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Green Leadership and Sustainable Business Performance in MSMEs: The Mediating Role of Green Innovation and the Moderating Role of Organizational Culture

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Abstract: This study aims to analyze the effect of Green Leadership on Sustainable Business Performance in micro, small, and medium-sized enterprises (MSMEs), with Green Innovation serving as a mediating mechanism and Organizational Culture as a moderating variable. The study adopts a quantitative explanatory research design involving 100 respondents consisting of MSME owners/managers and employees. Data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with the assistance of SmartPLS 4.0. The results indicate that Green Leadership has a positive and significant effect on Green Innovation ($\beta = 0.656$; $p < 0.001$) and Sustainable Business Performance ($\beta = 0.487$; $p < 0.001$). Green Innovation also has a positive and significant effect on Sustainable Business Performance ($\beta = 0.276$; $p = 0.004$). Meanwhile, Green Leadership does not have a significant effect on Organizational Culture ($\beta = 0.166$; $p = 0.118$), and Organizational Culture does not significantly affect Sustainable Business Performance ($\beta = -0.085$; $p = 0.308$). Organizational Culture has a positive and significant direct effect on Green Innovation ($\beta = 0.147$; $p = 0.048$), but does not moderate either the Green Leadership–Green Innovation relationship or the Green Innovation–Sustainable Business Performance relationship. These findings highlight the importance of Green Leadership and Green Innovation in enhancing sustainable business performance among MSMEs.

Keywords: Green Leadership, Green Innovation, Organizational Culture, Sustainable Business Performance, MSMEs.

INTRODUCTION

Changes in the business environment, increasing pressure for environmental sustainability, and growing demands from consumers and stakeholders for responsible business practices have encouraged organizations to position sustainability as an integral component of business strategy. Sustainability is no longer viewed merely as a form of social and environmental compliance but increasingly as a source of value creation, efficiency, innovation, competitiveness, and long-term business continuity. This condition is particularly important for micro, small, and medium-sized enterprises (MSMEs), which make substantial contributions to economic activity, employment creation, and local economic development but continue to face limitations in financial resources, technology, knowledge, and managerial capabilities when implementing sustainability strategies. Such limitations may constrain the adoption of green practices despite increasing environmental and market pressures. (Alraja et al, 2022) demonstrated that MSME sustainability increasingly depends on the ability to integrate technological innovation and green practices into business activities.

Within this context, Green Leadership represents a strategic factor capable of directing sustainability transformation in MSMEs. Green Leadership integrates environmental values and objectives into organizational vision, strategy, decision-making, resource allocation, and behavior. Green leaders not only establish environmental objectives but also serve as role models, mobilize organizational members, encourage creativity, and create conditions that support environmental problem-solving. (Begum et al, 2022) demonstrated that green transformational leadership contributes to green thinking, creative process engagement, and green innovation. Accordingly, Green Leadership can be understood as a managerial capability that transforms sustainability orientation into organizational innovation processes.

The relationship between green leadership and sustainable performance has also received empirical support in the MSME context. Research on SMEs has shown that green transformational leadership positively affects environmental performance, while green innovation and green human resource management serve as mechanisms explaining this relationship. These findings indicate that the effectiveness of green leadership depends not only on leaders' ability to establish an environmental vision but also on the organization's ability to translate that vision into concrete capabilities and practices. In the Indonesian context, (Satriadi et al, 2025) identified relationships among green transformational leadership, green human resource management, and environmental performance, with green organizational culture and green work engagement serving as important mechanisms in achieving environmental performance.

One strategic mechanism through which Green Leadership can generate sustainable performance is Green Innovation. Green innovation encompasses the development and implementation of products, processes, technologies, and organizational practices that reduce resource and energy consumption, waste, emissions, and environmental impacts while simultaneously creating economic value. For MSMEs, green innovation is particularly important because resource constraints encourage organizations to improve raw-material and energy efficiency while creating value-added products. (Rustiarini et al, 2022) demonstrated that Green Innovation represents an important strategy for SMEs to enhance sustainability and financial performance.

Green Innovation also contributes to organizational performance more broadly. Singh et al. demonstrated that green innovation affects firm performance in SMEs, while green dynamic capabilities support the development of such innovation. (Baeshen et al, 2021) identified green innovation as an important determinant of sustainable business performance through economic, environmental, and social dimensions. (Le et al, 2022) likewise found that green innovation promotes sustainable corporate performance, particularly when supported by green strategies and sustainable supply chain practices.

The relationship among Green Leadership, Green Innovation, and sustainable performance is further supported by (Le and Gia, 2025). Their study of 449 SME executives in Vietnam found that green transformational leadership positively affects sustainable corporate performance, both directly and indirectly through green innovation and green corporate social responsibility. Drawing on the Natural Resource-Based View (NRBV) and Stakeholder Theory, the study demonstrated that leadership, innovation, and environmental responsibility can generate improved economic and environmental performance. These findings reinforce the position of Green Innovation as a strategic mechanism that translates leadership orientation into sustainable business performance.

However, the effectiveness of Green Leadership in generating innovation and performance does not occur within an organizationally neutral context. Organizational Culture determines how leaders' values, visions, and directives are received and translated into organizational behavior. A culture that supports sustainability can establish norms of resource efficiency, environmental awareness, learning, creativity, collaboration, and openness to change. Conversely, a culture narrowly focused on short-term profitability may reduce the effectiveness of sustainability initiatives. Research on green organizational culture indicates that a green-oriented culture enhances an organization's ability to generate green innovation and can strengthen the relationship between organizational capabilities and green innovation. Research involving 200 organizations in Vietnam also found that green organizational culture and green transformational leadership are significant determinants of green innovation, while green innovation and green transformational leadership positively affect sustainable performance.

