

The Influence of Green Transformational Leadership, Employee Engagement, and Green Organizational Culture on Sustainable Employee Performance through Green Innovation Behavior: Evidence from the Indonesian Maritime Security Agency

Winda Lisnawati^{1*}, Agus Arijanto²
Universitas Mercu Buana, Indonesia

Corresponding Author: Winda Lisnawati winda.lisnawati12@gmail.com

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A B S T R A C T

This study examines how Green Transformational Leadership, Employee Engagement, and Green Organizational Culture influence Sustainable Employee Performance through Green Innovation Behavior at the Indonesian Maritime Security Agency (Bakamla RI). A quantitative survey was conducted among 165 employees at Bakamla RI Headquarters in Jakarta. Data were analyzed using PLS-SEM with SmartPLS 4. The results show that all three antecedents positively and significantly affect Sustainable Employee Performance and Green Innovation Behavior. Green Innovation Behavior also positively affects Sustainable Employee Performance and significantly mediates all three antecedent-performance relationships. The findings highlight the importance of integrating green leadership, employee engagement, organizational culture, and employee innovation into public-sector sustainability management.

INTRODUCTION

Organizations increasingly face pressure to maintain long-term performance while responding to social and environmental expectations. Sustainability therefore extends beyond short-term productivity to include how employees work, use resources, adapt to change, and contribute to organizational goals. From the Triple Bottom Line perspective, sustainability requires a balance among economic, social, and environmental considerations (Elkington, 1997). In human resource management, this perspective highlights the importance of employee behaviors and capabilities in supporting sustainable organizational performance.

This issue is particularly relevant to the Indonesian Maritime Security Agency (Badan Keamanan Laut Republik Indonesia/Bakamla RI), a public institution responsible for maritime security and safety. Given its maritime operational context, organizational sustainability is closely related to how employees perform their duties, manage resources, adapt to operational demands, and respond to environmental concerns. Sustainable Employee Performance (SEP) is therefore important not only as an individual outcome but also as a foundation for sustained institutional effectiveness.

The empirical context indicates that further improvement is needed. Bakamla RI's BerAKHLAK Index increased from 53.8 in 2023 to 74.47 in 2024, but remained below the healthy threshold of 80. Its SAKIP score also increased from 55.24 in 2020 to 63.56 in 2024, although improvements in organizational systems do not necessarily indicate that sustainable performance has been fully embedded in daily work practices. A preliminary survey of 30 employees further indicated relatively weak Green Transformational Leadership (GTL) and Green Innovation Behavior (GIB). Only 46.7% perceived leaders as providing environmentally responsible examples, while 40% reported using environmentally efficient work methods and only 20% reported seeking creative solutions to reduce environmental risks. In contrast, Employee Engagement showed relatively stronger results, with 83.3% perceiving their work as meaningful.

These findings highlight the need to examine how organizational and employee-related factors contribute to sustainable performance. Previous studies have associated Green Transformational Leadership, Employee Engagement, and Green Organizational Culture with employee performance and green innovation, although their relationships may vary across organizational contexts. Green Innovation Behavior may provide an important mechanism through which these organizational resources are translated into sustainable employee performance. The research gap is particularly relevant in public-sector organizations. Much of the existing literature focuses on private-sector, manufacturing, hospitality, and other commercial settings, whereas Bakamla RI operates within a government environment characterized by bureaucracy, a strong command structure, and a strategic public mandate. This context provides an opportunity to examine whether green leadership, employee engagement, and green organizational culture contribute to sustainable performance through employee innovation behavior in a public maritime-security institution.

Accordingly, this study examines the effects of Green Transformational Leadership, Employee Engagement, and Green Organizational Culture on Sustainable Employee Performance, both directly and through Green Innovation Behavior as a mediating variable. By integrating these constructs into a single PLS-SEM model, the study contributes empirical evidence on how organizational capabilities and employee innovation behavior can support sustainable performance in the public sector.

THEORETICAL REVIEW

Natural Resource-Based View

The study is anchored in the Natural Resource-Based View (NRBV), an extension of the Resource-Based View (RBV). RBV argues that organizational advantage can be derived from internal resources that are valuable, rare, difficult to imitate, and difficult to substitute (Barney, 1991). Hart (1995) extended this logic by placing environmental constraints and ecological sustainability at the center of strategic resource management. NRBV emphasizes pollution prevention, product stewardship, and sustainable development. In this perspective, sustainability is not simply an external compliance requirement; it can become an organizational capability developed through internal resources, routines, knowledge, and employee behavior.

