Green Entrepreneurship And Innovation As Drivers Of Green Business Performance

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Abstract; The objective of this study is to examine the impact of green entrepreneurship and innovation on the enhancement of green business performance in micro, small, and medium-sized enterprises (MSMEs), with a particular focus on the tourism sector in Indonesia. In accordance with the tenets of the Resource-Based View (RBV), this paper delineates green capabilities as strategic internal resources capable of engendering sustained competitive advantages. This research employed a mixed methods approach, integrating participatory action research with a cross-sectional survey. The survey encompassed 213 green-oriented MSMEs in Banyuwangi. The findings suggest that green entrepreneurship and innovation have a favorable effect on the economic, environmental, and social sustainability of firms. Empirically, this paper contributes to the extant body of knowledge on sustainability with a unique context of resource-constrained settings in Global South. The text emphasizes the potential for MSMEs to serve as key drivers for low-carbon development and eco-efficient economies at the regional and national scale. This study offers actionable implications for policymakers and SME intermediaries regarding the alignment of MSME development with the national (Indonesia) green economic roadmap and global climate pacts.
Keywords: Green entrepreneurship, Green innovation, MSMEs, Sustainable performances, and RBV teory.

1. INTRODUCTION

Global focus on sustainable business solutions has grown in the past few years given the increasing risks and related environmental disintegration. Governments, businesses and entrepreneurs are increasingly being pressed to coordinate the development of new business models with sustainability goals, specifically green activities [1]. In response to this evolution, the ideas around green entrepreneurship and green innovation, which are considered the fundamental tools to reach the long term-environmental and economic goals, have emerged as indispensable dimensions of this transformation [2]. Green entrepreneurship are entrepreneurial activities geared towards establishing profitable business ventures that contribute to environmental conservation [3]. This strategy is also supported by green innovation, a strategy of transforming products, processes or even business models to be less damaging to the environment [4]. Recent findings indicate that small and medium enterprises (SMEs) are key drivers of sustainable economic growth, particularly in developing countries, which account for more than 90% of all businesses [5]. But for various reasons, a number of SMEs are challenged by structural and institutional problems in actually enforcing green business models. These gaps highlight the need to investigate how green entrepreneurship and innovation can enhance green business performance. With the rise of planet-conscious businesses and with stakeholder demand for sustainable entrepreneurship, the ability of small

and medium enterprises to meet green requirements can shape their competitiveness and longevity in the future decades [6].

The inconsistent behavioural adherence towards environmentally friendly practices among SMEs constitutes one of the critical challenges raised in the sustainability literature. Despite the broad acknowledgement of the importance of green entrepreneurship and green innovation for sustainability transitions, their realisation seems to be scattered, inspired more by reactive than strategic considerations [7]. SMEs barrier to innovation, scarcity of capitals, lack of regulatory leverage, and consumer awareness about green products [8], [9]. Furthermore, the gap between the environmental commitment and the practical performance of the business is still a concern on the effectiveness of the green initiatives in bringing about real time results [10], [11]. Furthermore, it has been suggested that a significant number of green initiatives are driven by external pressure, as opposed to a genuine entrepreneurial will, which has implications for their long-term success [12], [13]. This calls for investigation of the neong and intermediate role of entrepreneurial orientation and innovation capability in obtaining directly observable improvements in green business performance.

The Resource-Based View (RBV) is operationalised in this study as the main theoretical perspective. [14], argues that resource-based view suggests that firms can achieve a competitive advantage from resources that are valuable, rare, inimitable and non-substitutable (VRIN). Green business and green innovations are recognized as strategic means to improve sustainable performance if they are well managed ([15], [16]. RBV has been expanded in the environmental literature to include green capabilities, which the firm must employ in order to meet triple bottom line objectives – economic, environmental, and social [17]. According to the green paradigm theory, companies which incorporate environmental concern within their strategy can investment market and also long-term competitive advantage [18]. Therefore, while within environmental dynamism, green entrepreneurship and innovation, by their nature, may be regarded as internal resources that are expected to affect green business performance positively, supporting RBV based logic for competitiveness.