(Al-Hakimi et al, 2022) demonstrated that green organizational culture strengthens the mechanisms linking green manufacturing practices, green innovation, and corporate sustainable performance in SMEs. These findings suggest that green practices do not necessarily generate optimal performance without an organizational culture that supports environmental values. Recent research also highlights the complexity of these relationships. A study involving 477 SMEs demonstrated that sustainable leadership is associated with green innovation and identified green organizational culture as an important mechanism. Research on SMEs in Istanbul found that green innovation mediates the relationship between green transformational leadership and sustainable competitive advantage. Meanwhile, (Oktrivina et al, 2025), in a study involving 353 micro and small enterprises in Indonesia, demonstrated that green transformational leadership promotes circular economy practices, which mediate the relationship between leadership and financial performance.

Research Gap

Although the literature on green leadership, innovation, organizational culture, and sustainability has developed rapidly, four important gaps remain.

First, an integration gap exists because previous studies have tended to examine the relationship between leadership and innovation, innovation and performance, or culture and innovation separately. Begum et al. (2022) emphasized cognitive and creativity mechanisms in the relationship between green transformational leadership and green innovation, whereas (Le and Gia, 2025) positioned green innovation as a mechanism linking green leadership to sustainable corporate performance. The integration of Green Leadership → Green Innovation → Sustainable Business Performance, with Organizational Culture serving as a boundary condition, remains relatively limited. Second, a mechanism gap concerns the limited explanation of how Green Leadership generates sustainable business performance. Previous studies have more frequently employed environmental performance, firm performance, or sustainable competitive advantage as outcome variables. This study extends the perspective by positioning Sustainable Business Performance as an outcome that integrates economic value creation, environmental responsibility, and long-term business sustainability. Third, a contingency gap concerns the limited number of studies examining Organizational Culture as a moderator of the relationship between Green Leadership and Green Innovation. Previous studies have more commonly positioned green culture as an antecedent or mediator. (Al-Hakimi et al, 2022), for example, demonstrated the strengthening function of organizational culture in the mechanism linking green manufacturing practices, green innovation, and sustainable performance. However, how organizational culture determines the effectiveness of green leadership in generating innovation, particularly among Indonesian MSMEs, requires further empirical examination. Fourth, a contextual gap exists because much of the empirical evidence originates from Vietnam, China, Saudi Arabia, Turkey, and other developing countries. Although research in Indonesia is beginning to expand, such as the study by (Oktrivina et al.,2025), its focus remains primarily on circular economy practices, financial performance, and environmental uncertainty. Therefore, a model is needed that specifically explains how Green Leadership contributes to Sustainable Business Performance among Indonesian MSMEs through Green Innovation, with Organizational Culture serving as a moderating factor.

Novelty and Research Objectives

Based on these research gaps, the novelty of this study lies in developing an integrated mediation–moderation model linking Green Leadership, Green Innovation, Organizational Culture, and Sustainable Business Performance in MSMEs. Green Leadership is positioned as the strategic driver, Green Innovation as the mediating capability, Organizational Culture as the boundary condition, and Sustainable Business Performance as the strategic outcome. This model extends the Natural Resource-Based View (NRBV) by integrating leadership as a strategic direction-setting mechanism, green innovation as a value-creating capability, and organizational culture as an internal context that determines the effectiveness of such capabilities.

Another novelty lies in positioning Organizational Culture as a moderator rather than merely a mediator, thereby enabling the study to explain the conditions under which Green Leadership can more effectively generate Green Innovation. Based on the foregoing discussion, this study aims to analyze the effect of Green Leadership on Sustainable Business Performance in MSMEs, examine Green Innovation as a mediating variable, and investigate Organizational Culture as a moderating variable in the relationship between Green Leadership and Green Innovation. The proposed model is expected to provide a theoretical contribution through the development of the NRBV perspective, a conceptual contribution through an integrated mediation–moderation framework, and an empirical contribution toward strengthening sustainability strategies among Indonesian MSMEs.

