, ensuring adequate item reliability (Hair et al., 2019). As shown in Table 2, all SFLs are significant ($p < 0.001$) and exceed the threshold value.

For assessing internal consistency reliability, we first employed composite reliability (CR). Higher values generally indicate improved reliability. According to Hair et al. (2019), values above 0.70 are considered acceptable. Regarding the latent variables (ESSL, GPsyCap, and OCBE), results in Table 2 indicate that all CR values exceed 0.70, ranging from 0.910 (ESSL) to 0.949 (OCBE), reflecting good reliability. Cronbach's alpha was also applied under similar threshold assumptions (0.70). Cronbach's alpha values ranged from 0.881 (ESSL) to 0.941 (OCBE), confirming good internal consistency reliability among the study's variables.

Following the third step, convergent validity was assessed. Convergent validity is determined by calculating the average variance extracted (AVE). A satisfactory AVE value is 0.50 or higher, indicating that the construct explains at least half of the variance in its items. In Table 2, all AVE values exceed the cutoff, ranging from 0.594 (ESSL) to 0.689 (GPsyCap). These results confirm that convergent validity has been established.

The fourth step involves evaluating discriminant validity (DV). DV was assessed following the recommendations of Fornell and Larcker (1981) and Henseler et al. (2015). According to Fornell and Larcker (1981), DV is achieved when the square root of AVE, represented by the bolded diagonal values in Table 3, is greater than the inter-construct correlation. Accordingly, DV has been confirmed. Furthermore, under Henseler et al. (2015) guidelines, the heterotrait-monotrait (HTMT) ratio was also used to assess DV. Following their guidelines, DV issues arise when HTMT values exceed 0.90. Results in Table 3 indicate that DV is not problematic in this study, as no HTMT value surpasses the 0.90 cutoff. The key model fit indices and their thresholds are shown in Table 4.

4.3 Testing the study hypotheses

For testing the study's hypotheses, PLS-SEM with the bootstrapping technique was employed. Results are presented in Table 5 and Figure 2.

Regarding the ESSL-OCBE relationship, results outlined in Table 5 reveal that ESSL is significantly and positively associated with OCBE ($\beta = 0.483$, $p < 0.001$), supporting H1. Furthermore, H2, which suggests that ESSL is significantly and positively associated with green psychological capital (GPsyCap), is also supported ($\beta = 0.689$, $p < 0.001$). Additionally, regarding the association between GPsyCap and OCBE, results demonstrate that GPsyCap is significantly and positively correlated with OCBE ($\beta = 0.291$, $p < 0.001$), thereby supporting H3.

TABLE 2 Constructs' reliability, and validity measures.

Construct	Items	SFL	VIF	Cronbach's alpha	CR	AVE
Environmentally specific servant leadership (ESSL)	ESSL1	0.742***	1.957	0.881	0.910	0.594
	ESSL2	0.710***	2.121			
	ESSL3	0.777***	2.314			
	ESSL4	0.734***	1.905			
	ESSL5	0.811***	1.738			
	ESSL6	0.783***	2.324			
	ESSL7	0.828***	2.417			
Green psychological capital (GPsyCap)				0.939	0.944	0.689
G-hope	GPsyCap1	0.884***	1.772	0.907	0.918	0.789
	GPsyCap2	0.862***	1.878			
	GPsyCap3	0.918***	1.912			
G-self-efficacy	GPsyCap4	0.848***	1.906	0.899	0.928	0.811
	GPsyCap5	0.911***	1.861			
	GPsyCap6	0.941***	1.573			
G-resilience	GPsyCap7	0.931***	1.485	0.948	0.955	0.879
	GPsyCap8	0.935***	1.661			
	GPsyCap9	0.946***	1.935			
G-optimism	GPsyCap10	0.933***	1.877	0.917	0.939	0.837
	GPsyCap11	0.899***	1.658			
	GPsyCap12	0.912***	1.889			
Organizational citizenship behavior for the environment (OCBE)				0.941	0.949	0.597
Eco-initiative	OCBE1	0.845***	2.117	0.804	0.884	0.717
	OCBE2	0.836***	2.425			
	OCBE3	0.860***	1.974			
Eco-civic engagement	OCBE4	0.932***	1.854	0.924	0.946	0.815
	OCBE5	0.917***	1.442			
	OCBE6	0.904***	1.244			
	OCBE7	0.855***	1.986			
Eco-helping	OCBE8	0.945***	1.955	0.876	0.924	0.803
	OCBE9	0.913***	2.014			
	OCBE10	0.826***	2.251			

*** $p < 0.001$.

TABLE 3 Fornell-Larcker and HTMT discriminant validities.