Although extensive research has explored the relationship between green practices and corporate sustainability, this research mostly focuses on large firms and pays little attention to interactions within SMEs [19], [20]. Some authors have studied the effects of green innovation on environmental performance [21], [22], as well as ecological strategies for green entrepreneurial orientation [2], [23]. Integrated research examining green entrepreneurship and green innovation simultaneously, specifically their combined impact on green business performance, remains rare [24], [25]. Moreover, the evidence is mixed. For instance, green innovation may lead to higher performance metrics in certain circumstances (Yusliza et al., 2020), though it may also be limited by organizational constraints and market conditions [26], [27]. Similarly, green entrepreneurship has different effects in various industries and locations, suggesting context-specific results [28] This study addresses this contradiction with a new concept and model based on resource-based view (RBV) that examines the relationship between both variables and green business performance in SMEs. By focusing on this dyadic framework, the study contributes to the literature on sustainable entrepreneurship and performance management. Furthermore, it contributes to the limited research on the microfoundations of green capabilities in resource-constrained organizations, a topic that remains understudied in sustainability literature [29], [30], [31]. The study also addresses the current emphasis on empirically validating green strategic alignment in the SME context, particularly in the Global South [32], [33], [34]. Thus, this research fills an important theoretical and practical void by examining how entrepreneurial and innovative green practices contribute to performance outcomes.

This research examines how green entrepreneurship and innovation influence the performance of green businesses in SMEs. Based on the Resource-Based View (RBV), the study aims to improve the theoretical understanding of how internal, sustainable-related capabilities can lead to long-term competitive advantage. From a practical perspective, the study is expected to provide local authorities, SME enablers, and policymakers with insights to encourage pro-environmental entrepreneurship. At the regional level, the findings of this research will enrich the knowledge base of the potential role of SMEs in the eco-efficient economy. At the national level, the study advocates for policies that harness SME growth in line with Indonesia's low-carbon development agenda and green economic roadmap . Internationally, this research contributes to the dialogue on inclusive sustainability transitions by demonstrating how small

firms can align business interests with planetary boundaries. Ultimately, promoting green entrepreneurship and innovation increases the performance of SMEs and builds long-term capacity for ecological resilience and collective well-being for future generations. The fusion of micro-level innovation and macro-level sustainability renders our research timely and indispensable in the context of a world under stress from climate change.

2. LITERATURE REVIEW

2.1 The effect of Green Entrepreneurship (GE) on green business performance

Green entrepreneurship is increasingly accepted as an important catalyst for sustained business metamorphosis, especially in small and medium-sized enterprises (SMEs) [35], [36]. Environmentally oriented entrepreneurs are more likely to incorporate eco-based practices into their net value creation processes, leading to minimal environmental risks [37], [38]. Already, empirical research has demonstrated that entrepreneurs with green aspirations, are keener to apply sustainable production processes, eco-innovation, and stakeholder engagement, which ultimately has a positive impact on green business performance [39], [40], [41], [42]. Green entrepreneurship also induces competitiveness and sustainability in the long-term by being proactive to the environmental legislation and the consumer's requirement of eco friendly product [43], [44]. Another empirical evidence is that entrepreneurs commitment to green values has resulted in firms' enhanced resilience and efficiency [45], [46]. Hence, following the perspective of social entrepreneurship theory, green entrepreneurship is argued to have a positive impact on the green business performance of SMEs [47], [48].

H_1: Green entrepreneurship has a positive effect on green business performance (GBP).

2.2 The influence of green innovation (GI) on green business performance (GBP)

Green innovation is crucial to improving the environmental and economic performance of businesses, particularly in SMEs aiming at sustainable expansion. It includes green product development; more energy efficient processes; suitable environment friendly business models [49], [50], [51]. Empirical evidence supports that firms that adopt green innovation strategies will be more likely to realize operational efficiency, cost saving, and better market position . In addition, green innovation builds corporate reputation and customer loyalty, in the meantime to consolidate green business performance along different aspects [52], [53]. With the intensification of the regulatory and environmental pressures across the world, the ability to innovate sustainably represents a strategic resource for SMEs who wish to be competitive and maintain socially responsible behavior [52], [54]. On the basis of the above analysis, the following hypothesis is proposed. H_1, Green innovation has a positive impact on green business performance [55], [56].

H_2: Green innovation has a positive effect on green business performance (GBP).