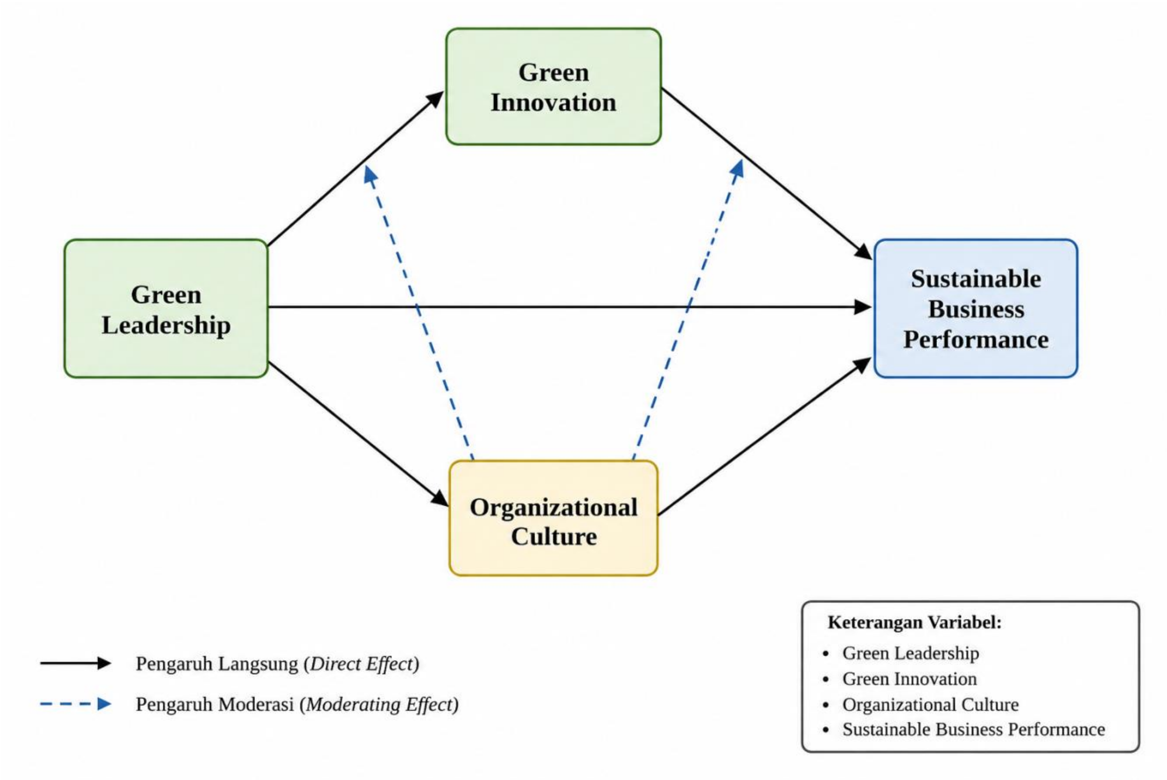

Figure 1. Conceptual Framework

Literature Review
Green Leadership

Green Leadership refers to a leadership approach that integrates environmental values, objectives, and responsibilities into organizational vision, strategy, decision-making, resource allocation, and behavior. From the perspective of the Natural Resource-Based View (NRBV), environmentally oriented leadership can be regarded as a strategic driver that directs organizational resources and capabilities toward creating difficult-to-imitate and sustainable competitive advantages. In MSMEs, this role is particularly important because relatively simple organizational structures give owners or managers substantial influence over strategic decisions, organizational culture, and innovation orientation.

Green Leadership has frequently been developed in the literature through the concept of green transformational leadership, namely leadership that provides an environmental vision, acts as a role model for green behavior, motivates employees, and encourages creativity to address environmental challenges. (Singh et al., 2020) demonstrated that green transformational leadership contributes to the development of green human resource management practices, which subsequently promote green innovation and environmental performance in SMEs. (Begum et al., 2022) also found that green transformational leadership significantly affects green thinking, creative process engagement, and green innovation. These findings indicate that green leadership not only directs behavior but also develops the cognitive processes and creativity required to generate environmental innovation.

Further empirical evidence demonstrates that green leadership has implications for sustainable performance. (Le et al., 2024) found that green transformational leadership enhances firm performance and environmental performance among Vietnamese SMEs, with green innovation serving as one of the important mechanisms. (Le and Gia, 2025) subsequently demonstrated that green transformational leadership positively affects sustainable corporate performance, both directly and indirectly through green innovation. Furthermore, research published in 2026 indicates that green transformational leadership significantly enhances green innovation through green knowledge-sharing processes. Therefore, Green Leadership can be positioned as a strategic driver of sustainability transformation in MSMEs.

Green Innovation

Green Innovation refers to an organization's capability to develop and implement products, processes, technologies, or management practices that reduce negative environmental impacts while simultaneously generating economic benefits. Such innovation may include green product innovation, green process innovation, waste reduction, energy efficiency, the use of environmentally friendly raw materials, and the adoption of technologies that reduce emissions and resource consumption.

Green Innovation is particularly relevant to MSMEs because resource constraints require organizations to identify solutions that improve efficiency while maintaining competitiveness. (Singh et al., 2022) found that green innovation affects firm performance in SMEs and serves as a mechanism linking green dynamic capabilities to firm performance. (Rustiarini et al., 2022), through a study involving 336 SMEs in Bali, also demonstrated that Green Innovation contributes to sustainability performance and financial performance.

These findings are reinforced by (Le et al., 2022), who demonstrated that Green Innovation contributes to sustainable corporate performance through the integration of green strategies and green supply chain management. (Lestari et al., 2023), in a study involving 160 food-sector SMEs in Greater Malang, also found that customer pressure, resources and capabilities, and management commitment encourage Green Innovation, which subsequently improves sustainable performance. Thus, Green Innovation is not merely a technical activity but a strategic capability that connects organizational resources with sustainable value creation.

The relationship between Green Leadership and Green Innovation is also increasingly supported by the literature. (Begum et al.,2022) demonstrated that green leadership directly promotes Green Innovation through green thinking and creative process engagement. A study of 286 manufacturing SMEs in Bangladesh found that green transformational leadership affects Green Innovation and environmental performance, while Green Innovation mediates the relationship between leadership and environmental performance. Research published in 2026 also provides evidence that Green Leadership enhances green innovation behavior through green knowledge sharing.

Sustainable Business Performance

Sustainable Business Performance refers to an organization's ability to achieve economic performance while simultaneously considering environmental and social dimensions. This concept extends traditional profit-oriented performance measures by incorporating resource efficiency, environmental protection, stakeholder relationships, social responsibility, and the ability to maintain long-term business continuity. (Baeshen et al., 2021) positioned Green Innovation as an important determinant of sustainable business performance among SMEs because green innovation enables organizations to integrate economic and environmental objectives. (Zhang et al., 2022) also demonstrated that innovation has heterogeneous effects across the economic, social, and environmental dimensions of sustainable performance in SMEs.