Applied to this study, GTL represents a leadership capability that directs attention toward environmental responsibility; EE represents a human resource capability involving energy, dedication, and psychological investment; GOC represents the shared values and routines that institutionalize sustainability; and GIB represents the behavioral mechanism through which sustainability-oriented resources are converted into new ideas, promotion, and implementation. SEP is the performance outcome reflecting the organization's ability to maintain productive, adaptive, responsible, and environmentally conscious employee contributions. Thus, the model follows the NRBV logic that internal organizational capabilities can be configured into sustainable routines and performance.

Green Transformational Leadership and Sustainable Employee Performance

Green Transformational Leadership extends transformational leadership into the environmental domain. It emphasizes green role modelling, inspirational motivation, intellectual stimulation, and individualized consideration oriented toward environmental sustainability (Robertson & Barling, 2017; Hussain et al., 2025). Such leadership can shape employee perceptions of what is valued, provide direction for sustainable behavior, and create psychological support for improvement and innovation. Previous research cited in the thesis indicates positive links between green transformational leadership, green creativity, green behavior, and sustainable performance (Li et al., 2020; Aulia & Nawangsari, 2023).

In Bakamla RI, a strong command structure makes leadership particularly consequential. When leaders demonstrate environmentally responsible practices and communicate sustainability as part of work quality, employees can

incorporate those expectations into their daily performance. Therefore, the study proposes:

H1: Green Transformational Leadership has a positive and significant effect on Sustainable Employee Performance.

Employee Engagement and Sustainable Employee Performance

Employee Engagement describes the extent to which employees invest physical, cognitive, and emotional energy in their work. The work engagement model emphasizes vigor, dedication, and absorption. Engaged employees are more likely to persist through challenges, experience meaning in their work, and maintain focused involvement in task execution. Saks (2022) and Albrecht et al. (2021) provide a basis for viewing engagement as an important resource for sustained performance.

In a public maritime-security organization, engaged employees may be more willing to sustain effort, coordinate with colleagues, respond to operational demands, and contribute beyond formal task requirements. Engagement may therefore support the consistency and adaptability that characterize sustainable employee performance.

H2: Employee Engagement has a positive and significant effect on Sustainable Employee Performance.

Green Organizational Culture and Sustainable Employee Performance

Green Organizational Culture refers to shared values, norms, policies, and work practices that encourage environmental responsibility and sustainability. A green culture makes sustainability part of routine organizational life rather than a temporary initiative. The thesis links green culture to responsible resource use, environmental awareness, and sustainable performance, drawing on studies such as Retno Andriyana and Setyawati (2025).

For Bakamla RI, culture can be expressed through efficient resource use, digitalization, waste reduction, environmental responsibility, and shared expectations regarding sustainable work practices. When such values are consistently embedded, employees have clearer behavioral cues for maintaining performance in ways that are compatible with sustainability.

H3: Green Organizational Culture has a positive and significant effect on Sustainable Employee Performance.

Antecedents of Green Innovation Behavior

Green Innovation Behavior refers to employees' creation, promotion, dissemination, and implementation of ideas that improve work while reducing environmental impact. From the NRBV perspective, GIB is especially important because it translates intangible organizational capabilities into observable routines. Green Transformational Leadership can encourage employees to think creatively about environmental problems, Employee Engagement can stimulate discretionary effort and proactivity, and Green Organizational Culture can establish innovation and sustainability as shared norms.

The thesis draws on prior studies showing that green leadership supports green creativity and innovation, employee engagement supports proactive and

innovative behavior, and green organizational culture creates an environment in which green ideas are more likely to be valued and implemented (Li et al., 2020; Li et al., 2022; Ahmed et al., 2023). Accordingly:

H4: Green Transformational Leadership has a positive and significant effect on Green Innovation Behavior.

H5: Employee Engagement has a positive and significant effect on Green Innovation Behavior.

H6: Green Organizational Culture has a positive and significant effect on Green Innovation Behavior.

Green Innovation Behavior and Sustainable Employee Performance

Innovation-oriented employees can identify inefficient routines, develop alternatives, and apply improved methods. When those innovations are environmentally responsible, they can simultaneously improve work effectiveness and reduce resource use. The thesis argues that GIB can therefore strengthen sustainable employee performance by increasing adaptability, creativity, problem solving, and efficiency. This is consistent with evidence linking green innovation to environmental and organizational performance (Ahmed et al., 2023).

H7: Green Innovation Behavior has a positive and significant effect on Sustainable Employee Performance.