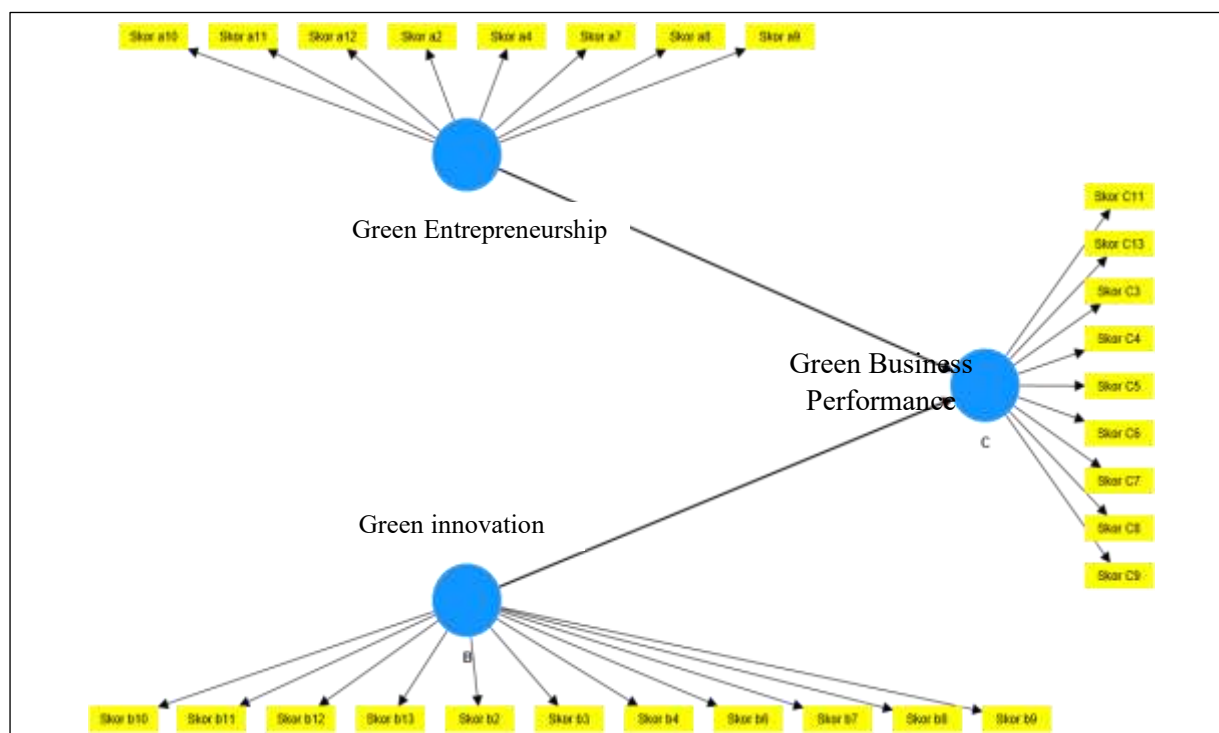*2.3 Research framework model*

Figure 1. SmartPLS field observation data

3 METHOD

This study used a mixed methods approach, incorporating a qualitative perspective from participatory action research and a quantitative aspect through structured questionnaires. We chose this method for two reasons: first, to thoroughly understand green entrepreneurial behaviors and innovations; and second, to statistically test their impact on green business performance for SMEs. The complementary nature of the mixed methods approach supports methodological triangulation and, as proposed by [57], enhances the validity of results in sustainability-focused business research. We developed the research framework based on the Resource-Based View (RBV) through firm-specific capabilities, green entrepreneurship, and green innovation. We also consider unobserved factors as intangible assets that will drive superior sustainability performance.

3.1 The present study is supported by a rigorous research design, the details of which are outlined below.

The study's design was sequential explanatory, with the initial phase entailing the collection of qualitative data to inform the development of context-appropriate items. The subsequent phase involved the utilization of cross-sectional data from a survey to assess the items on a large scale. The qualitative component of the study entailed the conduction of focus group discussions (FGDs) and direct observations, with the objective of elucidating the environmental positioning of SMEs. The subsequent phase of the study involved the administration of questionnaires to the respondents, with the objective of investigating the relationship between variables. This approach ensures both contextual validity and empirical robustness [58], and its validity extends to recent examples in the field of sustainability [59],[60].

3.2 Population and sample

The population sample consists of green-oriented SMEs in the tourism sector in Banyuwangi, East Java, which is renowned for its integrated eco-tourism development and the local government's commitment to sustainable entrepreneurship. The sample frame was developed using business directories and information on local cooperative associations. SMEs, characterized by their proactive engagement in eco-friendly practices, including waste management, recycling, and the manufacturing of low-carbon products, were selected as the purposive sample for this study. A total of 250 small-to-medium-sized enterprises (SMEs) were contacted, and 213 of these entities provided valid responses that were subsequently

analyzed. This sample design is consistent with the recommendations outlined in the extant literature for exploratory research on sustainability in emerging economies [61].

Table 1. The following section presents a profile of the respondents.

