

“Unpacking the mechanism between psychological empowerment and green innovative work behavior”

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UNPACKING THE MECHANISM BETWEEN PSYCHOLOGICAL EMPOWERMENT AND GREEN INNOVATIVE WORK BEHAVIOR

Abstract

Employee involvement in environment-oriented innovation is increasingly recognized as a key driver of organizational sustainability. This study explores the influence of organizational citizenship behavior toward the environment as a mediator in the relationship between psychological empowerment and green innovative work behavior, while considering perceived green organizational support as a moderator variable. This study employs a quantitative approach, utilizing data collected through a survey conducted in June 2025 among 222 employees of plantation companies in Indonesia using purposive sampling. Data analysis was performed using structural equation modeling, supplemented with simple slope analysis to test for interaction effects. The results indicate that psychological empowerment has a positive and significant influence on green innovative work behavior ($\beta = 0.253, p < 0.001$) and on organizational citizenship behavior toward the environment ($\beta = 0.569, p < 0.001$). Organizational citizenship behavior toward the environment also significantly influences green innovative work behavior ($\beta = 0.312, p = 0.004$) and was found to mediate the relationship between psychological empowerment and green innovative work behavior ($\beta = 0.178, p = 0.009$). Furthermore, perceived green organizational support was found to moderate the influence between organizational citizenship behavior toward the environment and green innovative work behavior ($\beta = 0.096, p = 0.018$), such that the effect of organizational citizenship behavior on green innovation becomes stronger when perceptions of organizational support for the environment are high. By integrating individual psychological factors, voluntary environmental behaviors, and organizational support into a single framework, the study expands the understanding of sustainable, green innovative behaviors.

Keywords

green, innovation, behavior, support, psychological empowerment

JEL Classification

O31, M12, M14

INTRODUCTION

In recent decades, environmental concern has become a top priority issue in the formulation of public policies and organizational strategies. Indonesia is one of the countries that has actively committed to encouraging plantation industries to be more sustainable, environmentally friendly, and efficient in the use of resources. Amid increasing environmental awareness, plantation companies are becoming important players in addressing or tackling the challenges posed by climate change and ecological degradation.

Green innovation is a timely organizational strategy that is needed to address the severity of the current environmental crisis. Green innovation introduces new ideas and adds value to organizations and society by reducing or avoiding environmental damage. This is not only the responsibility of the company as an institution, but also requires the active involvement of every individual in the organization. Employees' green innovative work behaviors are a key factor in the

success of these efforts. These behaviors are influenced by employees' intrinsic motivations, such as a sense of competence and concern for the environment, as well as organizational support that provides employees with opportunities to act in an environmentally conscious manner. Given the critical interplay between individual drive and workplace environment, investigating these combined mechanisms becomes highly necessary to bridge empirical gaps in pro-environmental behavior models. Ultimately, this study offers substantial relevance by providing a clear blueprint for organizations to leverage both internal psychology and contextual support to achieve long-term sustainability goals.

1. LITERATURE REVIEW AND HYPOTHESES

Maintaining sustainability within an organization is both a demand and a challenge (Dibattista et al., 2024; Hawela et al., 2025; Lamm et al., 2015). Organizational sustainability will be optimized if it is driven by employees' internal motivation in daily work behavior (Li et al., 2020a; Ma & Wang, 2024; Ramus & Killmer, 2007). In this context, green innovative work behavior is an important element in generating, promoting, and implementing new ideas that reduce environmental damage and support organizational sustainability (Chen & Chang, 2013). Employees are among the main drivers of sustainability in an organization (Chen & Zhang, 2024; Mukapit et al., 2024). However, employees' low awareness of green behavior is a challenge that may hinder the internalization of sustainability values within an organization (Su et al., 2024; Vanisri & Padhy, 2024).

Previous studies have shown that low internal and external motivation are one of the main factors in the formation of green behavior (Afsar et al., 2016; Li et al., 2020a; Li et al., 2020b; Ramus & Killmer, 2007). The findings indicate that green innovative work behavior is not only influenced by individuals (Cuong et al., 2026; Jameel et al., 2025; Khan et al., 2025; Li, 2022; Ma & Wang, 2024; Song et al., 2023; Widyanty et al., 2025), but also by organizations (Aboramadan, 2022; Alnaqbi et al., 2024; Piwovar-Sulej & Iqbal, 2025; Xu et al., 2022; Zhu et al., 2022). Therefore, a more comprehensive understanding of the factors that lead to the emergence of green innovative work behavior is needed.

To understand the formation of employee behavior, a robust theoretical framework is needed to explain the role of interactions between internal psychological states and contextual factors in the workplace. According to self-determination theory (SDT), pro-

active behavior and initiative emerge when an individual's three psychological needs are met. These basic psychological needs include competence, autonomy, and relatedness (Cheng et al., 2023; Chi et al., 2023; Olafsen et al., 2024). These basic needs motivate individuals to have control over their behavior, feel capable of completing their tasks and responsibilities, and believe that their work has meaning and a positive impact on themselves and their environment (Spreitzer, 1995). As a result, the drive to contribute beyond the core duties required by the organization is likely to emerge in their daily work. SDT provides insight into the development of creative work behavior and environmental awareness based on intrinsic motivation (Chantara et al., 2011). This is supported by previous research on the application of SDT in green innovative work behavior studies (Lin et al., 2023).

