

Green Entrepreneurial Orientation and Sustainable Performance of SMEs in Indonesia and Malaysia

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ABSTRACT

Objectives: This study investigates Green Entrepreneurial Orientation (GEO) as a key driver of Green Innovation (GI) in Small and Medium Enterprises (SMEs) in Indonesia and Malaysia. It examines how environmentally oriented entrepreneurial strategies encourage the adoption of green technologies, sustainable processes, and eco-friendly products. By integrating GEO into their operations, SMEs can enhance innovation, strengthen competitive advantage, and achieve sustainable performance while reducing environmental impacts.

Methodology: A quantitative research approach was employed using a cross-sectional survey of 200 SME owners and managers in Indonesia and Malaysia. Data were collected via structured questionnaires and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM), including comprehensive assessments of the measurement model, structural model, and mediation effects.

Finding: The results indicate that Green Entrepreneurial Orientation has a significant positive effect on Green Innovation. Green Innovation, in turn, has a significant positive effect on Sustainable Performance. However, Green Entrepreneurial Orientation does not have a significant direct effect on Sustainable Performance. The mediation analysis confirms that Green Innovation fully mediates the relationship between Green Entrepreneurial Orientation and Sustainable Performance, suggesting that entrepreneurial orientation contributes to sustainability outcomes only when translated into innovative environmental practices. These findings highlight the critical role of innovation capability in enhancing the sustainable performance of SMEs in both Indonesia and Malaysia.

Conclusion: This study demonstrates that Green Innovation is a key mechanism linking Green Entrepreneurial Orientation to Sustainable Performance. The findings contribute to the Resource-Based View by emphasizing the importance of innovation capability in transforming environmental orientation into sustainable competitive advantage. Practically, the study suggests that SME managers should prioritize the development of green innovation capabilities, while policymakers should strengthen institutional support, technology transfer, and sustainability-oriented programs to foster long-term sustainable performance across SMEs in Indonesia and Malaysia.

Keywords: Green Entrepreneurial Orientation; Green Innovation; Sustainable Performance; SMEs.

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INTRODUCTION

Environmental sustainability has become a strategic concern for businesses worldwide, particularly for Small and Medium Enterprises (SMEs) operating in developing countries (Muangmee, 2021; Mondal, S 2024). Prior studies argue that SMEs face increasing pressure from regulators, customers, and supply chain partners to adopt environmentally responsible practices despite their limited resources (Sharma, 2022; Khan et al., 2022). As a result, sustainability-oriented strategic behavior has emerged as a critical determinant of long-term SME competitiveness (Liu & Wang, 2021). SMEs play a crucial role in economic growth; however, their business activities often contribute to environmental degradation due to limited resources and lack of sustainable management practices. In response to increasing environmental pressures, firms are encouraged to integrate environmental values into their entrepreneurial strategies.

Despite the growing recognition of Green Entrepreneurial Orientation (GEO) as a strategic necessity, empirical evidence regarding its direct impact on sustainable performance remains highly inconsistent. On one hand, several scholars argue that GEO directly enhances a firm's competitive advantage and sustainability outcomes by aligning top management's strategic intent with external environmental demands (Khan et al., 2022; Pratono et al., 2019). From this perspective, an entrepreneurial posture characterized by green risk-taking and proactiveness is considered sufficient to navigate ecological challenges and generate sustainable value (Muangmee et al., 2021).

On the other hand, an emerging stream of literature highlights contradictory findings, suggesting that a green-oriented strategic mindset alone is frequently insufficient to generate measurable performance improvements, particularly in resource-constrained SMEs (Aftab, 2026; Sharma, 2022). This inconsistency reveals an unresolved theoretical gap concerning an "attitude-behavior gap" in green entrepreneurship: the disconnect between having a strategic orientation and achieving tangible economic, environmental, and social outcomes (Mondal et al., 2024). While the Resource-Based View (RBV) posits that strategic orientations act as valuable intangible resources (Sharma, 2022), it remains highly debated whether these orientations independently drive sustainable performance or if they strictly require the mediation of rare, operational mechanisms to materialize into actual results (Aftab, 2026).