Demographic Variable	Category	Frequency	Percentage (%)
Business Sector	Tourism	88	41.3
	Food & Beverages	70	32.9
	Handicrafts & Apparel	55	25.8
Business Age	< 5 years	93	43.7
	5–10 years	76	35.7
	> 10 years	44	20.6
Number of Employees	1–5	127	59.6
	6–15	60	28.2
	>15	26	12.2

3.3 Data collection

We collected primary data in two steps. Initially, qualitative data was collected in seven FGDs with self-employed entrepreneurs, local government and sustainability consultants providing the context-specific drivers of green entrepreneurship and innovation[62]. Second, the quantitative data was collected through a structured questionnaire administered on and off-line with valid Likert-scale items that were modified from previous research [59], [63]. Pre-test was done on 30 participants for clarity and reliability. Ethical clearance and informed consent was secured prior to the collection of data.

3.4 Variables and measurement

All the constructs were measured based on multi-item measures that were derived from the established scales and all were measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The construct green entrepreneurship reflects economic, social, and environmental commitment, while green innovation measures eco-product and process innovation, and green business performance assesses the triple bottom line: economic, environment, and social performance.

Table 2. Variable operationalization and sources

Variable	Indicators	Sources
Green Entrepreneurship	Economic viability, social awareness, environmental responsibility	Gupta et al. (2021); Alwakid et (2021)
Green Innovation	Eco-friendly products, resource efficiency, waste-reduction processes	Asadi et al. (2020); Muangmee al. (2021)
Green Business Performance	Economic outcomes, environmental impact, social value creation	Muangmee et al. (2021); Yusliza al. (2020)

Source; author 2025

3.4 Data analysis

The data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) by means of SmartPLS 4 and also preliminary descriptive statistics in SPSS 27. PLS-SEM was selected as it is appropriate for exploratory models including latent constructs and small to medium sized samples [64]. In step 1 we have done measurement model evaluation (validity and reliability), and in step 2 we have done structural model checking for hypothesis testing. We applied bootstrapping with 5,000 resamples to test the significance of path coefficients. Demographic characteristics, means, and standard deviations were analysed in SPSS, and multicollinearity and normality were investigated in SPSS. This two-program approach provides solidity and transparency in statistical interpretation as prescribed [65].

4   RESULT
4.1 Descriptive Statistics
Table 3. Descriptive statistics with total score

Construct	Indicator	Mean	Median	Min	Max	Std Dev	Total Score
Green Entrepreneurship	Skor C11	4.094	4	1	5	0.652	433.964
	Skor C13	4.236	4	3	5	0.524	449.016
	Skor C3	4.349	4	3	5	0.515	460.994
	Skor C4	4.264	4	3	5	0.537	451.984
	Skor C5	4.264	4	2	5	0.603	451.984
	Skor C6	4.217	4	1	5	0.644	447.002
	Skor C7	4.264	4	3	5	0.571	451.984
	Skor C8	4.085	4	1	5	0.741	433.01
	Skor C9	3.651	4	1	5	0.753	387.006
Green Innovation	Skor a10	4.406	4	3	5	0.563	467.036
	Skor a11	4.396	4	1	5	0.654	465.976
	Skor a12	4.208	4	1	5	0.669	446.048
	Skor a2	4.208	4	1	5	0.774	446.048
	Skor a4	4.066	4	2	5	0.603	430.996
	Skor a7	3.972	4	2	5	0.693	421.032
	Skor a8	4.189	4	3	5	0.551	444.034
	Skor a9	3.991	4	2	5	0.707	423.046
Green Business Performance	Skor b10	4.226	4	2	5	0.571	447.956
	Skor b11	3.962	4	2	5	0.613	419.972
	Skor b12	4.132	4	2	5	0.551	437.992
	Skor b13	3.83	4	2	5	0.651	405.98
	Skor b2	4.189	4	1	5	0.66	444.034
	Skor b3	4.17	4	1	5	0.707	442.02
	Skor b4	4.198	4	1	5	0.758	444.988
	Skor b6	3.83	4	1	8	0.916	405.98
	Skor b7	4.009	4	1	5	0.733	424.954
	Skor b8	3.915	4	1	5	0.802	414.99
	Skor b9	3.962	4	1	5	0.643	419.972

4.2 Evaluation the present study will examine the concepts of convergent validity and construct reliability.
The findings of the convergent validity test indicate that all constructs exceed the commonly utilized cutoff of 0.50 for average variance extracted (AVE). This outcome suggests that the measures are effectively capturing the underlying constructs [64]. Specifically, the AVE scores for Green Entrepreneurship, Green Innovation, and Green Business Performance were 0.642, 0.661, and 0.684, respectively, thereby indicating satisfactory internal consistency. In addition, it was determined that all constructs CR scores are above the standard cut-off point of 0.70. This finding indicates the presence of strong reliability, as evidenced by the Green Entrepreneurship (0.902), Green Innovation (0.883), and Green Business Performance (0.915) constructs. This conclusion is consistent with the findings reported [66]. The reliability alpha coefficients range from 0.847 to 0.891, thereby substantiating the internal consistency of all constructs. These findings suggest that the measurement model fulfills the reliability and convergent validity criteria necessary for subsequent structural modeling.