From this perspective, behavioral manifestations of intrinsic and proactive motivation in the workplace can be observed through employees' participation in environmentally oriented innovation. Green innovative work behavior refers to employees' efforts to generate, promote, and implement new ideas that reduce environmental harm and support organizational sustainability (Chen & Chang, 2013). Unlike conventional innovative work behavior, green innovative work behavior specifically focuses on environmentally oriented solutions embedded in daily work practices, processes, and services. These behaviors often involve identifying environmental problems, proposing alternative solutions, and actively participating in their implementation (Stankevičiute et al., 2020). Prior studies suggest that green innovative work behavior is closely related to discretionary and extra-role behaviors (Kuo et al., 2022; Sahibzada et al., 2024), as it frequently requires employees to invest additional effort beyond their formal job descriptions to support environmental initiatives (Paillé et al., 2020; Sahibzada et al., 2024).

The development of innovative behavior is undoubtedly influenced by initiative and the willingness to engage proactively. Therefore, it is essential to understand the psychological factors that underlie such behavior. The perception that individuals possess adequate competence, have self-control, and perceive their work as meaningful and impactful leads them to feel psychologically empowered (Spreitzer, 1995). When employees feel empowered, they have greater confidence in their abilities (Berlian et al., 2025), and their work becomes meaningful, motivating them to strive to have a positive impact on their environment. This occurs because they feel they have control over their work. Such conditions encourage proactive attitudes and a willingness to take initiative, including engaging in behaviors that support innovation and sustainability. Previous studies have repeatedly shown that psychological empowerment increases employees' sense of ownership and responsibility for their jobs, which, in turn, stimulates innovative behavior (Afsar et al., 2016; Chen & Chang, 2013; Prediger & Schermuly, 2025; Zhu et al., 2019; Zia et al., 2023).

Innovative behavior does not simply emerge without being supported by existing daily behaviors, especially when it comes to eco-friendly practices. Voluntary behaviors demonstrated in daily life provide significant opportunities for generating innovative ideas. Organizational citizenship behavior toward the environment is a voluntary, discretionary action taken by employees to support environmental management, which is neither officially rewarded nor mandated by the organization (Boiral, 2009). Specifically, it represents a form of employee commitment to the environment, rather than compliance-based environmental behavior. Employee involvement in organizational citizenship behavior toward the environment fosters an environmentally conscious organizational culture and embodies sustainable practices in daily operations (Boiral & Paillé, 2012; Pham et al., 2019), which stimulates the emergence of ideas and the implementation of environmentally friendly work practices (Al-shami et al., 2023; Khan et al., 2025; Srivastava et al., 2025; Zia et al., 2024).

Organizational influence is also a key factor in fostering innovative behavior. Organizations perceived as supportive of employees in their work

have a positive impact on how employees respond to policies and leadership (Rhoades & Eisenberger, 2002). Opportunities provided by the organization to engage in green behavior motivate employees to act accordingly. The perception that the organization provides employees with the space and trust to engage in green behavior strengthens their engagement and increases the likelihood of green innovative work behavior. Employees feel that their green behavior is supported and aligned with the company's values (Madan et al., 2025). This is because they perceive that the organization they work for shares their values and supports their eco-friendly behavior. Previous research has shown that perceived green organizational support can increase employees' green innovative work behavior (Aboramadan et al., 2022; Hawela et al., 2025; Kerse, 2024; Saydam et al., 2025).

Based on the above discussion, psychological and organizational factors play a significant role in shaping green innovative work behavior. However, a more comprehensive understanding is still needed to strengthen such behavior, specifically through the mediating role of organizational citizenship behavior toward the environment and perceived green organizational support.

Therefore, the primary objective of this study is to uncover the mechanisms of psychological empowerment that influence green innovative work behavior, as well as to examine the role of organizational citizenship behavior toward the environment as a mediator and perceived green organizational support as a moderator. Based on the literature review and theoretical framework (Figure 1), the following hypotheses are formulated:

- H1: *Psychological empowerment positively influences green innovative work behavior.*
- H2: *Psychological empowerment positively influences organizational citizenship behavior toward the environment.*
- H3: *Organizational citizenship behavior toward the environment positively influences green innovative work behavior.*
- H4: *Organizational citizenship behavior toward the environment mediates the relationship*