In the SME context, (Le et al., 2022) found that Green Innovation and green supply chain management play important roles in achieving sustainable corporate performance. (Le and Gia, 2025) subsequently provided evidence that green transformational leadership and Green Innovation jointly enhance sustainable corporate performance, including financial and environmental outcomes. Research published in 2026 further strengthens this relationship. (Duong, 2026) specifically found that green transformational leadership can predict sustainable performance through Green Innovation. In addition, (Rahman et al., 2026) demonstrated a positive relationship between Green Innovation and sustainable performance among SMEs and identified green knowledge sharing and green dynamic capabilities as important mechanisms.

Organizational Culture as a Moderating Variable

Organizational Culture refers to a set of values, norms, beliefs, and behavioral patterns that serve as shared guidelines for organizational members. In the context of sustainability, organizational culture determines the extent to which leaders' green visions and values are accepted, internalized, and translated into organizational behavior and innovation.

(Imran and Jingzu, 2022) identified relationships among green organizational culture, Green Innovation, and organizational performance. (Al-Hakimi et al., 2022) more specifically found that green organizational culture strengthens the relationship between green manufacturing practices and Green Innovation and enhances the indirect effect on corporate sustainable performance among 328 SMEs. These findings provide a basis for considering green culture as a boundary condition in the process of creating innovation and sustainable performance.

A study in Vietnam involving 200 organizations also demonstrated that green organizational culture and green transformational leadership are significant determinants of Green Innovation, while Green Innovation and green leadership positively affect sustainable performance. Other research indicates that Green Leadership can build a green culture that subsequently supports organizational sustainability. Meanwhile, research published in 2024 found that green transformational leadership strengthens green creativity through mechanisms involving green organizational culture and green mindfulness.

Accordingly, Organizational Culture in this study is not only understood as an internal organizational value system but also as a contextual condition that determines the strength of the effect of Green Leadership on Green Innovation. When organizational culture supports environmental awareness, learning, creativity, openness to change, and collaboration, the green vision of leaders is more likely to be translated into innovation. Conversely, a culture oriented toward short-term profitability may constrain the effectiveness of green leadership.

Green Leadership, Green Innovation, and Sustainable Business Performance

Conceptually, Green Leadership can serve as a strategic antecedent of Green Innovation because leaders determine organizational direction, provide support, mobilize resources, and establish an organizational climate conducive to creativity. Green Innovation subsequently functions as a mediating capability that translates leadership orientation into environmentally friendly and economically valuable products, processes, and business practices. Empirical evidence indicates that Green Innovation can mediate the relationship between green leadership and both environmental and business performance. (Singh et al., 2020), (Awan et al., 2023), (Le et al., 2024), and (Le and Gia, 2025) provide support for this mechanism.

At the same time, Organizational Culture serves as a boundary condition that may strengthen or weaken this process. (Al-Hakimi et al., 2022) demonstrated that green culture strengthens the mechanism linking green practices to Green Innovation and sustainable performance. Recent research also indicates that culture, leadership, and innovation are interconnected components in achieving sustainable performance.

Synthesis of the Conceptual Framework

Based on the overall literature review, this study positions Green Leadership (X) as the strategic driver, Green Innovation (M) as the mediating capability, Sustainable Business Performance (Y) as the strategic outcome, and Organizational Culture (Z) as the boundary condition. Conceptually, the model proposes that Green Leadership promotes Green Innovation, Green Innovation enhances Sustainable Business Performance, and Green

Leadership also exerts a direct effect on Sustainable Business Performance. Organizational Culture is subsequently positioned as a moderator determining the extent to which Green Leadership generates Green Innovation.

This configuration provides a foundation for a mediation–moderation model that addresses two important questions: "how," namely how green leadership generates sustainable business performance through Green Innovation; and "when," namely under what organizational cultural conditions the effect of Green Leadership on Green Innovation becomes stronger. The model is consistent with the NRBV perspective because it positions leadership, innovation, and culture as a combination of organizational resources and capabilities capable of generating competitive advantage and sustainability for MSMEs.

Research Hypotheses

H1: Green Leadership has a positive and significant effect on Green Innovation.
H2: Green Leadership has a positive and significant effect on Sustainable Business Performance.
H3: Green Leadership has a positive and significant effect on Organizational Culture.
H4: Green Innovation has a positive and significant effect on Sustainable Business Performance.
H5: Organizational Culture has a positive and significant effect on Sustainable Business Performance.
H6: Organizational Culture moderates the effect of Green Leadership on Green Innovation.
H7: Organizational Culture moderates the effect of Green Innovation on Sustainable Business Performance.

METHODS

Research Design

This study adopts a quantitative approach with an explanatory research design. This approach was selected because the study aims to examine causal relationships among Green Leadership, Green Innovation, Sustainable Business Performance, and Organizational Culture, including the mediation and moderation mechanisms incorporated into the research model. Specifically, the study analyzes how Green Leadership affects Sustainable Business Performance both directly and indirectly through Green Innovation and examines whether Organizational Culture strengthens or weakens the effect of Green Leadership on Green Innovation. Data analysis was conducted using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS 4.0. SEM-PLS was selected because it enables the simultaneous examination of direct, mediation, and moderation relationships and is appropriate for research oriented toward model development and prediction.

Population and Sample

The population of this study comprises MSMEs engaged in business activities involving resource management, innovation, and sustainability-oriented business practices. The unit of analysis is the organization/MSME, whereas the unit of observation consists of individuals who possess knowledge of activities and decision-making processes within MSMEs. The study involved 100 respondents, consisting of MSME owners/managers and employees. The inclusion of both managers/owners and employees as respondents was intended to obtain a more comprehensive perspective on green leadership, organizational culture, green innovation, and sustainable business performance.