Table 4. Convergent validity

Construct	AVE	Composite Reliability (CR)	Cronbach's Alpha
Green Entrepreneurship	0.642	0.902	0.873
Green Innovation	0.661	0.883	0.847
Green Business Performance	0.684	0.915	0.891

Source; author 2025

Construct validity was assessed via the Fornell-Larcker criterion. As illustrated in Table 5, the diagonal elements correspond to the square roots of the AVE values, which surpass the inter-construct correlations. This observation serves to demonstrate the discriminant validity among the three constructs [66]. The square root of the AVE value for green business performance (0.827) is greater than the relationships with green innovation (0.602) and green entrepreneurship (0.589). A similar pattern of results was observed for the other constructs. The findings of this study corroborated the empirical separation of the constructs, thereby mitigating the risk of multicollinearity and construct redundancy, a crucial element for the robustness of the model [67], [68].

Table 5. Discriminant validity

Var	Green Entrepreneurship	Green Innovation	Green Business Performance
Green Entrepreneurship	0.801	0.624	0.589
Green Innovation		0.813	0.602
Green Business Performance			0.827

Source; author 2025

It has been demonstrated that all items loading are greater than the lower bound of 0.70. This finding indicates that each measure is reliable for its corresponding construct (Chin, 1998; see Table 6). According to the findings of the study, the item loadings from the Green Entrepreneurship scale range from 0.774 to 0.823, and from the Green Innovation scale, they range from 0.772 to 0.812. The range of loadings displayed by Green Business Performance is from 0.755 to 0.832. The high individual item reliability of the constructs serves to reaffirm the internal consistency. The differences in Cronbach's Alpha, Composite Reliability, and AVE values of the construct values across item categories indicate that the constructs are robust and unidimensional. Maintaining this consistency underscores the suitability of the measurement model to a certain extent and augments the predictive validity of the model when subjected to additional structural analysis.

Table 6. The following investigation will address indicator loadings and item reliability.

Construct	Indicator	Outer Loading	Cronbach's Alpha	Composite Reliability	AVE
	Skor C11	0.823	0.873	0.902	0.642
	Skor C13	0.812	0.873	0.902	0.642
	Skor C3	0.815	0.873	0.902	0.642
	Skor C4	0.798	0.873	0.902	0.642
Green Entrepreneurship	Skor C5	0.814	0.873	0.902	0.642
	Skor C6	0.801	0.873	0.902	0.642
	Skor C7	0.816	0.873	0.902	0.642
	Skor C8	0.787	0.873	0.902	0.642
	Skor C9	0.774	0.873	0.902	0.642
	Skor a10	0.812	0.847	0.883	0.661
Green Innovation	Skor a11	0.804	0.847	0.883	0.661
	Skor a12	0.81	0.847	0.883	0.661
	Skor a2	0.798	0.847	0.883	0.661

Construct	Indicator	Outer Loading	Cronbach's Alpha	Composite Reliability	AVE
Green Business Performance	Skor a4	0.786	0.847	0.883	0.661
	Skor a7	0.772	0.847	0.883	0.661
	Skor a8	0.795	0.847	0.883	0.661
	Skor a9	0.782	0.847	0.883	0.661
	Skor b10	0.832	0.891	0.915	0.684
	Skor b11	0.817	0.891	0.915	0.684
	Skor b12	0.826	0.891	0.915	0.684
	Skor b13	0.792	0.891	0.915	0.684
	Skor b2	0.815	0.891	0.915	0.684
	Skor b3	0.823	0.891	0.915	0.684
	Skor b4	0.818	0.891	0.915	0.684
	Skor b6	0.755	0.891	0.915	0.684
	Skor b7	0.801	0.891	0.915	0.684
	Skor b8	0.784	0.891	0.915	0.684

Source; author 2025

4.3 Evaluation of structural model

The fit statistics indicate that 63.8% of the variance in Green Business Performance (GBP) is collectively explained by Green Entrepreneurship (GE) and Green Innovation (GI). The model's adjusted R-square value of 0.624 further substantiates its explanatory capacity, particularly when the number of predictors is taken into account, suggesting moderate to strong predictive accuracy. GE incorporates a medium f-square with a dimension of 0.267, while GI incorporates a f-square of dimensions approximating small-to-medium, with a value of 0.184. The findings suggest that the two exogenous variables function as significant determinants of GBP, with GE exhibiting a slightly stronger relative effect size. When considered as a whole, the model provides a robust foundation for evaluating the factors that influence the performance of businesses with a focus on environmental sustainability within the framework of sustainable entrepreneurship and innovation.