Mediating Role of Green Innovation Behavior

The mediation hypotheses follow the argument that organizational resources do not necessarily influence sustainable performance only through direct managerial or psychological effects. Leadership can stimulate innovation, engagement can create discretionary energy for innovation, and culture can normalize innovation. Once employees generate, promote, and implement green ideas, these behaviors can improve work processes and contribute to sustainable performance. Thus, GIB is expected to serve as a behavioral mechanism that translates GTL, EE, and GOC into SEP.

H8: Green Innovation Behavior mediates the effect of Green Transformational Leadership on Sustainable Employee Performance.

H9: Green Innovation Behavior mediates the effect of Employee Engagement on Sustainable Employee Performance.

H10: Green Innovation Behavior mediates the effect of Green Organizational Culture on Sustainable Employee Performance.

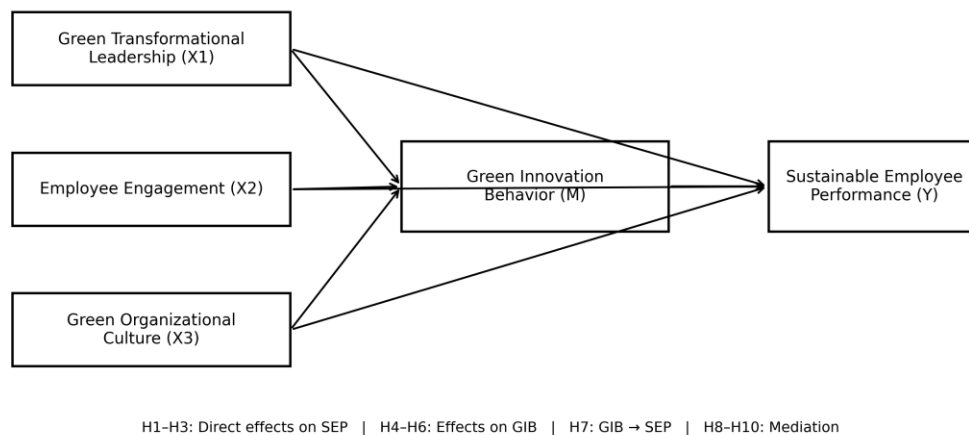


Figure 1. Conceptual Framework

METHODOLOGY

This study used a quantitative, causal-associative survey design to test relationships among GTL, EE, GOC, GIB, and SEP. The population consisted of 282 employees working at Bakamla RI Headquarters in Jakarta. Probability sampling with simple random sampling was used because members of the population had equal selection opportunities and were considered relatively homogeneous in terms of work system, regulation, and organizational culture. The sample size was determined using the Slovin formula with a 5% error tolerance, resulting in 165 respondents.

Primary data were collected through a structured questionnaire distributed online using Google Forms. The questionnaire measured the five latent constructs using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The indicators were adapted from the theoretical and empirical measures discussed in the thesis. GTL was represented by green idealized influence, green inspirational motivation, green intellectual stimulation, and green individualized consideration. EE covered vigor, dedication, and absorption. GOC represented green values, green norms, green symbols and rituals, and green practices and policies. GIB represented employee behaviors related to generating, promoting, disseminating, and realizing green ideas. SEP reflected contextual and adaptive performance dimensions.

Data analysis used Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The measurement model was evaluated through outer loading and Average Variance Extracted (AVE) for convergent validity, cross-loading, Fornell-Larcker, and HTMT for discriminant validity, and Cronbach's alpha and composite reliability for internal consistency. The structural model was assessed using VIF, R^2 , effect size (f^2), Q^2 predictive relevance, and bootstrapping. Hypotheses were evaluated using path coefficients, t-statistics, and p-values, with significance assessed at the 5% level. The mediation hypotheses were tested through indirect effects using bootstrapping.

RESULTS

Respondent Profile

The 165 respondents represented a broad range of demographic and organizational characteristics. Female respondents accounted for 51.5% and male respondents for 48.5%. Most respondents were 25–34 years old (44.8%), followed by 35–44 years (40.0%). In terms of rank, the largest group was Lieutenant Second to Captain Bakamla (42.4%). Almost half of respondents had more than eight years of tenure (47.3%), and 56.4% held a bachelor's degree. The profile indicates that the sample contained many employees with substantial organizational experience and direct exposure to daily work processes.