Construct	ESSL	GPsyCap	OCBE	ESSL	GPsyCap	OCBE
ESSL	0.771					
GPsyCap	0.689 ^{***}	0.830		0.566		
OCBE	0.684 ^{***}	0.624 ^{***}	0.773	0.623	0.708	

The AVE's square root is depicted by the bolded diagonal values, ^{***} correlation between latent constructs, ^{***} $p < 0.001$. HTMT < 0.90.

Regarding the indirect effect of ESSL on OCBE through the mediating role of GPsyCap, the results indicate that GPsyCap significantly and positively mediates the ESSL-OCBE relationship

($\beta = 0.201$, $p < 0.001$), thereby supporting H4. Following Zhao et al. (2010) guidelines for evaluating mediation effects, the findings confirm that GPsyCap partially mediates the ESSL-OCBE

relationship. Specifically, with both H1 and H4 significantly supported, the study underscores that ESSL impacts GPsyCap, which in turn drives OCBE.

The study's results, illustrated in Figure 2, also reveal the coefficient of determination (R^2). R^2 is known as a measure of in-sample predictive power, indicating the extent to which exogenous constructs influence endogenous ones (Rigdon, 2012; Hair et al., 2019). Following Hair et al. (2019), R^2 values are classified as weak at 0.25, moderate at 0.50, and substantial at 0.75. As shown in Figure 2, the R^2 value for the impact of ESSL on GPsyCap is 0.475, indicating that ESSL accounts for 47.5% of the variation in GPsyCap. This suggests moderate predictive power, emphasizing that ESSL plays a substantial role in influencing GPsyCap. Additionally, the calculated R^2 value for the combined effect of ESSL and GPsyCap as a mediator on OCBE is 0.512,

implying that the model explains 51.2% of the variance in OCBE. This suggests that slightly over half of the changes in OCBE can be attributed to these predictors (ESSL & GPsyCap), indicating a moderate to substantial level of predictive power for the model.

5 Discussion

The hospitality industry is one of the most resource-intensive sectors, significantly impacting the environment. Eco-friendly hotels, especially five-star establishments, are under pressure to promote sustainability due to their high visibility and influence on customer behavior. In this context, leadership plays a crucial role in fostering an environmentally conscious culture among employees. ESSL, with its focus on sustainability and serving others, aligns perfectly with the industry's need for sustainable operations by enhancing employees' pro-environmental behaviors.

In Egypt, the tourism industry is a major contributor to economic growth, making it essential to protect its natural and cultural resources. Eco-friendly hotels in popular tourist destinations play a key role in promoting sustainable tourism by adopting practices that help preserve the environment (Abdou et al., 2022). Hence, the current study examined the interplay among ESSL → OCBE, ESSL → GPsyCap, GPsyCap → OCBE, and the mediation effect of GPsyCap in the ESSL-OCBE relationship (ESSL → GPsyCap → OCBE). The key findings from the study are detailed as follows:

First, the findings of this research demonstrate that ESSL is significantly and positively associated with OCBE, including eco-initiative, eco-civic engagement, and eco-helping, among employees of eco-friendly five-star hotels. These results underscore the critical role of leadership in fostering voluntary eco-responsible behaviors that are not mandated by job responsibilities. The positive interplay between ESSL and OCBE aligns with the broader literature emphasizing the impact of ESSL style on OCBE among employees (i.e., Wengang et al., 2023; Luu, 2019; Zafar et al., 2022b; Gu and Liu, 2022). In the hospitality industry context, earlier research indicates that ESSL, which emphasizes environmental responsibility, prioritizes eco-initiatives, and grants subordinates the freedom to address ecological concerns, motivates employees to engage in voluntary eco-responsible behaviors, such as eco-initiative, eco-civic engagement, and eco-helping (Aboramadan