This unresolved debate underscores the necessity of moving beyond direct-effect models. While previous empirical studies emphasize GEO as an enabler for identifying green opportunities (Chen & Liu, 2019), there is limited clarity on the exact mechanisms required to bridge the gap between entrepreneurial intentions and performance execution. Consequently, this study addresses this critical gap by proposing a capability-driven sustainability model. We argue that GEO functions primarily as a strategic antecedent (Zhang et al., 2025), and that Green Innovation Capability acts as the essential, unresolved mediating bridge required to translate strategic green orientation into robust Sustainable Performance (Hossain et al., 2024).

Indonesia and Malaysia are emerging economies with rapidly growing SME sectors. Despite increasing awareness of sustainability issues, many SMEs in both countries still struggle to implement concrete green practices. This study addresses this research gap by empirically examining the effect of Green Entrepreneurial Orientation and Green Innovation on Sustainable Performance, based on verifikatif analysis. The findings are expected to contribute to the green entrepreneurship literature and provide practical insights for SME development policies in both countries.

LITERATURE REVIEW

Grand Theory: The Natural Resource-Based View (NRBV)

This study is fundamentally anchored in the Natural Resource-Based View (NRBV) as its central conceptual framework. While the traditional Resource-Based View (RBV) posits that firms achieve competitive advantage through valuable, rare, and inimitable resources, it largely ignores the constraints of the natural environment. The NRBV extends this perspective by asserting that a firm's sustained competitive advantage must be rooted in capabilities that facilitate environmentally sustainable economic activities. Within this theoretical hierarchy, NRBV serves as the grand theory that contextualizes how firms respond to ecological pressures. From the NRBV perspective, proactive environmental strategies and orientations are not merely ethical choices but critical, intangible strategic resources. Consequently, this study operationalizes the NRBV framework by positioning Green Entrepreneurial Orientation (GEO) as a strategic intangible resource (middle theory) that requires translation into a dynamic operational capability, specifically Green Innovation Capability (applied theory), to achieve multidimensional Sustainable Performance.

Green Entrepreneurial Orientation (GEO)

Green Entrepreneurial Orientation refers to the strategic posture of firms that emphasizes environmentally responsible entrepreneurial behaviours, including green innovativeness, green proactiveness, and green risk-taking (Muangmee, 2021). Chen and Liu, (2019) highlight that such orientation originates from top management's environmental values and strategic intent, while Sharma, (2022) emphasizes that GEO can be viewed as a proactive environmental strategy that is deeply rooted in a firm's resource-based capabilities. Firms with a strong green entrepreneurial orientation are more inclined to invest in environmentally friendly technologies, adopt sustainable production practices, and proactively anticipate environmental regulations and market demands. Such firms do not merely react to external environmental pressures; instead, they actively seek to transform ecological challenges into strategic opportunities. As a result, GEO plays a critical role in strengthening a firm's long-term competitiveness by aligning entrepreneurial initiatives with environmental responsibility, particularly in dynamic and sustainability-oriented markets.

Green Innovation (GIC)

Green Innovation involves the development or adoption of new products, processes, or practices that reduce environmental impacts (Aftab, 2026). Prior research indicates that green innovation contributes to cost efficiency, waste reduction, and improved environmental performance, particularly in resource-constrained SMEs (Shahbaz and Ahmad, 2025; Zhang et al., 2019). Moreover, entrepreneurial orientation has been identified as a key antecedent of green innovation capability (Zhang, Zhang and Cheng, 2025). In the context of SMEs, green innovation is frequently driven by the commitment of entrepreneurs and managers who prioritize sustainability as a core organizational value. This commitment enables SMEs to overcome structural limitations and leverage innovation as a strategic tool to achieve both environmental and economic objectives.