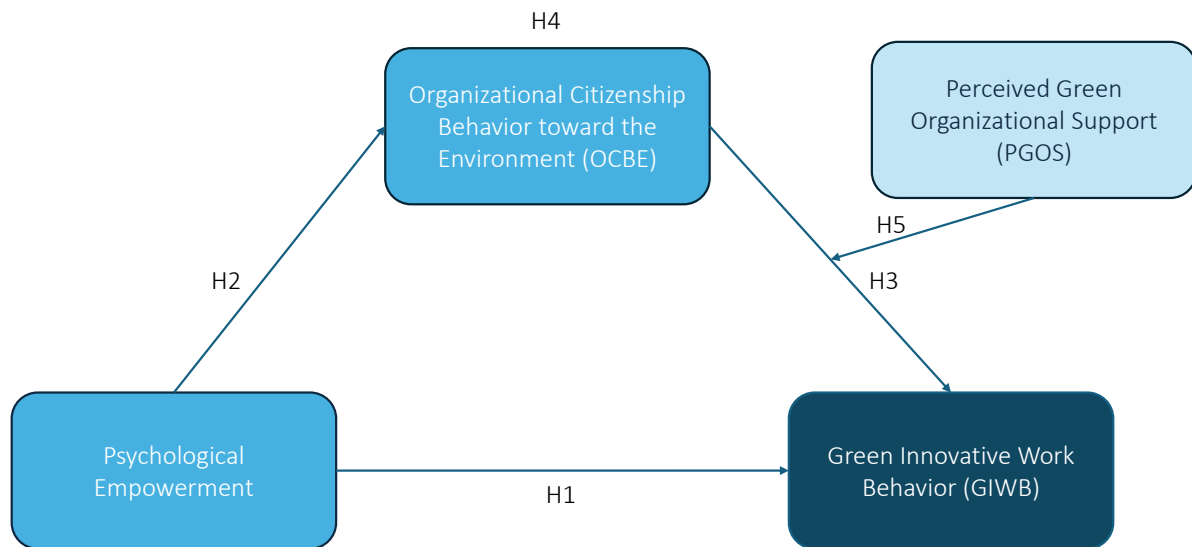


Figure 1. Conceptual framework

between psychological empowerment and green innovative work behavior.

H5: Perceived green organizational support strengthens the positive relationship between organizational citizenship behavior toward the environment and green innovative work behavior.

2. METHOD

This study employed a quantitative method, collecting data from employees working at various plantation companies in Indonesia through an online questionnaire. The study used purposive sampling, in which subjects were deliberately selected based on specific characteristics relevant to the research objectives (Ahmad & Wilkins, 2025; Memon et al., 2025). The criteria for respondents participating in this study were that they had been permanent employees at the time of data collection and had been directly involved in operational or technical roles, where their daily behavior directly impacts the organization's environmental performance. This criterion was intended to ensure that they had organizational experience relevant to the variables studied. In addition, permanent employees have a more stable bond and tenure with the organization, thus providing a better understanding of work dynamics, policies, and practices.

According to data from plantation companies in Indonesia, there were 3,358 active and permanent staff or assistant level (Board of Directors-3) employees. Based on G*Power calculations (95% confidence level, 5% margin of error) and Daniel Soper's method, it was determined that the minimum representative sample size is 129–137 respondents; however, this study used 222 respondents, thereby meeting the requirements for SEM analysis (Kline, 2016; Hair et al., 2019).

This study used Google Forms to distribute the questionnaire through the company's official internal communication network, with structural support from each company's HR department. Participation in this study was anonymous and voluntary. Data collection was conducted in June 2025. The participants consisted of 175 (78.8%) men and 47 (21.2%) women. The data obtained in this study were original and were collected specifically for this study. Table 1 presents the descriptive characteristics of the respondents.

This study involved several procedural steps. First, the measurement instruments were adapted from previous studies, thereby ensuring the reliability of each instrument. Second, the items were translated into Indonesian and reviewed by experts to ensure clarity and appropriateness within the research context. Third, the final

questionnaire was distributed to the participants. Finally, data completeness was verified, and incomplete data were excluded from the study.

Table 1. Descriptive characteristics

Specifications		Amount (n)	Percentage (%)
Gender	Male	175	78.8
	Female	47	21.2
Age (years old)	< 25	5	2.3
	25–34	60	27
	35–44	70	31.5
	45–54	76	34.2
	55–59	11	5
Education	High School/ Vocational School	58	26.1
	Diploma (D3)	22	9.9
	Bachelor (S1)	120	54.1
	Postgraduate (S2/S3)	22	9.9
Experience (years)	> 1	17	7.7
	1–3	28	12.6
	4–6	12	5.4
	< 6	165	74.3
Total		222	100

To operationalize the various constructs, this study used instruments adapted from previous research. The green innovative work behavior scale comprises 10 items adapted from Rosyiana et al. (2020) and Aboramadan et al. (2022), with a reliability of 0.94. Psychological empowerment was measured using a scale created by Spreitzer (1995). This scale has a reliability of 0.80 and consists of 12 items. Organizational citizenship behavior toward the environment was measured using items compiled by Boiral and Paillé (2012), comprising nine items with reliabilities of 0.92 for eco-initiative, 0.90 for eco-civic engagement, and 0.81 for eco-helping. Meanwhile, perceived green organizational support was measured using items adapted from the property scale developed by Saydam et al. (2025), consisting of five items. The questionnaire used a Likert scale with 5-point response options for three scales (green innovative work behavior, organizational citizenship behavior toward the environment, and perceived green organizational support) and 7-point response options for the psychological empowerment scale. All measurement items were adapted and modified from previous research and adjusted to the perspective of this study. A complete questionnaire and measurement items are provided in Appendix A.

The initial stage in assessing a measurement model using PLS was to evaluate the extent to which the model fits the data, as measured by the SRMR index. Findings from the analysis indicated that the SRMR value for this model was 0.078, which met the recommended cutoff of below 0.08 (Sarstedt & Cheah, 2019), indicating that the model had a high compatibility level. The next stage in the measurement model evaluation was to examine construct validity. In addition, the internal consistency of each variable used was also analyzed.

In evaluating the measurement model via confirmatory factor analysis (CFA), items were screened based on the strict cutoff thresholds proposed by Hair et al. (2019), whereby indicators with factor loadings below 0.70 were to be removed to ensure high convergent validity. For the psychological empowerment variable, this statistical criterion left six items. Despite the reduction, these remaining indicators still adequately represent the core dimensions of meaning (PE5), competence (PE12), self-determination (PE3), and impact (PE4, PE6, and PE11) among employees.