Table 1. Respondent characteristics

Characteristic	Category	N	%
Gender	Male	80	48.5
	Female	85	51.5
Age	<25 years	6	3.6
	25–34 years	74	44.8
	35–44 years	66	40.0
	≥44 years	19	11.5
Tenure	<3 years	36	21.8
	3–5 years	37	22.4
	6–8 years	14	8.5
	>8 years	78	47.3
Education	Senior high school/vocational	15	9.1
	Diploma	14	8.5
	Bachelor's	93	56.4
	Postgraduate	43	26.0

Descriptive Results

The descriptive results show generally favorable perceptions across all five constructs, although the lowest-scoring indicators identify useful managerial priorities. For GTL, the highest mean was GTL3 (4.145), representing leaders serving as role models for environmental protection, while GTL8 was lowest (3.885), indicating comparatively weaker guidance for creative thinking about environmental impacts. For EE, EE6 had the highest mean (4.436), reflecting wholehearted commitment to work, while EE8 was lowest (4.139), relating to sustained concentration.

For GOC, GOC2 recorded the highest mean (4.279), reflecting the perception that environmental protection is a shared responsibility, while GOC12 was lowest (3.709), indicating a need to strengthen training on environmentally friendly work practices. For GIB, GIB2 had the highest mean (4.073), reflecting sensitivity to environmental problems in daily work, while GIB12 was lowest (3.824), concerning active dissemination of environmental policy or program information. For SEP, SEP2 had the highest mean (4.388), concerning openness to feedback for continuous performance improvement, while SEP1 was lowest (4.055), concerning initiative in applying sustainable work practices.

Table 2. Descriptive highlights of the study constructs

Construct	Highest indicator (Mean)	Lowest indicator (Mean)	Interpretive focus
GTL	GTL3 (4.145)	GTL8 (3.885)	Role modelling is stronger than creative environmental coaching
EE	EE6 (4.436)	EE8 (4.139)	Commitment is strong; sustained concentration can be strengthened
GOC	GOC2 (4.279)	GOC12 (3.709)	Shared responsibility is strong; green training needs attention
GIB	GIB2 (4.073)	GIB12 (3.824)	Environmental awareness exceeds green knowledge dissemination
SEP	SEP2 (4.388)	SEP1 (4.055)	Feedback orientation is strong; sustainable initiative can improve

Measurement Model Evaluation

The measurement model demonstrated satisfactory convergent validity. All indicators had outer loadings above 0.70. The ranges were 0.777–0.847 for GTL, 0.787–0.850 for EE, 0.780–0.820 for GOC, 0.802–0.874 for GIB, and 0.755–0.839 for SEP. AVE values also exceeded the 0.50 threshold for every construct, indicating that each construct explained more than half of the variance of its indicators.

Table 3. Convergent validity results

Construct	Outer-loading range	AVE	Decision
GTL	0.777–0.847	0.659	Valid
EE	0.787–0.850	0.675	Valid
GOC	0.780–0.820	0.636	Valid
SEP	0.755–0.839	0.624	Valid
GIB	0.802–0.874	0.695	Valid

Discriminant validity was also established. Each indicator loaded more strongly on its intended construct than on the other constructs. The Fornell-Larcker criterion was satisfied because the square root of AVE for each construct exceeded its correlations with other constructs. HTMT values ranged from 0.485 to 0.766, all below the 0.90 liberal threshold and the 0.85 conservative threshold used as a stricter benchmark for most construct pairs. These results indicate that the five constructs were empirically distinguishable.

Table 4. Reliability and convergent validity summary

Construct	Cronbach's alpha	Composite reliability	AVE
GTL	0.953	0.954	0.659
EE	0.947	0.948	0.675
GOC	0.956	0.957	0.636
SEP	0.933	0.934	0.624
GIB	0.969	0.969	0.695

Internal consistency reliability was strong across all constructs. Cronbach's alpha values ranged from 0.933 to 0.969, while composite reliability values ranged from 0.934 to 0.969. All values exceeded 0.70, supporting the reliability of the measurement instruments.

The model fit assessment produced an SRMR of 0.053 for both the saturated and estimated models, below the 0.08 benchmark. Inner VIF values

ranged from 1.430 to 1.857 and were therefore well below 5.00, indicating no problematic multicollinearity among the predictors.

Structural Model Evaluation

Table 5. Coefficient of determination

Endogenous construct	R ²	Adjusted R ²	Interpretation
Sustainable Employee Performance	0.731	0.724	Strong explanatory power
Green Innovation Behavior	0.461	0.451	Moderate explanatory power

The model explained 73.1% of the variance in Sustainable Employee Performance, while 26.9% was attributable to factors outside the model. For Green Innovation Behavior, the model explained 46.1% of the variance, leaving 53.9% to other factors. The predictive relevance results were positive for both endogenous constructs, with Q² values of 0.624 for SEP and 0.419 for GIB, indicating meaningful predictive relevance.