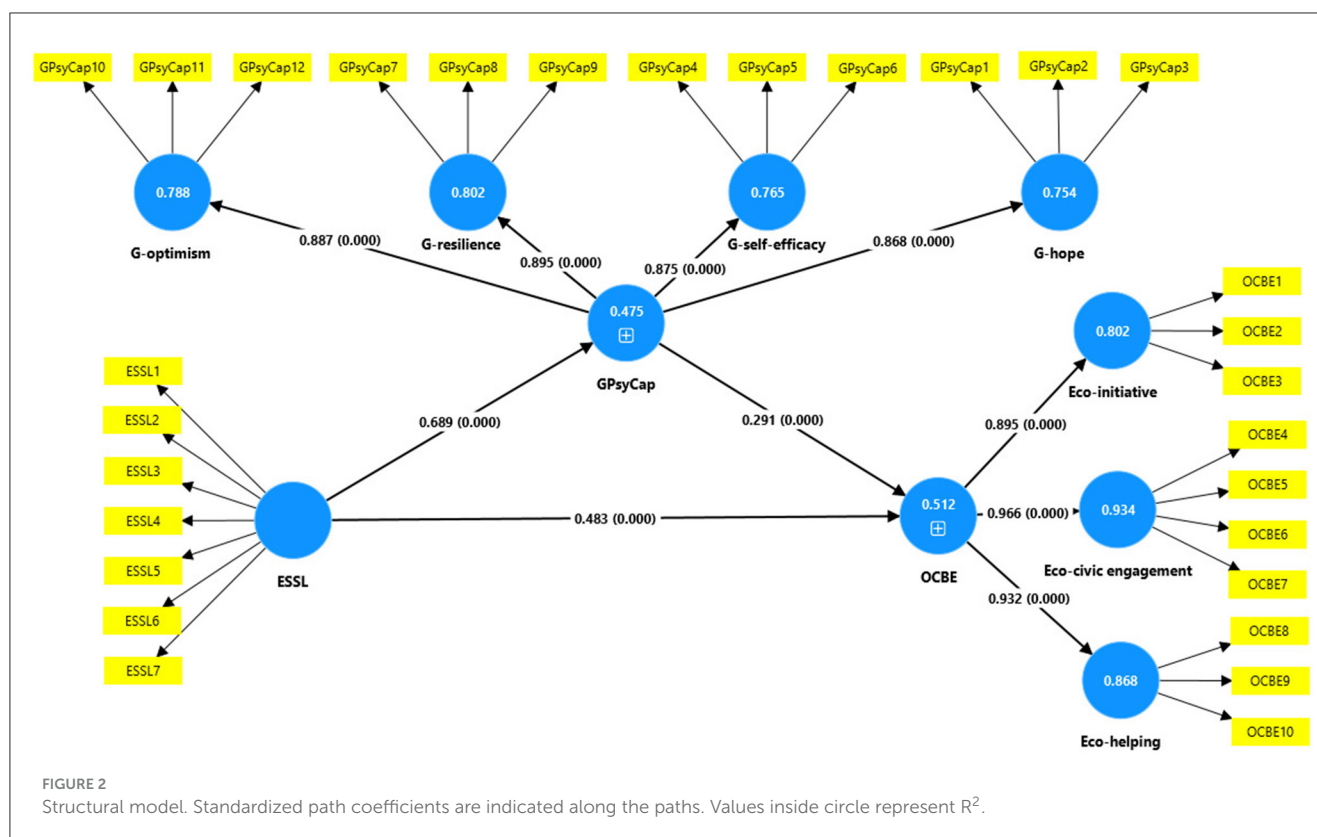
TABLE 4 Summary of key model fit indices and their thresholds.