Meanwhile, for green innovative work behavior (GIWB), items GIWB1 and GIWB2 were eliminated due to low factor loadings. However, this does not eliminate the concept of idea generation from the construct, as one valid item representing the green idea generation phase was successfully retained (GIWB3). The rest of the GIWB items heavily capture the subsequent phases of idea green innovation promotion (GIWB4, GIWB6, GIWB7, and GIWB8) and implementation (GIWB5, GIWB9, and GIWB10). For organizational citizenship behavior toward the environment and perceived green organizational support, all items were successfully maintained.

Model reliability was evaluated through the assessment of composite reliability and Cronbach's alpha values. All variables showed values exceeding the recommended minimum limit of 0.70, as shown in Table 2 and Figure 2 (Hair et al., 2019).

Validity convergence was calculated using the average variance extracted (AVE) value. Table 2 shows that green innovative work behavior, psychological empowerment, organizational citizenship behavior toward the environment, and per-

Table 2. Validity and reliability

Construct	Items	Λ	α	AVE	CR
Green Innovative Work Behavior	GIWB3	0.722	0.933	0.680	0.940
	GIWB4	0.825			
	GIWB5	0.805			
	GIWB6	0.821			
	GIWB7	0.849			
	GIWB8	0.889			
	GIWB9	0.859			
	GIWB10	0.823			
Psychological Empowerment	PE3	0.753	0.874	0.613	0.890
	PE4	0.816			
	PE5	0.786			
	PE6	0.758			
	PE11	0.809			
	PE12	0.772			
Organizational Citizenship Behavior toward the Environment	OCBE1	0.703	0.948	0.685	0.951
	OCBE2	0.750			
	OCBE3	0.834			
	OCBE4	0.852			
	OCBE5	0.907			
	OCBE6	0.883			
	OCBE7	0.818			
	OCBE8	0.866			
	OCBE9	0.818			
Perceived Green Organizational Support	PGOS1	0.775	0.903	0.722	0.904
	PGOS2	0.870			
	PGOS3	0.823			
	PGOS4	0.881			
	PGOS5	0.895			

Note: λ = factor loading; α = Cronbach's alpha; AVE = average variance extracted; CR = composite reliability.

ceived green organizational support each had AVE values exceeding 0.50. These findings indicated that the convergent validity criteria had been adequately met. Meanwhile, discriminant validity was examined using two main methods. The approaches used included the Fornell–Larcker

criteria and the HTMT ratio, the application of which referred to the guidelines from Hair et al. (2019). Table 3 shows that both methods indicated that the discriminant validity of all constructs had been established. In addition, the variance inflation factor (VIF) analysis was conducted to ensure

Table 3. Discriminant validity results (HTMT and Fornell-Larcker)

Indicators	GIWB	PGOS	OCBE	PE
Heterotrait-monotrait ratio (HTMT) – Matrix				
GIWB				
PGOS	0.539			
OCBE	0.570	0.824		
PE	0.524	0.656	0.607	
PGOS x OCBE	0.075	0.367	0.278	0.225
Fornell–Larcker				
GIWB	0.825			
PGOS	0.504	0.850		
OCBE	0.544	0.769	0.828	
PE	0.498	0.589	0.569	0.783

Note: GIWB = green innovative work behavior; PGOS = perceived green organizational support; OCBE = organizational citizenship behavior toward the environment; PE = psychological empowerment.

there were no multicollinearity issues. The VIF value should be less than 10 (Hair et al., 2019). The highest VIF value in the study was 5.428, indicating that there was no multicollinearity in the data.

3. RESULTS

The structural model was tested using the 5,000-bootstrap method after the measurement model's validity and reliability were confirmed (Hair et al., 2019). The coefficient of determination (R^2) should be greater than 0.10 (Sarstedt & Cheah, 2019). These values showed that the model could explain 32.4% of organizational citizenship behavior toward the environment and 37% of green innovative work behavior. Furthermore, the Stone–Geisser test results indicated that the model had adequate predictive capability, as evidenced by positive Q^2 values for all variables analyzed (Table 4).

This study also assessed the effect size in the conceptual model using f^2 . Based on the classification of Hair et al. (2019), an f^2 value of 0.02 indicates a small effect, 0.15 indicates a medium effect, and