Table 6. Direct-effect hypothesis testing

Path	β	t	p	Decision
GTL → SEP	0.326	3.842	<0.001	Supported
EE → SEP	0.213	2.414	0.016	Supported
GOC → SEP	0.179	2.401	0.016	Supported
GTL → GIB	0.215	2.348	0.019	Supported
EE → GIB	0.324	4.052	<0.001	Supported
GOC → GIB	0.288	2.91	0.004	Supported
GIB → SEP	0.336	4.272	<0.001	Supported

All seven direct paths were positive and statistically significant. GTL had the strongest direct coefficient among the three antecedents of SEP, whereas GIB had the largest direct coefficient on SEP. For GIB, EE showed the strongest coefficient, followed by GOC and GTL. These results indicate that both organizational conditions and employee-level engagement contribute to green innovation behavior, which in turn supports sustainable performance

Table 7. Mediation hypothesis testing

Mediated path	Indirect β	t	p	Decision
GTL → GIB → SEP	0.072	2.069	0.039	Supported
EE → GIB → SEP	0.109	2.728	0.006	Supported
GOC → GIB → SEP	0.097	2.208	0.027	Supported

The indirect effects were all positive and significant. Thus, GIB significantly mediates the relationships between GTL and SEP, EE and SEP, and GOC and SEP. Taken together, all ten hypotheses were supported. Effect-size results further show that GTL had a medium effect on SEP ($f^2 = 0.241$), GIB had a medium effect on SEP ($f^2 = 0.225$), while EE and GOC had small effects on SEP. The three antecedents had small effects on GIB, with EE showing the largest among them ($f^2 = 0.136$).

DISCUSSION

Green Transformational Leadership and Sustainable Employee Performance

H1 was supported. Green Transformational Leadership (GTL) had a positive and significant effect on Sustainable Employee Performance (SEP), with a path coefficient of $\beta = 0.326$, $t = 3.842$, and $p < 0.001$. Because the p-value is below 0.05 and the t-statistic exceeds the commonly used critical value of 1.96, the relationship is statistically significant. The positive coefficient indicates that stronger green transformational leadership is associated with higher sustainable employee performance at Bakamla RI.

This finding is consistent with the Natural Resource-Based View (NRBV), which emphasizes the role of internal organizational resources in developing sustainability-oriented capabilities. In this study, leadership functions as an organizational resource that provides direction, role modelling, and encouragement for environmentally responsible work behavior. The descriptive results support this interpretation: GTL3, concerning leaders serving as environmental role models, recorded the highest mean (4.145). This suggests that visible leadership behavior is particularly important in shaping employees' perceptions and performance. However, GTL8 recorded the lowest mean (3.885), indicating that guidance for creative thinking about environmental impacts can still be strengthened.

The finding is consistent with Li et al. (2020), who found that green transformational leadership supports employees' green creativity, and Aulia and Nawangsari (2023), who reported a positive relationship between green transformational leadership and sustainable employee performance. In the context of Bakamla RI, the result implies that the existing command structure can be used to communicate clear sustainability expectations while also providing controlled opportunities for employees to propose improvements.

Employee Engagement and Sustainable Employee Performance

H2 was supported. Employee Engagement (EE) had a positive and significant effect on Sustainable Employee Performance, with $\beta = 0.213$, $t = 2.414$, and $p = 0.016$. The p-value is below 0.05, indicating that the relationship is statistically significant. The positive coefficient shows that employees with stronger engagement tend to demonstrate higher sustainable performance.

The result indicates that sustainable performance is influenced not only by formal organizational systems and leadership but also by the psychological energy employees invest in their work. The descriptive results show that EE6 had the highest mean (4.436), reflecting strong commitment to work, whereas EE8 had the lowest mean (4.139), relating to sustained concentration. Thus, employees appear to have a strong motivational foundation, while maintaining focus under demanding work conditions remains an area that can be strengthened.

This finding supports Albrecht et al. (2021) and Saks (2022), who emphasize the importance of meaningful work, job resources, and employee engagement for sustained employee involvement and performance. For Bakamla RI, the result suggests that management can strengthen sustainable performance by maintaining employee engagement through meaningful communication,

recognition of contributions, opportunities for employee input, and supportive supervision.

Green Organizational Culture and Sustainable Employee Performance

H3 was supported. Green Organizational Culture (GOC) had a positive and significant effect on Sustainable Employee Performance, with $\beta = 0.179$, $t = 2.401$, and $p = 0.016$. Since the p-value is below 0.05, the relationship is statistically significant. The positive coefficient indicates that stronger green organizational culture is associated with better sustainable employee performance.