Fit index	Threshold	Study results	Reference
Outer loadings	≥ 0.708	All indicator loadings > 0.708	Hair et al., 2019
Cronbach's alpha	≥ 0.70	ESSL: 0.881, GPsyCap: 0.939, OCBE: 0.941	
Composite reliability	≥ 0.70	ESSL: 0.910, GPsyCap: 0.944, OCBE: 0.949	
Average variance extracted	$AVE \geq 0.50$	ESSL: 0.594, GPsyCap: 0.689, OCBE: 0.597	
Multicollinearity check	$VIF \leq 3.00$	No multicollinearity detected, all VIF values < 3	
R^2	(0.25 = weak, 0.50 = moderate, 0.75 = substantial)	R^2 for ESSL → GPsyCap: 0.475 (moderate), R^2 for ESSL & GPsyCap → OCBE: 0.512 (moderate to substantial)	
Heterotrait-Monotrait ratio	$HTMT \leq 0.90$	All HTMT values < 0.90	Henseler et al., 2015

TABLE 5 Structural parameter estimates.

Hypothesized path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics	Confidence intervals		Results
					2.5%	97.5%	
Direct effect							
ESSL -> OCBE	0.483	0.487	0.047	10.366***	0.393	0.578	Accepted
ESSL -> GPsyCap	0.689	0.692	0.023	29.608***	0.644	0.737	Accepted
GPsyCap -> OCBE	0.291	0.286	0.056	5.196***	0.174	0.393	Accepted
Indirect effect							
ESSL -> GPsyCap -> OCBE	0.201	0.198	0.041	4.938***	0.120	0.278	Accepted

*** $p < 0.001$.



et al., 2021; Luu, 2019). This finding also supports the perspective of SET, emphasizing that when leaders exhibit behaviors that prioritize environmental responsibility, empower employees, and demonstrate a commitment to promoting consistent, ethical, and environmentally responsible practices, employees feel an obligation to reciprocate by actively and voluntarily contributing to environmental activities.

Second, our findings reveal that ESSL is significantly and positively associated with Green PsyCap, including green self-efficacy, green hope, green optimism, and green resilience, among employees of eco-friendly five-star hotels. The significant association between ESSL and Green PsyCap aligns with previous studies in non-green contexts, suggesting that the servant leadership style, which emphasizes ethical, supportive, and empowering behaviors, fosters PsyCap (Grobler and Flotman, 2021; Clarence et al., 2021; Brohi et al., 2021).

In the context of green hospitality, our findings suggest that ESSL enhances employees' belief in their ability to make a positive environmental impact by providing support, resources, and autonomy. Furthermore, leaders' consistent focus on environmental stewardship gives employees a sense of direction and motivation to pursue sustainability objectives (green hope). Additionally, in terms of green optimism, ESSL fosters a positive outlook on the organization's ability to overcome environmental challenges. Finally, ESSL cultivates green resilience by supporting employees as they navigate setbacks or challenges related to environmental practices. This finding also supports COR Theory (Hobfoll, 1989) by demonstrating that ESSL acts as a resource-enriching factor for employees. ESSL provides key

resources, such as support, autonomy, and a clear vision for environmental sustainability, which help employees build their Green Psychological Capital.

Third, regarding the GPsyCap-OCBE relationship, the study's findings confirm that GPsyCap has a significant positive association with OCBE among eco-friendly five-star hotel employees. This provides further support for previous findings, which illustrated that PsyCap serves as a significant contributor to promoting employees' organizational citizenship behaviors (i.e., Bogler and Somech, 2022; Sri Ramalu and Janadari, 2022; Waseem, 2025; Yuwono et al., 2023; Su and Hahn, 2023; Jung and Yoon, 2015; Gupta et al., 2017). In the green hospitality context, this positive association highlights that employees in environmentally sustainable organizations (such as eco-friendly hotels) are more likely to voluntarily engage in behaviors that promote sustainability when supported by internal resources like GPsyCap. This result further aligns with COR Theory, demonstrating how GPsyCap resources, including green hope, resilience, optimism, and self-efficacy, enhance employees' OCBE. Consequently, we conclude that the greater the perceived GPsyCap, the stronger the performance of OCBE.