Sustainable Performance (SP)

Sustainable Performance reflects a firm's ability to achieve economic, environmental, and social outcomes simultaneously (Mondal, S 2024) This multidimensional perspective is

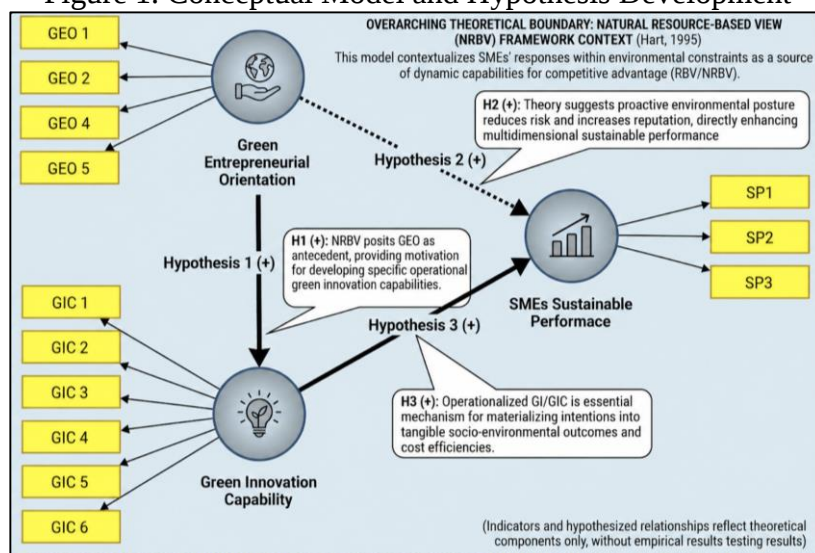
consistent with the triple bottom line framework, which emphasizes long-term value creation through balanced economic growth, environmental stewardship, and social responsibility (Muangmee, 2021; Mondal, S 2024). In this study, sustainable performance is viewed as a multidimensional construct capturing long-term competitiveness and responsible business practices. In this study, sustainable performance is conceptualized as a multidimensional construct that captures economic efficiency, environmental responsibility, and social accountability simultaneously. From an SME perspective, achieving sustainable performance is particularly challenging due to limited financial, technological, and human resources. However, firms that successfully integrate sustainability into their strategic and operational activities are more likely to enhance their competitiveness, resilience, and legitimacy in the long run. Consequently, sustainable performance serves as a key indicator of how effectively firms translate sustainability-oriented strategies, such as green entrepreneurial orientation and green innovation, into tangible and enduring outcomes.

Conceptual Model and Hypothesis Development

The Relationship between Green Entrepreneurial Orientation and Sustainable Performance

According to the NRBV, intangible strategic resources such as environmental proactiveness and risk-taking can provide a foundation for competitive advantage. Proponents of a direct-effect model argue that a strong GEO aligns the firm with emerging market demands for eco-friendly operations, thereby reducing regulatory risks and enhancing corporate reputation, which directly translates to improved sustainable performance. However, reflecting recent contradictory findings in the literature, this direct relationship may be complex and context-dependent in emerging economies, where strategic intent does not always equal execution. Nonetheless, testing this baseline direct relationship remains crucial to understanding the underlying mechanics of green entrepreneurship in Southeast Asian SMEs.

Figure 1. Conceptual Model and Hypothesis Development



H1: Green Entrepreneurial Orientation has a positive and significant effect on Green Innovation Capability

A strategic orientation inherently shapes a firm's resource allocation and operational focus. Drawing on the premise that strategic intent precedes capability development, GEO functions as a critical antecedent to green innovation. SMEs that exhibit high green proactiveness and risk-taking are more willing to commit financial and human capital toward research and development, continuous improvement, and the adoption of green technologies. Without a strong entrepreneurial posture toward the environment, firms are unlikely to prioritize the arduous process of developing new eco-friendly products or altering existing production lines. Thus, GEO provides the necessary strategic environment and motivation to cultivate robust green innovation capabilities.

H2: Green Entrepreneurial Orientation has a positive and significant effect on Sustainable Performance

The transition from capability to performance is a central tenet of the NRBV. Green Innovation Capability represents the concrete, operational execution of environmental strategies. By developing green products and optimizing eco-efficient processes, SMEs can achieve tangible reductions in energy consumption and waste (environmental performance), lower production costs and open new green market niches (economic performance), and improve community relations and employee safety (social performance). Therefore, the capability to innovate environmentally is not just a mediating factor, but a direct and powerful driver of multidimensional sustainability outcomes.