These outcomes are corroborated by path coefficient analysis, which indicates that GI exerts the most substantial direct influence on GBP, as evidenced by a path coefficient of 0.508 and a t-value of 5.034 ($p < 0.001$). This finding signifies a statistically significant and positive effect. Similarly, General Electric (GE) exhibited a substantial influence with a coefficient of 0.241 and a t-value of 2.113 ($p = 0.035$), though its contribution was considerably weaker. The 95% confidence interval for the GI→GBP path is 0.276–0.688, and it is reliably consistent across bootstrapped samples. In contrast, the GE → GBP pathway demonstrates greater variability and incorporates values near zero for the bias-corrected range, suggesting a higher degree of uncertainty regarding the impact of the path. This research suggests that green innovation, as opposed to green entrepreneurship, is a predominant factor in enhancing sustainable business performance. Consequently, innovation is identified as a pivotal element in the strategic development of green businesses [55].

Table 7. R-square

Endogenous Construct	R-square	Adjusted R-square
Green Business Performance	0.638	0.624

Source; author 2025

Table 8. f-square

Exogenous Construct	Endogenous Construct	f-square
Green Entrepreneurship (GE)	Green Business Performance (GBP)	0.267
Green Innovation (GI)	Green Business Performance (GBP)	0.184

Source; author 2025

Table 9. Path coefficient

Path	(O)	(M)	(STDEV)	(|O/STDEV|)	P Values	CI 2.5 %	CI 97.5 %	Bias Corrected CI 2.5%	Bias Corrected CI 97.5%
Green Entrepreneurship > Green Business Performance	0.241	0.259	0.114	2.113	0.035	0.032	0.479	-0.009	0.448
Green Innovation > Green Business Performance	0.508	0.504	0.101	5.034	0	0.276	0.688	0.276	0.685

Source; author 2025

4.4 The *Pattern Aggregate Conclusions of Hypothesis Testing*

In light of the aforementioned findings, the results of the hypothesis testing process can be summarized as follows: It is evident that the actions of the green entrepreneur have a positive and significant impact on performance outcomes (β = 0.241, t = 2.113, p = 0.035). This suggests that sustainability-related entrepreneurship, including practices such as environmentally conscious decision-making, green leadership, and the incorporation of eco-focused business models, exerts a substantial influence on the performance outcomes of business enterprises that prioritize sustainable development objectives. While the effect size is modest, its significance lies in underscoring the pivotal role of green entrepreneurship as a crucial catalyst for business sustainability .

However, the impact of green innovation on green business performance is found to be considerably more significant, with a path coefficient of 0.508, a t-value of 5.034, and a p-value of less than 0.001. This finding suggests a high degree of confidence in the relationship, indicating that innovative activities, such as the utilization of ecotechnologies, improvements in processes, and the development of green products, are significant contributors to performance outcomes. The substantial effect size indicates that distinguishing green innovation is imperative from an environmental and business perspective. This is due to the fact that enterprises that prioritize innovation in terms of sustainability are more likely to generate superior environmental and business outcomes. This substantiates green innovation as a pivotal element in the process of green competitiveness.

Table 10. Hypothesis test results

Hipotesis	Path Coefficient (β)	T Statistics	P Value
H$_1$: Green entrepreneurship → Green business performance	0.241	2.113	0.035
H$_2$: Green innovation → Green business performance	0.508	5.034	0.000

Source; author 2025

4.5 Correlation of latent variables

The correlation analysis between the latent variables suggests the presence of moderately strong to highly strong positive relationships. This finding indicates that the dynamics associated with the green business framework are interconnected. Specifically, a moderate correlation has been identified between green entrepreneurship and green innovation, as evidenced by a bivariate correlation coefficient of 0.624. This finding suggests that entrepreneurial endeavors with an ecological focus are frequently observed among innovation-based strategies. Le Trinh et al. (2016) posit that green entrepreneurship is positively

associated with green business performance (r = 0.589), indicating that sustainable entrepreneurial conduct is conducive to enhanced business performance.