Fourth, Green PsyCap was observed to exert a positive influence on the ESSL-OCBE association. The study illustrated that the relationship between ESSL and OCBE is significantly and partially mediated by GPsyCap. This partial mediation suggests that while ESSL directly encourages OCBE, Green PsyCap amplifies this effect by serving as a psychological resource (a mechanism) that translates environmental leadership practices into employee environmental behaviors. More specifically, through the

lens of COR theory, ESSL, as a resource-enriching leadership style, provides employees with the guidance, autonomy, and support needed to develop Green PsyCap. In turn, Green PsyCap intrinsically motivates employees to engage in OCBE, as they derive satisfaction and confidence from their ability to contribute to sustainability. Accordingly, we conclude that the greater the perception of ESSL, the better the development of GPsyCap, which subsequently encourages OCBE among hotel employees.

This finding supports the results of Wang et al. (2023), which concluded that PsyCap significantly partially mediates the relationship between responsible leadership and green behavior among teachers in the higher education context. Their findings indicate that PsyCap serves as a partial, rather than a full, mediator in the responsible leadership-green behavior relationship. The findings also are consistent with Mughal et al. (2022), who concluded that ESSL has a significant impact on employees' pro-environmental behavior, with green self-efficacy—a key component of GPsyCap—acting as a critical mediating mechanism.

In the context of our study, this may be particularly relevant to ESSL fosters a culture of environmental responsibility by establishing behavioral norms, empowering employees, and reinforcing eco-friendly values. As a result, employees may internalize these values directly and engage in OCBE, regardless of their level of psychological capital. Additionally, eco-friendly five-star hotels, sustainability is often an integral part of organizational identity and employee expectations. Employees may feel an immediate sense of responsibility toward pro-environmental behaviors (OCBE) as part of their professional roles, independent of their GPsyCap.

6 Theoretical and practical implications

6.1 Theoretical implications

This study advances the existing literature on environmental sustainability in hospitality by integrating the concept of environmentally specific servant leadership (ESSL) with Green Psychological Capital (GPSCap) as a mediating mechanism. Unlike prior research that has primarily examined leadership and pro-environmental behavior separately, this study provides a comprehensive framework demonstrating how ESSL fosters employees' voluntary sustainability efforts through psychological resources. Firstly, the study enriches Social Exchange Theory (SET) within green hospitality by demonstrating how ESSL fosters employees' OCBE through reciprocal mechanisms. It shows that when leaders prioritize environmental stewardship, empower employees, and exhibit pro-environmental behaviors, employees perceive this support as a valuable resource and, in return, engage in voluntary pro-environmental behaviors (OCBE) as a form of reciprocation.

Secondly, to the best of the author's knowledge, this study is the first to apply Green Psychological Capital (GPSCap) as a mediating pathway between ESSL and OCBE, particularly in the hospitality context. While previous studies have examined PsyCap in organizational settings, its green adaptation (GPSCap) remains an emerging construct, with limited research on its role in influencing

pro-environmental behaviors. Specifically, this research contributes to the growing field of GPSCap by demonstrating its significance in predicting voluntary pro-environmental behaviors (OCBE).

Thirdly, the study extends the Conservation of Resources (COR) framework by identifying Green PsyCap—including green self-efficacy, hope, resilience, and optimism—as a key psychological resource significantly associated with employees' OCBE. This contribution enhances the COR literature by emphasizing specific green resources that support employee sustainability efforts. Similarly, the findings support COR theory by underscoring the role of ESSL as a resource-enriching leadership style that promotes green psychological resources among hotel employees. Additionally, the study extends the application of the SOR model to the green hospitality context by using it as a framework to explore the intermediating effect of GPsyCap on the association between ESSL and OCBE.

Fourthly, in response to scholarly calls by Aboramadan et al. (2021), Luu (2019), and Iftikhar et al. (2024), this research explores the mechanisms through which ESSL fosters voluntary pro-environmental behaviors. Specifically, it validates a novel theoretical model that positions Green PsyCap as a mediator between ESSL and OCBE within the hospitality industry. By integrating ESSL, GPsyCap, and OCBE into a single framework, this study extends the sustainability literature and offers a new perspective on leadership's role in promoting sustainability beyond direct behavioral influence. This framework also establishes a theoretical foundation for future research to further explore the interactions between ESSL, Green PsyCap, and OCBE, particularly in the hospitality sector, where environmental sustainability is becoming increasingly vital.