H3: Green Innovation Capability has a positive and significant effect on Sustainable Performance

The transition from an organizational capability to measurable business outcomes is a core tenet of the Natural Resource-Based View (NRBV) framework. While an environmental orientation provides the initial strategic intent, Green Innovation Capability (GIC) represents the concrete, operational execution of that strategy. Through the proactive ability to develop eco-friendly products and optimize eco-efficient production processes, SMEs can achieve tangible reductions in energy consumption, resource depletion, and waste generation (environmental performance). Furthermore, these green capabilities enable SMEs to lower long-term operational costs, comply with stringent environmental regulations, and capture new green market niches, thereby securing sustainable financial growth (economic performance). Simultaneously, fostering a safe, non-toxic production environment enhances employee well-being and community relations (social performance). Therefore, the capability to innovate environmentally is positioned not merely as a supplementary activity, but as a robust, primary driver that directly generates multidimensional sustainability outcomes.

METHOD

This study employed a quantitative research design using a cross-sectional survey to examine the relationships among Green Entrepreneurial Orientation (GEO), Green Innovation Capability (GIC), and Sustainable SME Performance (SSP) among small and medium-sized enterprises (SMEs) in Indonesia and Malaysia. Data were collected from SME owners and managers through a structured questionnaire using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measurement items were adapted from previously validated studies to ensure content validity and contextual relevance.

A purposive sampling technique was employed to select respondents who met the predetermined criteria, namely SME owners or managers who had actively implemented environmentally oriented business practices. The data collection in the field was carried out systematically, initially distributing 30 questionnaires specifically for validity and reliability testing. Following this pilot phase, a total of 200 valid questionnaires were successfully collected as the main source of research data. A final sample size of 200 respondents is highly robust and optimally balances statistical strength with field representativeness. It comfortably satisfies and exceeds the minimum sample size requirement for Partial Least Squares Structural Equation Modeling (PLS-SEM), which is highly appropriate for prediction-oriented research involving complex structural relationships and cross-national contexts.

The respondent profile consisted of SMEs operating across various sectors in Indonesia and Malaysia. The majority of the respondents were SME owners and senior managers who have operated their businesses long enough to possess adequate experience in evaluating strategic and operational sustainability. The structured research instrument utilized a 5-point Likert scale to measure Green Entrepreneurial Orientation (15 indicators), Green Innovation Capability (16 indicators), and Sustainable Performance (10 indicators).

RESULTS AND DISCUSSION

Results

1. Measurement Model Assessment

The measurement model was evaluated by examining internal consistency reliability, convergent validity, and discriminant validity. Internal consistency was assessed using Cronbach's alpha and composite reliability (CR), while convergent validity was evaluated using the Average Variance Extracted (AVE).

As presented in Table 1, all constructs demonstrate satisfactory reliability. Cronbach's alpha values range from 0.920 to 0.939, exceeding the recommended threshold of 0.70. Similarly, composite reliability values vary between 0.940 and 0.957, indicating excellent internal consistency. Furthermore, all AVE values are greater than 0.50, ranging from 0.759 to 0.882, confirming adequate convergent validity. These findings indicate that all measurement items reliably represent their respective constructs.

Table 1. Measurement Model Assessments

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Green Entrepreneurial Orientation	0,920	0,929	0,940	0,759
Green Innovation Capability	0,939	0,940	0,952	0,767
SMEs Sustainable Performance	0,933	0,933	0,957	0,882

The discriminant validity assessment was performed using the Heterotrait-Monotrait Ratio (HTMT). The HTMT values for all construct pairs were below the recommended threshold of 0.90, indicating satisfactory discriminant validity. Therefore, each construct

measures a distinct conceptual domain and no multicollinearity issues were identified among the latent variables.

2. Structural Model Assesment

The structural model was evaluated using the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and model fit.