The finding supports the NRBV perspective that organizational values and routines can become internal capabilities for sustainability. When environmental responsibility is incorporated into everyday work practices, employees receive clearer behavioral cues regarding resource efficiency, waste reduction, and responsible work practices. The descriptive results show that GOC2 had the highest mean (4.279), indicating that employees strongly perceived environmental protection as a shared responsibility. In contrast, GOC12 had the lowest mean (3.709), suggesting that environmentally friendly work training remains an area for improvement.

The result is consistent with Roscoe et al. (2019) and Retno Andriyana and Setyawati (2025), which emphasize the importance of green organizational culture in embedding environmental values into organizational routines and employee performance. At Bakamla RI, this can be strengthened through practical routines such as digital document management, efficient use of electricity and water, waste reduction, and continued green-oriented training.

Green Transformational Leadership, Employee Engagement, Green Organizational Culture, and Green Innovation Behavior

H4, H5, and H6 were all supported. GTL had a positive and significant effect on Green Innovation Behavior (GIB) ($\beta = 0.215$, $t = 2.348$, $p = 0.019$). EE also had a positive and significant effect on GIB ($\beta = 0.324$, $t = 4.052$, $p < 0.001$), while GOC had a positive and significant effect on GIB ($\beta = 0.288$, $t = 2.910$, $p = 0.004$). All three p-values are below 0.05, confirming the significance of the relationships.

Among the three antecedents, EE had the largest coefficient toward GIB ($\beta = 0.324$). This indicates that employees' psychological investment and willingness to devote effort may be particularly important in converting sustainability expectations into innovative behavior. GTL provides direction and encouragement for green problem solving, while GOC provides shared values and norms that make environmentally oriented ideas more acceptable within the organization.

These results are consistent with Li et al. (2020) regarding the role of green leadership in stimulating creativity, with Monje-Amor et al. (2020) and Saks (2022) regarding the relationship between engagement and proactive behavior, and with Roscoe et al. (2019) and Ahmed et al. (2023) regarding the importance of organizational conditions for green-oriented behavior. Therefore, the results indicate that green innovation behavior at Bakamla RI is more likely to develop when leadership direction, employee engagement, and organizational culture operate together rather than independently.

Green Innovation Behavior and Sustainable Employee Performance

H7 was supported. Green Innovation Behavior had a positive and significant effect on Sustainable Employee Performance, with $\beta = 0.336$, $t = 4.272$, and $p < 0.001$. The result is statistically significant because the p-value is below 0.05. The coefficient is also the largest direct coefficient among the predictors of SEP in the model, indicating that GIB has an important role in explaining sustainable employee performance.

This finding suggests that sustainability becomes more observable in employee performance when employees actively identify problems, generate ideas, promote solutions, and implement improved ways of working. The result is consistent with Ahmed et al. (2023), which links green innovation with environmental and organizational performance. In the Bakamla RI context, green innovation behavior may take practical forms such as reducing paper through digitalization, improving information flows, simplifying administrative procedures, optimizing technology use, and reducing unnecessary resource consumption.

The finding also supports the NRBV perspective because GIB represents a behavioral mechanism through which organizational resources can be converted into sustainable routines and performance outcomes. Thus, green innovation should not be viewed only as an organizational program but also as an employee-level behavior that contributes directly to sustainable performance.

Mediating Role of Green Innovation Behavior

H8, H9, and H10 were supported. Green Innovation Behavior significantly mediated the relationship between GTL and SEP (indirect $\beta = 0.072$, $t = 2.069$, $p = 0.039$), between EE and SEP (indirect $\beta = 0.109$, $t = 2.728$, $p = 0.006$), and between GOC and SEP (indirect $\beta = 0.097$, $t = 2.208$, $p = 0.027$). All three indirect effects are positive and statistically significant because their p-values are below 0.05.

These findings demonstrate that GTL, EE, and GOC influence sustainable employee performance not only directly but also by encouraging employees to engage in green innovation behavior. In other words, leadership provides direction and support, employee engagement provides the energy and persistence to act, and organizational culture provides the shared norms that support green initiatives. GIB then converts these resources into concrete employee actions such as generating, promoting, disseminating, and implementing environmentally oriented improvements. The mediation results provide an important explanation of the overall model. The direct effects and indirect effects are both significant, indicating that GIB functions as a meaningful mechanism through which the three antecedent variables contribute to SEP while also retaining their direct relationships with SEP. This integrated pattern is consistent with the NRBV logic: GTL, EE, and GOC operate as enabling resources; GIB represents the behavioral conversion mechanism; and SEP represents the resulting sustainable performance outcome.