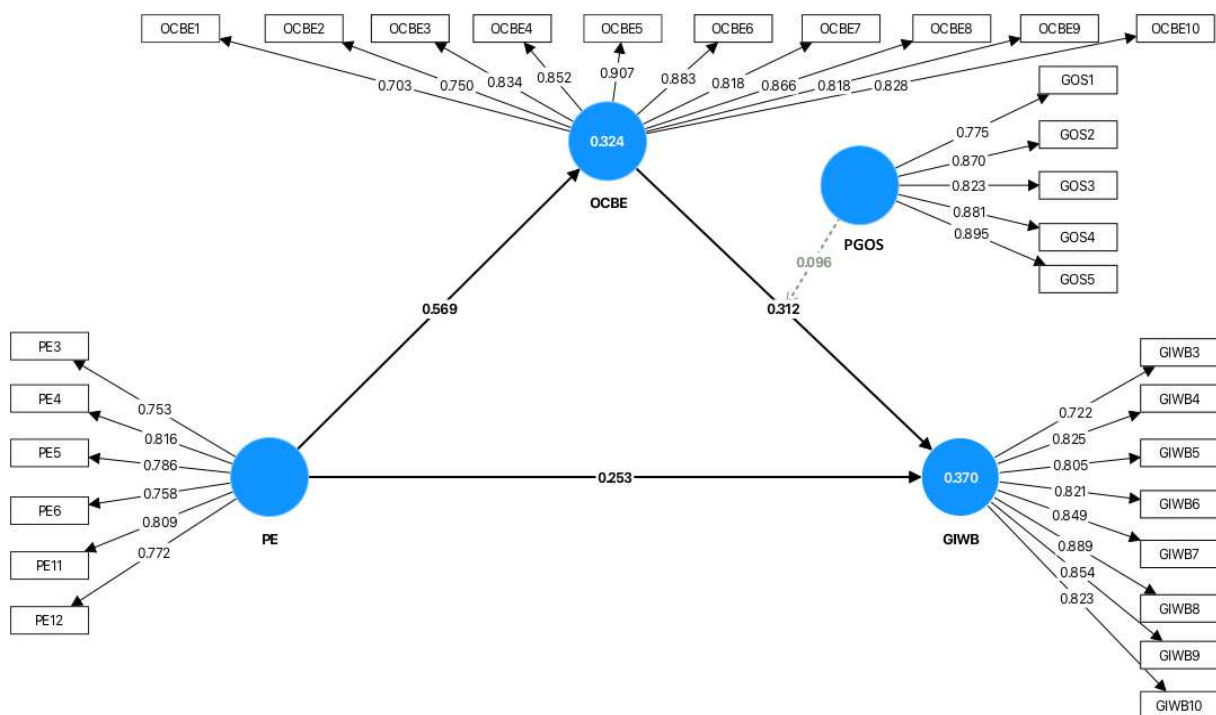
0.35 indicates a large effect. In these findings, f^2 values ranged from 0.060 to 0.479, indicating that the model included effects ranging from small to large.

Table 4. Coefficient of determination (R^2) and predictive relevance (Q^2)

Constructs	R^2	Q^2
GIWB	0.370	0.231
OCBE	0.324	0.202

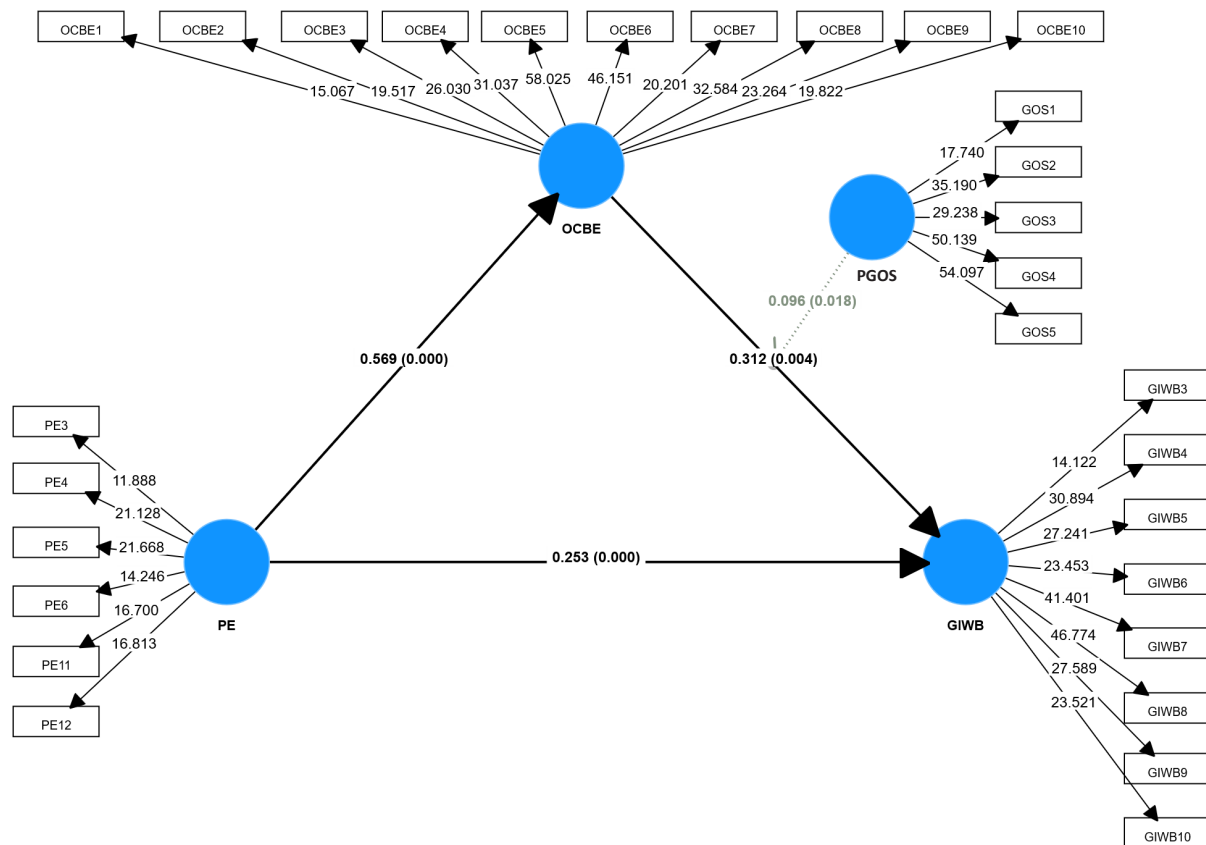
Note: R^2 = Coefficient of determination, Q^2 = Coefficient of predictive relevance. GIWB = green innovative work behavior; OCBE = organizational citizenship behavior toward the environment.