The sampling technique employed was purposive sampling, whereby respondents were selected based on specific criteria relevant to the research objectives. The respondent criteria were as follows: (1) currently working in or managing an MSME; (2) having a minimum tenure of one year to ensure adequate understanding of organizational conditions; (3) being familiar with leadership practices and MSME operational activities; and (4) being willing to participate in the study. A total of 100 respondents were included in the study and analyzed using SEM-PLS. Although the sample size is relatively limited, the PLS-SEM approach enables the estimation of structural models involving multiple constructs simultaneously, particularly in studies oriented toward predictive analysis and model development.

RESULTS AND DISCUSSION

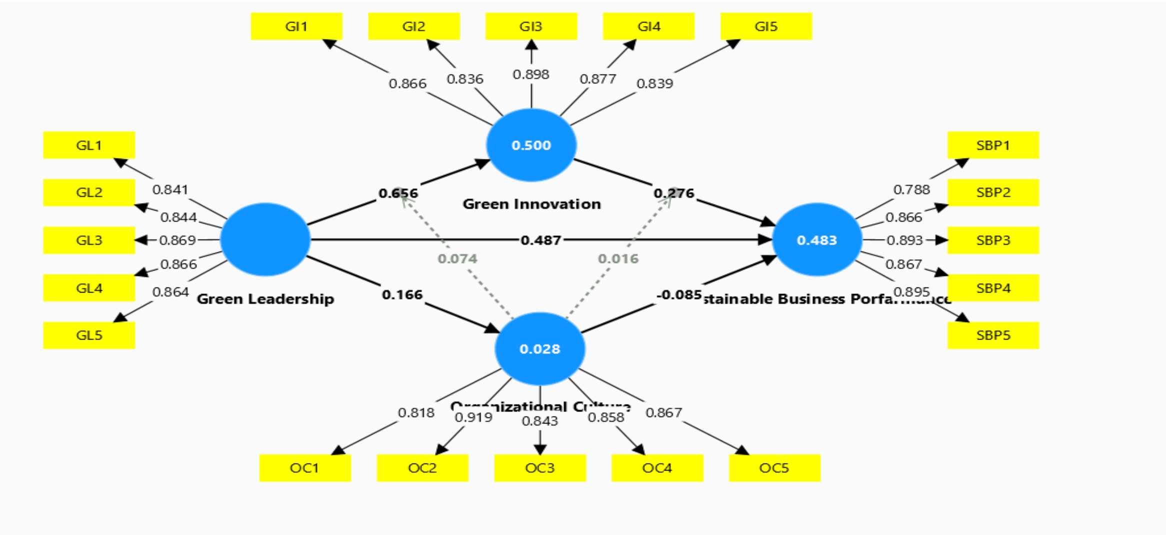

Figure 4.1. Structural Model of the Study Using SEM-PLS

Table 4.1. Path Coefficients

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values
Green Innovation → Sustainable Business Performance	0.276	0.279	0.095	2.897	0.004
Green Leadership → Green Innovation	0.656	0.657	0.052	12.578	0.000
Green Leadership → Organizational Culture	0.166	0.177	0.106	1.562	0.118
Green Leadership → Sustainable Business Performance	0.487	0.488	0.094	5.159	0.000
Organizational Culture → Green Innovation	0.147	0.150	0.074	1.982	0.048
Organizational Culture → Sustainable Business Performance	−0.085	−0.087	0.083	1.020	0.308
Organizational Culture × Green Leadership → Green Innovation	0.074	0.070	0.061	1.199	0.231
Organizational Culture × Green Innovation → Sustainable Business Performance	0.016	0.015	0.066	0.248	0.804

H1: Green Leadership → Green Innovation

The hypothesis testing results indicate that Green Leadership has a positive and significant effect on Green Innovation, with an Original Sample coefficient of 0.656, a T-statistic of 12.578, and a P-value of 0.000. Since the T-statistic exceeds 1.96 and the P-value is below 0.05, H1 is supported. The coefficient of 0.656 indicates a positive and relatively strong relationship. This means that the stronger the implementation of Green Leadership within an organization, the greater the organization's ability to generate or implement Green Innovation. In other words, environmentally oriented leadership can serve as a primary driver of innovation aimed at achieving sustainability. This finding demonstrates that leaders play a strategic role in establishing an environmental vision, directing environmentally friendly practices, and encouraging organizational members to generate new ideas and solutions that support sustainability. The very high T-statistic of 12.578 further indicates that the relationship between Green Leadership and Green Innovation represents one of the strongest relationships in the research model.

Conclusion for H1: Supported.

H2: Green Leadership → Sustainable Business Performance

The results indicate that Green Leadership has a positive and significant effect on Sustainable Business Performance, with $\beta = 0.487$, T-statistic = 5.159, and P-value = 0.000.

The positive coefficient of 0.487 indicates that an increase in Green Leadership is associated with an increase in Sustainable Business Performance. Meanwhile, the T-statistic of 5.159 and P-value of 0.000 demonstrate that this effect is statistically significant. This finding indicates that Green Leadership not only promotes green innovation but also has a direct effect on sustainable business performance. Leaders who incorporate sustainability principles into strategic decision-making can help organizations optimize resource utilization, improve operational efficiency, strengthen organizational reputation, and respond to increasingly environmentally conscious market demands. An important finding is that the direct effect of Green Leadership on Sustainable Business Performance ($\beta = 0.487$) is greater than the direct effect of Green Innovation on Sustainable Business Performance ($\beta = 0.276$). This indicates that, within the present research model, green leadership has a more dominant direct role in explaining sustainable business performance than green innovation.

Conclusion for H2: Supported.