The results show that the R^2 value for Green Innovation Capability is 0.502, indicating that Green Entrepreneurial Orientation explains approximately 50.2% of the variance in Green Innovation Capability. According to Hair et al. (2022), this represents a moderate explanatory power.

Meanwhile, the R^2 value for SMEs Sustainable Performance is 0.699, indicating that Green Entrepreneurial Orientation and Green Innovation Capability jointly explain approximately 69.9% of the variance in Sustainable Performance. This value demonstrates a substantial explanatory capability of the proposed structural model.

Regarding effect size, Green Entrepreneurial Orientation exhibits a very large effect on Green Innovation Capability ($f^2 = 1.009$). Likewise, Green Innovation Capability has a very large effect on Sustainable Performance ($f^2 = 1.017$). Conversely, the direct effect of Green Entrepreneurial Orientation on Sustainable Performance is negligible ($f^2 = 0.008$), suggesting that its direct contribution to Sustainable Performance is minimal.

The model fit assessment shows an SRMR value of 0.084, which is close to the recommended threshold of 0.08, indicating an acceptable model fit for PLS-SEM.

Figure 2. Structural Model Results

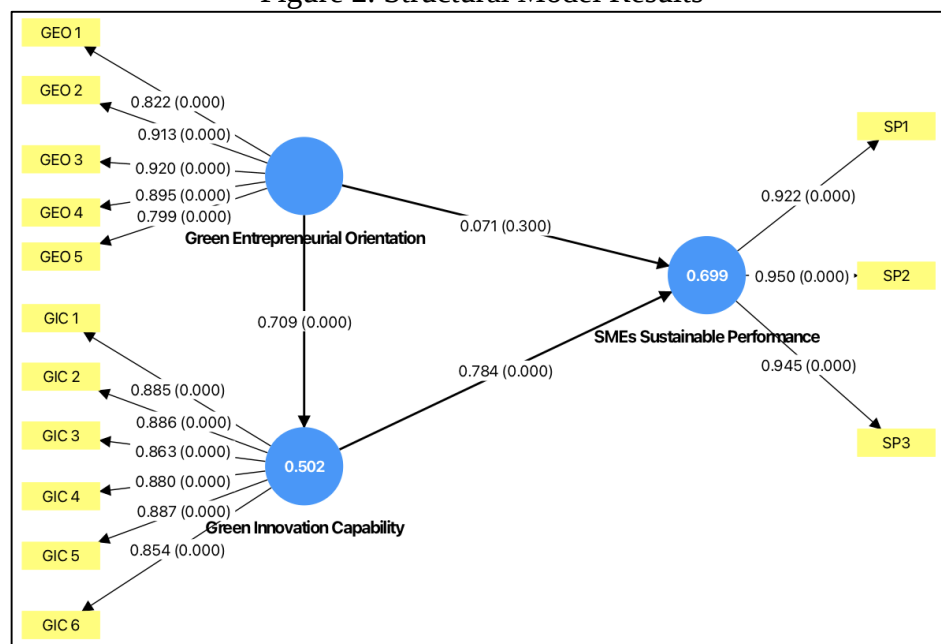


Figure 2 illustrates the final structural model estimated using PLS-SEM. Green Entrepreneurial Orientation significantly influences Green Innovation ($\beta = 0.709$, $p < 0.001$), while Green Innovation significantly affects Sustainable Performance ($\beta = 0.784$, $p < 0.001$). However, the direct relationship between Green Entrepreneurial Orientation and Sustainable Performance is not statistically significant ($\beta = 0.071$, $p = 0.300$). The model also explains

50.2% of the variance in Green Innovation and 69.9% of the variance in Sustainable Performance.

3. Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping procedure with 5,000 resamples. The results are presented in Table 2.

Table 2. Hypothesis Testing

Hypothesis	β	t	p	Decision
GEO $\rightarrow$ GI	0.709	12.258	<0.001	Supported
GEO $\rightarrow$ SP	0.071	1.037	0.300	Not Supported
GI $\rightarrow$ SP	0.784	11.222	<0.001	Supported

The findings reveal that Green Entrepreneurial Orientation has a strong positive effect on Green Innovation Capability ($\beta = 0.709$, $t = 12.258$, $p < 0.001$). Therefore, H1 is supported.