In terms of hypotheses testing, Table 5 and Figure 3 indicate that all the hypotheses are statistically supported. All p -values in Table 5 are less than 0.05, indicating that all hypotheses showed significant relationships. These findings confirm the positive and highly significant influence of psychological empowerment on two key variables: green innovative work behavior ($\beta = 0.253$, $t = 3.656$, $p = 0.000$) and organizational citizenship behavior toward the environment ($\beta = 0.569$, $t = 9.744$, $p = 0.000$). Therefore, $H1$ and $H2$ are accepted. Organizational citizenship behavior toward



Note: GIWB = green innovative work behavior; PGOS = perceived green organizational support; OCBE = organizational citizenship behavior toward the environment; PE = psychological empowerment.

Figure 2. Structural model



Note: GIWB = green innovative work behavior; PGOS = perceived green organizational support; OCBE = organizational citizenship behavior toward the environment; PE = psychological empowerment.

Figure 3. Bootstrapping results of the structural model

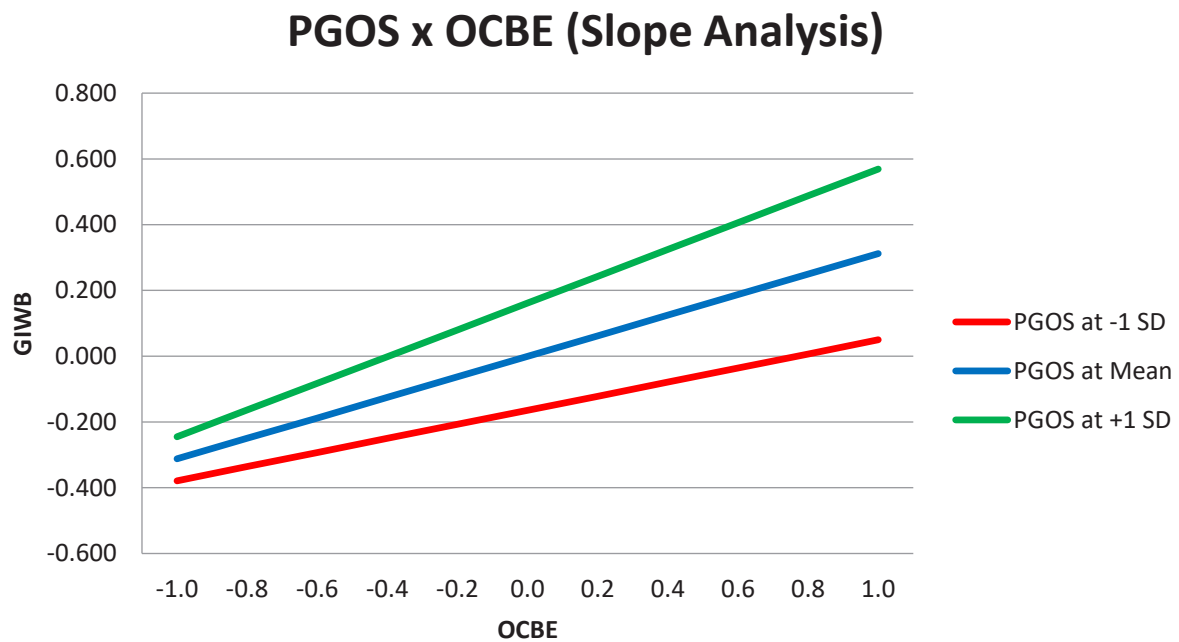
Table 5. Results of hypotheses testing

Hypotheses		β	t	p	Confidence Interval		Results
					2.5%	97.5%	
Direct path analysis							
H1	PE → GIWB	0.253	3.656	0.000	0.121	0.397	Accepted
H2	PE → OCBE	0.569	9.744	0.000	0.462	0.687	Accepted
H3	OCBE → GIWB	0.312	2.903	0.004	0.105	0.524	Accepted
Indirect path analysis							
H4	PE → OCBE → GIWB	0.178	2.627	0.009	0.060	0.327	Accepted
H5	PGOS x OCBE → GIWB	0.096	2.373	0.018	0.012	0.172	Accepted

Note: GIWB = green innovative work behavior; PGOS = perceived green organizational support; OCBE = organizational citizenship behavior toward the environment; PE = psychological empowerment.

the environment was found to have a positive and highly significant effect on green innovative work behavior ($\beta = 0.312$, $t = 2.903$, $p = 0.004$), thus supporting *H3*. The mediating and moderating effects also showed a significant influence of green innovative work behavior. Testing hypothesis *H4* provided evidence of a positive, significant mediating effect. Organizational citizenship behavior toward the environment was proven to act as a mediator

($\beta = 0.178$, $t = 2.627$, $p = 0.009$). These findings supported the acceptance of *H4*. Moreover, the findings indicated that the presence of perceived green organizational support enhanced the correlation between organizational citizenship behavior and green innovative work behavior ($\beta = 0.096$, $t = 2.373$, $p = 0.018$). This result verified a positive and statistically significant relationship, thereby supporting *H5*.



Note: GIWB = green innovative work behavior; PGOS = perceived green organizational support; OCBE = organizational citizenship behavior toward the environment.

Figure 4. Slope analysis

4. DISCUSSION

This paper focuses on understanding the impact of psychological empowerment on green innovative work behavior by exploring the mediating role of organizational citizenship behavior toward the environment and the moderating role of perceived green organizational support. All findings showed statistically significant results.