Overall Interpretation of the Hypothesis Testing Results

Overall, all ten hypotheses were supported. The results show a consistent pattern across the structural model: GTL, EE, and GOC each contribute positively

to SEP; the same three variables also contribute positively to GIB; GIB contributes positively to SEP; and GIB significantly mediates each antecedent-SEP relationship. The R^2 value of 0.731 indicates that the model explains 73.1% of the variance in SEP, while the R^2 value of 0.461 indicates that GTL, EE, and GOC explain 46.1% of the variance in GIB. The Q^2 values of 0.624 for SEP and 0.419 for GIB further indicate predictive relevance.

The pattern of coefficients also provides a more specific interpretation. GTL has the strongest direct effect among the three antecedents on SEP ($\beta = 0.326$), GIB has the strongest direct effect on SEP overall ($\beta = 0.336$), and EE has the strongest effect among the three antecedents on GIB ($\beta = 0.324$). Therefore, the findings suggest that leadership is particularly important for sustainable performance, while employee engagement is particularly important for stimulating green innovation, and green innovation itself is an important pathway for strengthening sustainable employee performance. These results provide a clear empirical basis for the conclusion that sustainable performance at Bakamla RI is supported by the interaction of organizational leadership, employee engagement, organizational culture, and employee innovation behavior.

CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that Green Transformational Leadership, Employee Engagement, and Green Organizational Culture are significant positive predictors of Sustainable Employee Performance at Bakamla RI. The three antecedents also significantly influence Green Innovation Behavior, and GIB significantly improves Sustainable Employee Performance. Importantly, GIB significantly mediates the effects of all three antecedents on SEP. The findings indicate that sustainable employee performance is best understood as the outcome of an integrated system in which leadership, employee psychological resources, organizational culture, and innovative behavior reinforce one another.

The results have several managerial implications for Bakamla RI. First, leaders should institutionalize structured feedback and coaching on sustainable work behavior. Periodic reviews can discuss resource efficiency, environmental responsibility, innovation, and process improvement and record follow-up actions. Second, employee engagement can be connected to recognition and competency development. Recognition may take the form of performance acknowledgement, certificates, training opportunities, or access to development programs for employees and units that make meaningful contributions.

Third, Bakamla RI can translate Green Organizational Culture into unit-level targets that employees can directly influence, such as reducing paper through digitalization, saving electricity and water, reducing single-use materials, sorting waste, and reusing serviceable equipment. Fourth, cross-unit problem-solving forums can be held periodically so that employees can identify operational barriers, share information, propose solutions, assign responsibility, and monitor follow-up. Fifth, a simple employee idea-management mechanism can be established through a digital suggestion channel or unit innovation forum. Ideas can be screened based on usefulness, feasibility, resource requirements, and sustainability impact, then piloted before broader implementation.

Taken together, these recommendations focus on turning sustainability from a general organizational aspiration into observable employee routines. They also preserve the strengths of Bakamla RI's command structure while creating controlled mechanisms for participation, feedback, and innovation.

FURTHER STUDY

The study has several limitations. First, the model is restricted to five constructs, so other determinants of Sustainable Employee Performance may remain unexplained. Second, the respondents were drawn only from Bakamla RI Headquarters in Jakarta; therefore, the results should not automatically be generalized to all Bakamla RI units or operational zones. The organization's bureaucratic and command characteristics may also shape the strength of the relationships observed. Third, the study relied on questionnaire-based perceptions, which may not fully capture the reasons, experiences, and organizational conditions underlying employees' behaviors.

Future research can extend the model by examining Green Human Resource Management, Organizational Commitment, Job Satisfaction, Green Training, Environmental Knowledge, or Perceived Organizational Support. Replication across ministries, government agencies, state-owned enterprises, and private organizations would also help determine whether the relationships are context-specific. Larger samples, broader geographic coverage, longitudinal designs, or mixed-method approaches could further clarify how Green Innovation Behavior develops and how it translates organizational resources into Sustainable Employee Performance.