However, Green Entrepreneurial Orientation does not significantly influence Sustainable Performance ($\beta = 0.071$, $t = 1.037$, $p = 0.300$). Consequently, H2 is not supported.

In contrast, Green Innovation Capability significantly improves Sustainable Performance ($\beta = 0.784$, $t = 11.222$, $p < 0.001$). Therefore, H3 is supported.

4. Mediation Analysis

To examine the mediating role of Green Innovation Capability, an indirect effect analysis was conducted using the bootstrapping procedure.

The results indicate that the indirect relationship between Green Entrepreneurial Orientation and Sustainable Performance through Green Innovation Capability is statistically significant ($\beta = 0.556$, $t = 8.443$, $p < 0.001$). Thus, H4 is supported.

Since the direct effect of Green Entrepreneurial Orientation on Sustainable Performance is insignificant while the indirect effect is significant, Green Innovation Capability can be classified as a full mediator. This finding suggests that Green Entrepreneurial Orientation contributes to Sustainable Performance only when it is translated into innovation capability.

Discussion

Rather than reiterating the statistical findings, the discussion focuses on explaining why SMEs require innovation capability to transform environmental orientation into sustainability outcomes. These findings suggest that a green entrepreneurial mindset alone does not automatically generate sustainable performance. Instead, SMEs must develop tangible innovation capabilities that enable environmental strategies to be translated into environmentally friendly products, cleaner production processes, and sustainable business practices. Therefore, organizational capabilities, rather than strategic intentions alone, determine whether green entrepreneurial orientation can create measurable sustainability outcomes.

From a theoretical perspective, these findings provide strong support for the Resource-Based View (RBV) by explaining how intangible strategic resources are transformed into sustainable competitive advantage. RBV argues that firms achieve superior performance not merely by possessing valuable resources but by developing unique organizational capabilities that are difficult for competitors to imitate. In this study, Green Entrepreneurial Orientation represents a valuable intangible strategic resource, while Green Innovation Capability functions as the organizational capability that converts environmental commitment

into competitive advantage and ultimately sustainable performance. Consequently, the study extends RBV by demonstrating that innovation capability is the missing link connecting strategic orientation with sustainability outcomes, particularly within SMEs operating in developing economies.

The insignificant direct effect of Green Entrepreneurial Orientation on Sustainable Performance also provides an important empirical contribution. Although SMEs may possess strong environmental values and strategic commitment, these orientations alone are insufficient to improve sustainability performance without effective implementation through innovation. This finding reflects the practical realities faced by SMEs in Indonesia and Malaysia, where limited financial resources, technological readiness, skilled human capital, and institutional support often constrain the successful implementation of green initiatives. Consequently, environmental orientation remains a strategic intention unless firms possess the capability to convert these intentions into operational innovations. This result reinforces the argument that strategic orientation should be complemented by innovation capability before meaningful improvements in economic, environmental, and social performance can be achieved.

Despite the insignificant direct relationship, the findings continue to support the strategic importance of Green Entrepreneurial Orientation through its indirect influence on Sustainable Performance. This result is consistent with previous studies showing that environmentally oriented entrepreneurial strategies improve organizational performance when supported by appropriate innovation capabilities (Aftab, 2026; Sharma, 2022). Likewise, the significant mediating role of Green Innovation Capability confirms that innovation-oriented sustainability practices represent the primary pathway through which entrepreneurial orientation contributes to long-term organizational performance (Chen & Liu, 2019; Pratono et al., 2019). SMEs that actively integrate environmental concerns into innovation activities are more capable of improving operational efficiency, reducing environmental impacts, enhancing customer value, and strengthening long-term competitiveness. These findings also align with Muangmee (2021) and Hossain et al. (2024), who argue that innovation capability is a fundamental mechanism linking entrepreneurial orientation with sustainable competitive advantage.