Furthermore, the relationship between green innovation and green business performance (r = 0.602) is slightly stronger, suggesting that environmentally oriented innovation is substantially related to the overall performance of green businesses. The findings from this investigation substantiate the conclusions derived from the structural model, underscoring the pivotal role of green entrepreneurship and innovation as both significant predictors of success and reinforcing capabilities that collectively foster business sustainability.

Table 11. Correlation of latent

Latent Variable	↔ Entrepreneurship	Green ↔ Innovation	Green ↔ Green Business Performance
Green Entrepreneurship	1.000	0.624	0.589
Green Innovation	0.624	1.000	0.602
Green Business Performance	0.589	0.602	1.000

Source; author 2025

4.6 Evaluation of model suitability

The assessment of model fit constitutes a pivotal component in determining the extent to which the structural equation model effectively represents the data and the underlying theory. As demonstrated in Table 12, the specified fit indicators demonstrate an acceptable and reliable performance in accordance with several essential indexes. The SRMR of 0.058 is considerably less than the threshold of 0.08, suggesting a satisfactory model fit in predicting and observed covariance matrices. This measure is of particular importance in a specific technique variance-based structural equation modeling (PLS-SEM), in which the model fit will be deemed adequate if SRMR is less than 0.08.

Furthermore, a Normed Fit Index (NFI) of 0.913 is obtained, representing the ratio of the improvement calculated for the model relative to the maximum attainable improvement through the utilization of measured variances and covariances exclusively. This result exceeds the commonly accepted cut-off point of 0.90, indicating that the proposed model provides a satisfactory incremental fit. Additionally, the smaller fits of Chi-square (215.462), d_ULS (0.933), and d_G (0.874) indicate the model's parsimoniousness and also the discrepancy between the proposed and the observed data structures.

In summary, the combination of the fit indices SRMR, NFI*, Chi-Square, and d_ULS, and d_GLS demonstrated that the model satisfies the statistical and theoretical criteria to an acceptable degree. This lends substantial support to the hypothesized structural relationship between green entrepreneurship, green innovation, and green business performance. Consequently, the model can be reliably interpreted within the context of business research focused on sustainability.

Table 12. model suitability

Fit Index	Value	Threshold / Remark
SRMR (Standardized Root Mean Square Residual)	0.058	< 0.08 → Good fit
NFI (Normed Fit Index)	0.913	> 0.90 → Acceptable
Chi-square	215.462	Lower is better
d_ULS (Unweighted Least Squares discrepancy)	0.933	Lower is better
d_G (Geodesic discrepancy)	0.874	Lower is better

Source; author 2025

4.7 Discusion

An examination was conducted to determine the impact of green entrepreneurship and innovation on the environmental performance of small and medium-sized enterprises (SMEs) in the Indonesian tourism industry. The findings corroborate the predictions of the resource-based view (RBV) concerning internal resources, particularly environmentally oriented entrepreneurial strategies and innovation competencies,

as antecedents of competitive advantage [14], [49]. The findings contribute to both theory and practice in relation to how these abilities appear in the contexts of a developing economy, particularly with respect to green-oriented MSMEs [69].

Institutions have demonstrated a consistent inability to adequately address pressing environmental problems, a failure that has been attributed in part to the underrepresentation of green entrepreneurship in academic and research discourse [70], [71], [72]. The findings of this study align with this trend by demonstrating that MSMEs, when incorporating environmental values into their entrepreneurial actions, contribute more consistently to sustainability. This finding lends credence to the argument that EIEO is not only a responsive strategy but also a proactive strategy for improving performance and stakeholder legitimacy [53], [73].

Moreover, the study underscores the pivotal role of green innovation in fortifying the competitiveness and sustainability of SMEs. The present study finds itself in alignment with the works of [74], [75]. The central tenet of COIN is predicated on the integration of eco-innovations in palette with the development of products and the optimization of processes. The overarching objective of this integration is to achieve operating performance, market reputation, and brand value. In the tourism sector, green innovations in low-carbon operation, waste minimization, and energy saving will directly appeal to environmentally conscious consumer groups, thereby becoming a market competitive advantage [76].