6.2 Practical implications

This study offers valuable practical implications for the hospitality industry, particularly for eco-friendly hotels, by demonstrating how ESSL can be leveraged to foster sustainable behaviors among employees. Hospitality managers play a critical role in shaping a culture of environmental responsibility, and the following strategies provide concrete ways to enhance OCBE. First, hotels should invest in leadership development programs centered on ESSL principles to equip managers with the skills needed to inspire, support, and empower employees in sustainability efforts. These training programs can encourage leaders to serve as role models by demonstrating pro-environmental behaviors that employees are motivated to emulate. One effective approach is partnering with sustainability organizations to conduct eco-leadership workshops, ensuring that managers gain a deep understanding of how to integrate environmental values into daily hotel operations.

Second, encouraging employee participation in green decision-making is essential. Leaders should foster open communication on sustainability by establishing regular meetings where employees can share ideas, challenges, and successes related to environmental practices. Transparent communication reinforces the organization's commitment to ecological values and motivates employees to actively participate in OCBE. One

effective approach is the creation of “Green Committees” in hotels, where employees can contribute ideas, such as reducing food waste in hotel kitchens, enhancing water conservation efforts, and organizing community sustainability projects.

Third, building Green Psychological Capital (GPsyCap) among hotel employees is crucial. Hotels should implement initiatives that enhance employees’ green self-efficacy, hope, resilience, and optimism. For instance, creating a supportive workplace environment and offering workshops and training sessions focused on GPsyCap—such as resilience in tackling environmental challenges, optimism about achieving sustainability goals, and self-efficacy in implementing eco-friendly practices—can significantly boost employees’ Green PsyCap, thereby promoting OCBE.

Fourth, hotel managers should recognize and reward voluntary eco-friendly behaviors, such as eco-helping and eco-civic engagement. Recognition programs, awards, and eco-friendly competitions can motivate employees to undertake sustainability efforts beyond their formal job responsibilities. Fifth, promoting a culture of environmental stewardship is crucial. Fostering an organizational culture where environmental responsibility is embedded in core values can be achieved through regular workshops, awareness campaigns, and team-building activities centered around sustainability.

Fifth, embedding sustainability into daily operations is essential. Managers should integrate sustainability into standard operating procedures (SOPs) and make it a core aspect of employee responsibilities. For example, front desk managers can train receptionists to educate guests on eco-friendly hotel policies, while housekeeping teams can implement towel and linen reuse programs through guest engagement campaigns.

7 Limitations of study and further research

This research has some limitations, as follows. First, it was exclusively conducted within eco-friendly five-star hotels, which limits the generalizability of its findings to other sectors or types of organizations. Future studies could examine the interplay between ESSL, Green PsyCap, and OCBE in other sectors or non-hospitality industries to extend the applicability of the findings to a broader population. Second, data for the study were obtained through a cross-sectional method at a single time frame, which limits the ability to determine causal relationships between ESSL, OCBE, and Green PsyCap. Longitudinal studies are recommended to gain deeper insights into the causal mechanisms linking ESSL to Green PsyCap and OCBE and to understand how these relationships evolve over time. Third, the study was conducted within a specific geographical context, focusing on eco-friendly hotels in Egypt. Cultural or regional factors may influence the applicability of the findings to other regions. Comparative studies across different countries or regions could provide a more comprehensive understanding of these interrelationships. Fourth, the study integrates COR Theory and SET to examine the interrelationships between the constructs. However, further research could explore alternative theoretical frameworks, such as Social Learning Theory or the Theory of Planned Behavior, to offer broader insights into the connections between ESSL, Green PsyCap,

and OCBE. Fifth, the study primarily focused on Green PsyCap as an intermediary variable in the relationship between ESSL and OCBE. Future research could examine additional mediators, such as green organizational support and green engagement, as well as moderators, such as employee tenure and environmental awareness, that may influence the relationships between ESSL, OCBE, and Green PsyCap.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving humans were approved by Research Ethics Committee—King Faisal University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

AA: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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