H3: Green Leadership → Organizational Culture

The results indicate that the relationship between Green Leadership and Organizational Culture has a coefficient of $\beta = 0.166$, a T-statistic of 1.562, and a P-value of 0.118. Although the coefficient is positive, the effect is not statistically significant because the T-statistic of 1.562 is below 1.96 and the P-value of 0.118 exceeds 0.05. Therefore, H3 is not supported. This finding indicates that Green Leadership in the context of this study is not sufficiently strong to directly shape or transform Organizational Culture. In other words, the presence of environmentally oriented leadership does not automatically produce a sustainability-oriented organizational culture. This condition may occur because organizational culture is a relatively complex construct that requires a long-term process of value internalization. Cultural transformation does not depend solely on leadership behavior but is also influenced by organizational systems, established values, employee habits, reward systems, internal communication, organizational structure, and management practices that are implemented consistently. Interestingly, although Green Leadership does not significantly affect Organizational Culture, the results demonstrate that Green Leadership has a very strong effect on Green Innovation. This suggests that, in the context of this study, green leadership may be translated into innovative behavior more rapidly than into organizational cultural transformation.

Conclusion for H3: Not supported.

H4: Green Innovation → Sustainable Business Performance

The results demonstrate that Green Innovation has a positive and significant effect on Sustainable Business Performance, with β = 0.276, T-statistic = 2.897, and P-value = 0.004.

Since the T-statistic exceeds 1.96 and the P-value is below 0.05, H4 is supported. The coefficient of 0.276 indicates that Green Innovation positively contributes to Sustainable Business Performance. This means that the better an organization develops and implements green innovations, the greater its potential to improve sustainable business performance.

Green Innovation can generate benefits through the development of more environmentally friendly products, more efficient production processes, waste reduction, more effective resource utilization, and the organization's ability to meet the needs of increasingly sustainability-conscious consumers.

Although statistically significant, the coefficient of 0.276 is lower than the effect of Green Leadership on Sustainable Business Performance, which is 0.487. Thus, Green Innovation remains an important factor, but within this model, Green Leadership has a greater direct contribution to Sustainable Business Performance.

Conclusion for H4: Supported

H5: Organizational Culture → Sustainable Business Performance

The results indicate that Organizational Culture does not have a significant effect on Sustainable Business Performance, with a coefficient of −0.085, a T-statistic of 1.020, and a P-value of 0.308.Because the P-value of 0.308 exceeds 0.05 and the T-statistic of 1.020 is below 1.96, H5 is not supported.The negative coefficient of −0.085 indicates that the direction of the relationship in the sample is negative, although the relationship is not statistically significant. Therefore, there is insufficient empirical evidence to conclude that Organizational Culture directly improves Sustainable Business Performance.This finding is important because it demonstrates that the existence of an organizational culture alone does not necessarily lead to improved sustainable business performance. Organizational culture can contribute to sustainability only when the values and norms embedded within the organization are genuinely sustainability-oriented and translated into concrete business practices.Thus, an organization may possess a strong internal culture, but if that culture does not specifically support innovation, resource efficiency, environmental responsibility, and sustainability objectives, its existence may not necessarily improve Sustainable Business Performance.

Conclusion for H5: Not supported.

H6: Moderating Effect of Organizational Culture on Green Leadership → Green Innovation

The interaction-effect results indicate that Organizational Culture does not moderate the effect of Green Leadership on Green Innovation. The interaction effect has a coefficient of β = 0.074, a T-statistic of 1.199, and a P-value of 0.231. Because the P-value of 0.231 exceeds 0.05 and the T-statistic of 1.199 is below 1.96, H6 is not supported. Although the interaction coefficient is positive (0.074), the effect is not statistically significant. This means that there is insufficient statistical evidence to conclude that Organizational Culture strengthens or weakens the relationship between Green Leadership and Green Innovation. This finding is particularly interesting when considered alongside the results of H1. Green Leadership has a very strong and significant effect on Green Innovation (β = 0.656; $p < 0.001$), yet Organizational Culture does not significantly strengthen this relationship. Therefore, Green Leadership in this study appears to promote Green Innovation relatively independently of the level of Organizational Culture. This may indicate that leaders' decisions and encouragement regarding green innovation are more influential than organizational culture as a contingency factor.

Conclusion for H6: Not supported.

H7: Moderating Effect of Organizational Culture on Green Innovation → Sustainable Business Performance

The results demonstrate that Organizational Culture does not moderate the relationship between Green Innovation and Sustainable Business Performance. The interaction effect has a coefficient of $\beta = 0.016$, a T-statistic of 0.248, and a P-value of 0.804. Because the T-statistic is substantially below 1.96 and the P-value is substantially above 0.05, H7 is not supported. The very small interaction coefficient of 0.016 indicates that Organizational Culture produces almost no change in the strength of the relationship between Green Innovation and Sustainable Business Performance. Thus, although Green Innovation has a significant direct effect on Sustainable Business Performance ($\beta = 0.276$; $p = 0.004$), this effect does not become significantly stronger or weaker depending on Organizational Culture. This finding indicates that the benefits of Green Innovation for sustainable business performance in the present research context are primarily direct rather than contingent upon interaction with Organizational Culture.

Conclusion for H7: Not supported.

Overall Discussion of the Structural Model

Overall, the structural model results demonstrate that Green Leadership is the most dominant variable in the research model. This is reflected in the effect of Green Leadership on Green Innovation, which has a path coefficient of 0.656, a T-statistic of 12.578, and a P-value of 0.000. Furthermore, Green Leadership has a positive and significant effect on Sustainable Business Performance, with a coefficient of 0.487, a T-statistic of 5.159, and a P-value of 0.000. These findings demonstrate that sustainability-oriented leadership not only encourages organizations to develop green innovations but also directly contributes to sustainable business performance.