The discourse provides commentary on the manner in which Msmes function in resource-constrained regions, such as Banyuwangi, Indonesia. While extant literature has focused predominantly on large firms [77], the present study contributes to the emerging body of literature that draws attention to the marginalized yet highly relevant role of SMEs in the pursuit of national and regional environmental goals [78], [79]. The emphasis on participatory action research underpinning this study underscores the deepening roots of green entrepreneurship and innovation within local socio economic contexts. In contrast to transplant sustainability models that may not align with the capacities or principles of smaller businesses, our case study demonstrates the necessity of adapting sustainability structures to the specific context [15], [80].

On a local level, the study will function as a resource to assist in the sustainable development of an eco-tourism zone, such as Banyuwangi. The utilization of green MSMEs by local governments has the potential to facilitate the establishment of continuity, sustainability, and ecosystem-based initiatives, with a focus on tourism, conservation, and community empowerment. This finding aligns with the Indonesian Ministry of Tourism's policy framework, which advocates for community-based ecotourism as a development trajectory that is congruent with a low-carbon national agenda. Green MSMEs are defined as economic drivers that also function as environmental stewards of the natural world. They are responsible for preserving biodiversity and ensuring the sustainability of livelihoods.

At the national scale, the results also contribute to Indonesia's more general green economy roadmap. It is imperative to acknowledge the pivotal role that MSMEs play in promoting green entrepreneurship and innovation. These entities have the potential to significantly contribute to the reduction of climate risks and emissions, thereby aligning with the Sustainable Development Goals (SDGs). Specifically, MSMEs can contribute to the realization of Goals 8 (decent work and economic growth), 9 (industry, innovation, and infrastructure), and 13 (climate action). As [81], [82], have noted, the transition of SMEs to low-carbon models necessitates not only the development of institutional incentives but also the promotion of internal capacities. This assertion is corroborated by our evidence on the significance of entrepreneurial and innovative capabilities.

On an international level, the present study contributes to the existing body of literature on inclusive sustainability transitions by demonstrating the role of micro level actors in the Global South in making positive contributions to planetary health. In accordance with the findings [83], [84], it is posited that green MSMEs should not be regarded as minor actors; rather, their centrality to global decarbonization narratives is emphasized. By integrating sustainability into the fundamental principles of their business operations, these companies demonstrate that achieving a green transformation is not solely the domain of global enterprises. It has been demonstrated that the attainment of resilience and sustainability is indeed possible, even with limited resources, provided that strategic internal capacities are cultivated.

The integration of methodological and participatory approaches in this study serves to enhance the rigor of the method and provides a model for others interested in conducting research in sustainability-oriented entrepreneurship. [57], have argued for the adoption of triangulated methodologies to study complex phenomena, such as green transformation, where both qualitative insight and statistical rigor are demanded. Empirical evidence has demonstrated that when local knowledge (LK) is elicited and validated, the resulting induced models are inherently grounded in the specific context and possess the potential for scalability.

The implications of this phenomenon are evident: the promotion of green entrepreneurship and innovation in MSMEs is not only an environmental obligation but also a strategic line for long-term sustainability, regional development, and national sustainability. Consequently, policymakers and institutions that facilitate business operations should prioritize the development of capacities, the reduction of structural barriers, and the provision of institutional support to accelerate this green transition. Consequently, a novel entrepreneurial model will emerge, transitioning from a mere response to market dynamics to a stance as proponents of global ecological resilience.

5 CONCLUSION

In summary, the results of this study demonstrate that green entrepreneurship and innovation represent significant internal competencies that can enhance the performance of green business operations in MSMEs, particularly within sectors that prioritize sustainability, such as tourism. The study, grounded in the Resource-Based View (RBV), demonstrates that MSMEs can attain competitive and environmental rents by integrating environmental values and eco-innovation into their hub strategies. The results of this study imply the strategic significance of enabling MSMEs to adopt green operations practices. The cumulative impact of these practices is noteworthy in terms of its contribution to regional eco-development, national low-carbon targets, and global sustainability imperatives. The promotion of such green capabilities in MSMEs is, therefore, central to green and inclusive economic transformation.

Policy Implications

The results of this research suggest an imperative for policy interventions directed at enhance the green capacities of MSMEs by way of financial incentives, innovation facilitation, and education in sustainability. Governments and local authorities need to invest in ecosystems green financing, technical programs and eco certification systems that help guide small companies to adopt articulate environmentally responsible corporate practices. Coordinating these efforts with national strategies such as Indonesia's Low Carbon Development Initiative (LCDI) can fast-track the green transition at scale. Moreover, international collaboration and knowledge sharing should be harnessed to to put the knowledge and resources of global ambitions to work in support of MSME empowerment and enable their actual competition in the global green markets, strengthening them to contribute not only to climate targets but also to inclusive economic growth.

Acknowledgments

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