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REFERENCES

- Ahmed, R. R., Akbar, W., Aijaz, M., Channar, Z. A., Ahmed, F., & Parmar, V. (2023). The role of green innovation on environmental and organizational performance: Moderation of human resource practices and management commitment. *Heliyon*, 9(1). <https://doi.org/10.1016/j.heliyon.2022.e12679>
- Albrecht, S. L., Green, C. R., & Marty, A. (2021). Meaningful work, job resources, and employee engagement. *Sustainability*, 13(7). <https://doi.org/10.3390/su13074045>
- Aulia, K. Z., & Nawangsari, L. C. (2023). Effects of Green Human Resource Management and Green Transformational Leadership towards Employee Sustainable Performance through Employee Green Behavior at Mercu Buana University. *European Journal of Business and Management Research*, 8(5), 181–186. <https://doi.org/10.24018/ejbmr.2023.8.5.2128>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.

- Bass, B. M., & Avolio, B. J. (1994). Improving organizational effectiveness through transformational leadership. Sage Publications.
- Darvishmotevali, M., & Altinay, L. (2022). Green HRM, environmental awareness and green behaviors: The moderating role of servant leadership. *Tourism Management*, 88, 104401. <https://doi.org/10.1016/j.TOURMAN.2021.104401>
- Demir, B., Akdemir, M. A., Kara, A. U., Sagbas, M., Sahin, Y., & Topcuoglu, E. (2025). The mediating role of green innovation and environmental performance in the effect of green transformational leadership on sustainable competitive advantage. *Sustainability*, 17(4), 1–22. <https://doi.org/10.3390/su17041407>
- Elkington, J. (1997). *Cannibals with forks: The triple bottom line of 21st century business*. New Society.
- Hair, J. F., Hair, J., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). A primer on partial least squares structural equation modeling (PLS-SEM). *Structural Equation Modeling: A Multidisciplinary Journal*, 30(1).
- Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, 20(4), 986–1014.
- Heveri, M., Novak, L., Solcova, I. P., & Tavel, P. (2025). Validation of the Utrecht Work Engagement Scale (UWES-9) in the Czech Republic. *Scientific Reports*, 15(1), 42767. <https://doi.org/10.1038/s41598-025-26907-z>
- Hussain, M. A., Ali, S., Ali, S., Goh, G. G. G., Saif, N., & Khan, S. U. (2025). Redefining the concept of green transformational leadership through psychometric analysis: Evidence from educational setup of developing country prospective. *Asia Pacific Management Review*, 30(3), 100354. <https://doi.org/10.1016/j.apmrv.2024.100354>
- Li, W., Bhutto, T. A., Xuhui, W., Maitlo, Q., Zafar, A. U., & Ahmed Bhutto, N. (2020). Unlocking employees' green creativity: The effects of green transformational leadership, green intrinsic, and extrinsic motivation. *Journal of Cleaner Production*, 255, 120229. <https://doi.org/10.1016/j.jclepro.2020.120229>
- Min, J., Iqbal, S., Khan, M. A. S., Akhtar, S., Anwar, F., & Qalati, S. A. (2020). Impact of supervisory behavior on sustainable employee performance: Mediation of conflict management strategies using PLS-SEM. *PLoS ONE*, 15(9), 1–20. <https://doi.org/10.1371/journal.pone.0236650>
- Monje-Amor, A., Abeal Vázquez, J. P., & Faíña, J. A. (2020). Transformational leadership and work engagement: Exploring the mediating role of structural empowerment. *European Management Journal*, 38(1), 169–178. <https://doi.org/10.1016/j.EMJ.2019.06.007>
- Retno Andriyana, & Irma Setyawati. (2025). The influence of green organizational culture, green employability, and green innovation on employee performance through job satisfaction at PT Geo Dipa Energi (Persero). *Jurnal Manajemen Bisnis*, 12(2), 75–89. <https://doi.org/10.33096/jmb.v12i2.1254>

- Robertson, J. L., & Barling, J. (2017). Toward a new measure of organizational environmental citizenship behavior. *Journal of Business Research*, 75, 57–66. <https://doi.org/10.1016/J.JBUSRES.2017.02.007>
- Roscoe, S., Subramanian, N., Jabbour, C. J. C., & Chong, T. (2019). Green Human Resource Management and the enablers of green organizational culture: Enhancing a firm's environmental performance for sustainable development. *Business Strategy and the Environment*, 28(5), 737–749.
- Saks, A. M. (2022). Caring human resources management and employee engagement. *Human Resource Management Review*, 32(3), 100835. <https://doi.org/10.1016/J.HRMR.2021.100835>
- Sekaran, U., & Bougie, R. (2020). *Research methods for business: A skill-building approach*. Wiley.
- Zaid, A. A., Jaaron, A. A. M., & Bon, A. T. (2018). The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study. *Journal of Cleaner Production*, 204, 965–979.