Furthermore, the strong positive relationship between Green Entrepreneurial Orientation and Green Innovation Capability confirms that entrepreneurial orientation functions as a strategic antecedent of innovation capability. SMEs with proactive environmental orientations are more likely to invest in green research and development, encourage employee participation in eco-innovation initiatives, adopt environmentally friendly technologies, and collaborate with external stakeholders to strengthen innovation capacity. The substantial effect size observed in the structural model further indicates that Green Entrepreneurial Orientation is one of the most influential drivers of Green Innovation Capability. This finding reinforces previous literature suggesting that entrepreneurial orientation shapes firms' strategic behaviour and stimulates innovation activities that ultimately support sustainable development. Therefore, rather than focusing solely on cultivating environmental awareness, SME managers should prioritize strengthening organizational innovation capabilities through technology adoption, knowledge development, and collaborative innovation networks to achieve long-term sustainability.

Overall, the findings provide both theoretical and practical implications for SMEs in Indonesia and Malaysia. Theoretically, the study extends the Resource-Based View by empirically confirming that Green Innovation Capability fully mediates the relationship between Green Entrepreneurial Orientation and Sustainable Performance. Practically, the results suggest that policymakers should complement sustainability-oriented regulations with financial incentives, technology transfer programmes, and innovation support systems that

enable SMEs to develop green innovation capabilities. For SME managers, the findings emphasize that sustainable competitive advantage is achieved not merely through environmental commitment but through the successful implementation of innovation strategies that transform green entrepreneurial orientation into measurable sustainability performance.

CONCLUSION

This study examines the effects of Green Entrepreneurial Orientation and Green Innovation Capability on Sustainable Performance among SMEs in Indonesia and Malaysia using a quantitative approach and PLS-SEM analysis. The findings provide empirical evidence that sustainable performance in SMEs is driven more strongly by capability-based factors than by strategic orientation alone.

The results indicate that Green Entrepreneurial Orientation does not have a significant direct effect on Sustainable Performance. Although GEO reflects SMEs' strategic commitment toward environmental responsibility, innovativeness, and proactiveness, such orientation alone is insufficient to directly enhance economic, environmental, and social performance outcomes. This suggests that, in the context of SMEs, green entrepreneurial values may remain at the strategic or conceptual level if not supported by concrete implementation mechanisms.

In contrast, Green Innovation Capability is found to have a positive and significant effect on Sustainable Performance. SMEs that possess stronger capabilities in developing green products, adopting environmentally friendly processes, and integrating sustainability into operational activities are more likely to achieve superior sustainable performance. This finding confirms that green innovation capability represents a critical organizational resource that enables SMEs to transform sustainability intentions into measurable outcomes.

Furthermore, the significant influence of Green Entrepreneurial Orientation on Green Innovation Capability indicates that GEO functions as an important strategic antecedent of innovation capability, rather than as a direct determinant of performance. Green entrepreneurial orientation shapes firms' innovation mindset and encourages environmentally oriented initiatives; however, it is the actual capability to implement green innovation that ultimately determines sustainable performance. These findings highlight the importance of distinguishing between strategic orientation and operational capability when explaining sustainability outcomes in SMEs.

The study contributes to the green entrepreneurship and sustainability literature by clarifying the distinct roles of entrepreneurial orientation and innovation capability. Unlike prior studies that position green innovation as a mediating mechanism, this study empirically demonstrates that Green Innovation Capability operates as an independent driver of Sustainable Performance, reinforcing a capability-driven perspective of sustainability in SMEs.

From a practical standpoint, the findings suggest that policymakers and SME development institutions should not only promote green entrepreneurial awareness but also prioritize the development of SMEs' green innovation capabilities. Support mechanisms such as access to green technologies, innovation-oriented training programs, and sustainable financing schemes are essential to enhance SMEs' capacity to implement environmentally friendly innovations. For SME owners and managers, the results emphasize that adopting green entrepreneurial values must be accompanied by concrete investments in innovation capability to achieve long-term sustainable performance.

Future research is encouraged to expand the model by incorporating moderating variables such as government support, regulatory pressure, or market dynamics, as well as employing

longitudinal data to capture the dynamic relationship between green orientation, innovation capability, and sustainable performance over time.

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