Green Innovation also has a positive and significant effect on Sustainable Business Performance, with a coefficient of 0.276, a T-statistic of 2.897, and a P-value of 0.004. This finding indicates that innovations aimed at reducing environmental impacts, improving resource efficiency, and developing more environmentally friendly products and processes can contribute to improved sustainable business performance. Therefore, Green Innovation represents an important strategic mechanism for supporting business sustainability. Conversely, Green Leadership does not significantly affect Organizational Culture. Although the coefficient of 0.166 indicates a positive direction, the P-value of 0.118 demonstrates that the effect is not statistically significant. This suggests that the presence of green leadership does not automatically transform or establish organizational culture. Similarly, Organizational Culture does not have a significant direct effect on Sustainable Business Performance, as indicated by the coefficient of −0.085 and P-value of 0.308. The moderation analysis also demonstrates that Organizational Culture does not strengthen the relationship between Green Leadership and Green Innovation or the relationship between Green Innovation and Sustainable Business Performance. The first interaction effect has a coefficient of 0.074 with a P-value of 0.231, whereas the second interaction effect has a coefficient of 0.016 with a P-value of 0.804. Accordingly, H6 and H7 do not receive empirical support. These findings indicate that the relationships between Green Leadership → Green Innovation and Green Innovation → Sustainable Business Performance do not depend on the level of Organizational Culture in the present research context.

Nevertheless, an additional finding demonstrates that Organizational Culture has a positive and significant direct effect on Green Innovation, with $\beta = 0.147$, $T = 1.982$, and $p = 0.048$. This finding indicates that although Organizational Culture does not function as a moderator, it still plays a direct role in promoting Green Innovation. Therefore, empirically, Green Leadership and Organizational Culture both represent factors that encourage Green

Innovation, whereas Green Leadership and Green Innovation constitute the primary factors contributing to Sustainable Business Performance.

CONCLUSION

This study aimed to analyze the effect of Green Leadership on Sustainable Business Performance by considering the roles of Green Innovation and Organizational Culture in MSMEs. Based on the results obtained using SmartPLS 4.0, it can be concluded that Green Leadership has a positive and significant effect on both Green Innovation and Sustainable Business Performance. Green Innovation also has a positive and significant effect on Sustainable Business Performance. These findings indicate that environmentally oriented leadership represents a strategic factor in promoting green innovation while simultaneously enhancing sustainable business performance.

Conversely, Green Leadership does not significantly affect Organizational Culture, and Organizational Culture does not significantly affect Sustainable Business Performance. The moderation analysis further demonstrates that Organizational Culture does not moderate either the relationship between Green Leadership and Green Innovation or the relationship between Green Innovation and Sustainable Business Performance. However, Organizational Culture has a positive and significant direct effect on Green Innovation. Overall, this study confirms that Green Leadership and Green Innovation are key factors in improving Sustainable Business Performance, whereas Organizational Culture appears to function more as a direct supporting factor for Green Innovation than as a moderating variable.

Recommendations

Future research should develop the proposed model by considering other moderating or contingency variables, such as organizational learning, environmental commitment, digital capability, Green Human Resource Management, environmental uncertainty, technological capability, and government support, which may provide a stronger explanation of the relationships among Green Leadership, Green Innovation, and Sustainable Business Performance.Future studies should also employ larger sample sizes, broader geographical coverage, and multiple MSME sectors to enhance the generalizability of the findings. In addition, a longitudinal research design could be employed to examine the development of Green Leadership, Organizational Culture, Green Innovation, and Sustainable Business Performance over time. Future research is also encouraged to explicitly test Green Innovation as a mediating variable between Green Leadership and Sustainable Business Performance. Such an examination is expected to provide a deeper understanding of the mechanism through which green leadership contributes to sustainable business performance through green innovation.

REFERENCES

Al-Hakimi, M. A., Al-Swidi, A. K., Gelaidan, H. M., & Mohammed, A. (2022). The influence of green manufacturing practices on the corporate sustainable performance of SMEs under the effect of green organizational culture: A moderated mediation analysis. *Journal of Cleaner Production, 376*, 134346. https://doi.org/10.1016/j.jclepro.2022.134346

Alraja, M. N., Imran, R., Khashab, B. M., & Shah, M. (2022). Technological innovation, sustainable green practices and SMEs sustainable performance in times of crisis (COVID-19 pandemic). *Information Systems Frontiers, 24*, 1081–1105.

Awan, F. H., Dunnan, L., Jamil, K., & Gul, R. F. (2023). Stimulating environmental performance via green human resource management, green transformational leadership, and green innovation: A mediation-moderation model. *Environmental Science and Pollution Research, 30*(2), 2958–2976. https://doi.org/10.1007/s11356-022-22424-y

Baeshen, Y. A., Soomro, Y. A., & Bhutto, M. Y. (2021). Determinants of green innovation to achieve sustainable business performance: Evidence from SMEs. *Frontiers in Psychology*, *12*, 767968. https://doi.org/10.3389/fpsyg.2021.767968

Begum, S., Ashfaq, M., Xia, E., & Awan, U. (2022). Does green transformational leadership lead to green innovation? The role of green thinking and creative process engagement. *Business Strategy and the Environment*, *31*(1), 580–597. https://doi.org/10.1002/bse.2911

Chen, X., Chen, Y., & Zhang, X. (2023). Green transformational leadership and green innovation: Is green knowledge sharing a missing link? *Engineering, Construction and Architectural Management*. https://doi.org/10.1108/ECAM-02-2023-0117