The first hypothesis (*H1*) is supported by data showing a significant effect of psychological empowerment on green innovative work behavior. These results are consistent with previous studies showing that workers who feel psychologically empowered are not only motivated to engage in voluntary activities in their organizations, but are also able to realize their innovative potential for sustainability in their professional lives (Akkoç et al., 2022; Grošelj et al., 2020; Liu et al., 2019; Lv et al., 2021; Nguyen et al., 2023; Sinha et al., 2016).

Employees with a positive work outlook are more inclined to be motivated, loyal, and concerned about their own and the company's achievements (Dong et al., 2026). Employees who can create a sense of autonomy and self-confidence, as well

as perceive that their work has meaning and that they are competent in their work, are important psychological conditions for the emergence of innovative work behaviors related to environmental issues (Nguyen et al., 2023). Employees who are motivated by meaning and self-determination demonstrate greater creativity than those who are not. When these abilities are supported by strong competencies and work that has a positive impact, employees are more likely to generate ideas and suggestions for change. This process ultimately results in greater innovation in the workplace (Sinha et al., 2016). Work that is considered meaningful and aligned with their personal values encourages employees to integrate environmental principles into daily work behavior (Jing et al., 2026).

Responding to the second hypothesis (*H2*), the research findings indicate that psychological empowerment significantly influences organizational citizenship behavior toward the environment. This finding is consistent with previous research stating that the greater the control individuals have over themselves and their understanding of their abilities and the meaning of their work, the greater the positive contribution they make beyond the formal job description, including en-

vironmental issues (Asif et al., 2025; Kamil et al., 2024). Employees with a positive work-related outlook tend to be more motivated, loyal, and concerned about their own and the company's achievements (Asif et al., 2025; Lamm et al., 2015). Psychological empowerment has the potential to motivate individuals to engage in voluntary extra-role behaviors related to environmental issues within the scope of their work (Dong et al., 2026; Jing et al., 2026). Previous research has discussed the relationship between psychological empowerment and OCB in general (S. Singh & A. Singh, 2019; Turnipseed & VandeWaa, 2020). This paper complements the literature by examining the relationship between psychological empowerment and OCB specific to the environment.

In addition, Hypothesis 3 (*H3*) is accepted. The findings are consistent with the existing literature on organizational citizenship behavior toward the environment and green innovative work behavior (Khan et al., 2025; Turnipseed & VandeWaa, 2020). The voluntary behavior demonstrated by employees in their concern for the environment provides a strong social and psychological foundation for them to behave innovatively and to act on that concern (Aboramadan et al., 2021). Employees participate in formulating and learning together, fostering a sense of involvement and togetherness with their colleagues (Pathak et al., 2026). Involvement in informal actions, such as eco-friendly practices, efficiency, and voluntary waste reduction, makes them accustomed to generating new ideas. The search for ideas, the formulation of ideas, and, finally, the implementation of environmentally friendly ideas do not occur immediately, but are based on shared habits and togetherness with fellow employees. These voluntary actions in daily work life provide a good basis for generating innovative ideas (Daily et al., 2009). The presence of organizational citizenship behavior toward the environment here is therefore essential in the context of developing a habit of environmentally friendly behavior. These actions are the basis of green innovative work behavior.

Regarding *H4*, the findings show that organizational citizenship behavior toward the environment mediates the relationship between psychological empowerment and green innovative work behavior. In other words, psychological empow-

erment increases employees' tendency to act voluntarily toward the environment, thereby encouraging the emergence of green innovation in the workplace. This mediation reinforces the psychosocial process model approach in explaining the origins of green innovative work behavior. When employees feel that their work has meaning and that they possess competence, autonomy, and impact, they tend to be more motivated to go beyond the demands of their role and voluntarily engage in actions that support the environment (Skrinou & Gkorezis, 2020). This voluntary behavior then forms the psychological and social conditions that support the emergence of green ideas, experiments, and the implementation of green innovations in organizations (Al-shami et al., 2023).

From these results, it is evident that organizational citizenship behavior toward the environment is the foundation for building a cohesive professional network among employees, which is crucial for improving organizational efficiency and success (Asif et al., 2025). When employees actively help their coworkers, mentor them, and effectively protect and maintain company assets or values, innovation and efficiency are more likely to occur (Lim et al., 2025).

In closing, the findings of *H5* indicate that perceived green organizational support can enhance the relationship between organizational citizenship behavior toward the environment and green innovative work behavior. The simple slope analysis supports this finding, as illustrated in Figure 4. The effect of organizational citizenship behavior toward the environment on green innovative work behavior is strongest when perceived green organizational support is high (green line) and weakest when it is low (red line). These findings contribute a new perspective: that organizational support for green practices reinforces the influence of organizational citizenship behavior toward the environment on employee green innovation. Employees tend to engage in organizational citizenship behavior toward the environment naturally when they feel that their organization supports them (Lamm et al., 2013). When organizations show a real commitment to sustainability, employees who behave pro-environmentally feel more empowered to innovate in green ways (Aboramadan et al., 2022), as they perceive that they have the space

and opportunity to align their values and sensitivity to the environment (Li et al., 2020a).