Duong, C. H. (2026). Green transformational leadership and its prediction of sustainable performance: The mediating role of green innovation. *Ho Chi Minh City Open University Journal of Science–Economics and Business Administration*, *17*(2). https://doi.org/10.46223/HCMCOUJS.econ.en.17.2.4859.2027

Forcadell, F. J., Úbeda, F., & Aracil, E. (2021). Effects of environmental corporate social responsibility on innovativeness of Spanish industrial SMEs. *Technological Forecasting and Social Change*, *162*, 120355. https://doi.org/10.1016/j.techfore.2020.120355

Ibarra-Cisneros, M. A., Vela-Reyna, J. B., & Hernández-Perlines, F. (2024). Green transformational leadership as a foundation for implementing green strategic orientations and the development of green innovation and green performance. *Entrepreneurial Business and Economics Review*, *12*(4), 43–58. https://doi.org/10.15678/EBER.2024.120403

Imran, M., & Jingzu, G. (2022). Green organizational culture, organizational performance, green innovation, environmental performance: A mediation-moderation model. *Journal of Asia-Pacific Business*, *23*(2), 161–182. https://doi.org/10.1080/10599231.2022.2072493

Indrawati, H., Caska, C., Hermita, N., Sumarno, S., & Syahza, A. (2023). Green innovation adoption of SMEs in Indonesia: What factors determine it? *International Journal of Innovation Science*. https://doi.org/10.1108/IJIS-02-2023-0047

Khan, N. R., Ameer, F., Bouncken, R. B., & Covin, J. G. (2023). Corporate sustainability entrepreneurship: The role of green entrepreneurial orientation and organizational resilience capacity for green innovation. *Journal of Business Research*, *163*, 114296. https://doi.org/10.1016/j.jbusres.2023.114296

Le, T. T. (2024). How green transformational leadership drives environmental performance and firm performance? Empirical evidence from an emerging economy. *Corporate Social Responsibility and Environmental Management*. https://doi.org/10.1002/csr.2872

Le, T. T., & Gia, L. L. C. (2025). How green innovation and green corporate social responsibility transform green transformational leadership into sustainable performance? Evidence from an emerging economy. *Corporate Social Responsibility and Environmental Management*, *32*(2), 2527–2541. https://doi.org/10.1002/csr.3077

Le, T. T., Vo, X. V., & Venkatesh, V. G. (2022). Role of green innovation and supply chain management in driving sustainable corporate performance. *Journal of Cleaner Production*, *374*, 133875. https://doi.org/10.1016/j.jclepro.2022.133875

Lestari, S. D., et al. (2023). Fostering green innovation in achieving sustainable performance. *Natural Resources Forum*. https://doi.org/10.1111/1477-8947.12293

Lutfi, A., Alqudah, H., Alrawad, M., et al. (2023). Green environmental management system to support environmental performance: What factors influence SMEs to adopt green innovations? *Sustainability*, *15*(13), 10645. https://doi.org/10.3390/su151310645

Makumbe, W., & Lisita, T. (2026). The mediating role of green knowledge sharing on the relationship between green transformational leadership and green innovation.

International Journal of Organizational Analysis, 34(12), 330–350. https://doi.org/10.1108/IJOA-01-2026-6477

Oktrivina, A., Sumail, L. O., Hendryadi, Effendi, S., Budiantoro, H., & Astuti, S. B. (2025). Green transformational leadership and financial performance in micro and small enterprises: The interplay of circular economy practices and environmental uncertainty. *Frontiers in Sustainability, 6*. https://doi.org/10.3389/frsus.2025.1684185

Rahman, et al. (2026). Power of green capabilities and artificial intelligence (AI): Understanding how and when green innovation promotes sustainability. *Business Strategy and the Environment*. https://doi.org/10.1002/bse.70252

Rustiarini, N. W., Bhegawati, D. A. S., & Mendra, N. P. Y. (2022). Does green innovation improve SME performance? *Economies, 10*(12), 316. https://doi.org/10.3390/economies10120316

Satriadi, Agusven, T., Marhalinda, Ilyas, I., & Zami, A. (2025). Green transformational leadership, green human resource management, and environmental performance: A mediation model. *EKUITAS: Jurnal Ekonomi dan Keuangan, 9*(1), 97–109. https://doi.org/10.24034/j25485024.y2025.v9.i1.6908

Singh, S. K., Del Giudice, M., Chiappetta Jabbour, C. J., Latan, H., & Sohal, A. S. (2022). Stakeholder pressure, green innovation, and performance in small and medium-sized enterprises: The role of green dynamic capabilities. *Business Strategy and the Environment, 31*(1), 500–514. https://doi.org/10.1002/bse.2906

Singh, S. K., Del Giudice, M., Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change, 150*, 119762. https://doi.org/10.1016/j.techfore.2019.119762

Yuliza, Y., & Musa, H. (2025). Building green performance through green HRM and green transformational leadership: The mediation role of green innovation. *Asian Management and Business Review, 5*(2). https://doi.org/10.20885/AMBR.vol5.iss2.art1

Zhang, Z., Zhu, H., Zhou, Z., & Zou, K. (2022). How does innovation matter for sustainable performance? Evidence from small and medium-sized enterprises. *Journal of Business Research*. https://doi.org/10.1016/j.jbusres.2022.08.034

Zhou, J., Sawyer, L., & Safi, A. (2021). Institutional pressure and green product success: The role of green transformational leadership, green innovation, and green brand image. *Frontiers in Psychology, 12*, 704855. https://doi.org/10.3389/fpsyg.2021.704855