This study demonstrates that psychological empowerment is a crucial cognitive antecedent for employees seeking to expand innovative behavioral models in the workplace. These findings highlight that individual self-control and meaningful work play significant roles in encouraging voluntary engagement with the environment and innovative environment-based work behaviors. This finding corroborates the theory of self-determination about cognitive motivation in individuals. In addition, this study enriches the body of research on green innovative work behavior, which is influenced not only by external but also by internal individual factors. In addition, this study integrates prosocial theory and innovation theory, with organizational citizenship behavior toward the environment as the mediating variable, into a transition mechanism linking intrinsic motivation in individuals to innovative behaviors. In this case, it shows that pro-environmental behavior is not only altruistic but also serves to generate green ideas in the workplace.

The inclusion of perceived green organizational support highlights the important role of organizational support in encouraging green behavior. These findings support person-environment fit theory, in which individual potential (organizational citizenship behavior toward the environment) can be developed when organizations provide appropriate support. Organizations need to redesign their employee enablement programs to incorporate sustainability. For example, through training that combines work competency development with environmental values, granting autonomy in operational decision-making that affects the environment, and involving employees in the development of environmentally friendly solutions. This result not only enhances organizational citizenship behavior toward the environment but also strengthens the potential for environmentally

oriented innovation. It is not only an indicator of loyalty, but also a foundation for the emergence of green innovative work behavior. Therefore, organizations need to facilitate organizational citizenship behavior toward the environment, such as by providing space and time for informal pro-environmental activities and by appreciating even small contributions in the form of green ideas. Thus, the culture of green innovation will grow organically.

The results of the moderation effect of perceived green organizational support show that the effect of organizational citizenship behavior toward the environment on green innovative work behavior is optimal when the organization provides a strong signal of support. Therefore, organizations must build systems that explicitly reflect green commitments (Mirhadin et al., 2023), for example, by drafting clear environmental policies, providing incentives for environmentally friendly innovations, and demonstrating leadership commitment to a green vision.

Although this study makes an important contribution, it acknowledges that the number of items was reduced to meet statistical validation standards. Nevertheless, all core dimensions of psychological empowerment and green innovative work behavior remain well-represented in the model. In addition to these methodological adjustments, emotional factors and personal values, such as eco-anxiety, moral identity, and green values, may also play an important role in driving organizational citizenship behavior toward the environment and green innovative work behavior. Therefore, future research is advised to adapt and contextualize this measurement scale by taking into account the cultural factors of workers in various industrial sectors to avoid item deletion. Exploring the role of affective and moral psychology in driving ecological engagement in the workplace is also needed to expand the theoretical framework from a cognitive to an affective perspective.

CONCLUSION

The primary objective of this study is to uncover the mechanisms of psychological empowerment that influence green innovative work behavior, as well as to examine the role of organizational citizenship behavior toward the environment as a mediator and perceived green organizational support as a mod-

erator. The results confirmed that psychological empowerment significantly influenced green innovative work behavior and organizational citizenship behavior toward the environment. Organizational citizenship behavior toward the environment was also confirmed to influence green innovative work behavior significantly. Furthermore, organizational citizenship behavior toward the environment was found to mediate the relationship between psychological empowerment and green innovative work behavior. The moderating role of perceived green organizational support was also found to significantly enhance the relationship between organizational citizenship behavior toward the environment and green innovative work behavior.

It can be concluded that fostering employees' internal psychological motivation and voluntary pro-environmental behavior, combined with strong organizational support, serves as an evidence-based human resources strategy to ensure sustainable green innovation and long-term organizational sustainability. The sample size in this study was limited to a specific sector or region, so generalizing the results to other organizational contexts requires caution. Future research is also recommended to include additional variables, such as leadership style (e.g., green transformational leadership), organizational culture, and external factors (e.g., environmental regulations), to develop a more comprehensive model.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Measurement scale

Construct	Items
Green Innovative Work Behavior To increase green/eco-friendly innovation in the workplace,	I am looking for a new working method, technique or instrument/tool
	I provide new/original solutions to every problem in the workplace
	I use a new way to carry out my work
	I make important people in my work group feel enthusiastic about my innovative ideas
	I convince many people to support innovative ideas
	I systematically/structurally apply my innovative ideas to my work
	I contribute to the application of new ideas
	I am trying to develop new things / develop something that does not yet exist
Psychological Empowerment	I have significant autonomy in determining how I do my job
	My impact on what happens in my department is large
	My job activities are personally meaningful to me
	I have a great deal of control over what happens in my department
	I have significant influence over what happens in my department
Organizational Citizenship Behavior toward the Environment	I am self-assured about my capabilities to perform my work activities
	In my work, I weigh the consequences of my actions before doing something that could affect the environment
	I voluntarily carry out environmental actions and initiatives in my daily work activities
	I make suggestions to my colleagues about ways to protect the environment more effectively, even when it is not my direct responsibility
	I actively participate in environmental events organized in and/or by my company
	I stay informed of my company's environmental initiatives
	I undertake environmental actions that contribute positively to the image of my organization
	I volunteer for projects, endeavors, or events that address environmental issues in my organization
	I spontaneously give my time to help my colleagues take the environment into account in everything they do at work
Perceived Green Organizational Support	I encourage my colleagues to adopt more environmentally conscious behavior
	I encourage my colleagues to express their ideas and opinions on environmental issues
	I feel that I can behave as sustainably as I want to at the organization where I currently work
	My organization makes an active effort to help employees be environmentally proactive
	My organization provides an incentive for me to reduce the use of non-renewable resources
	I feel that I make a positive environmental impact through work at my organization
	My actions toward sustainability are appreciated by my organization