JURNAL ECONOMINA
e-ISSN: 2963-1181
Volume 5, Number 7, July 2026
Homepage: ejournal.45mataram.ac.id/index.php/economina

The Effects of Green Accounting, Green Innovation, and Green Competitive Advantage on Sustainability Performance at Hotels In East Kalimantan

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Article History

Received: 25-06-2026
Revised: 02-07-2026
Published: 30-07-2026

Keywords: Green Accounting, Green Innovation, Green Competitive Advantage, Sustainable Performance, Hospitality Industry

ABSTRACT

This study aims to analyze the effects of green accounting, green innovation, and green competitive advantage on sustainable performance in the hospitality industry in East Kalimantan Province. Using a quantitative approach, primary data were collected from the entire population of hotel managers in the region and analyzed using Partial Least Squares-based Structural Equation Modeling (PLS-SEM). The results of the study reveal that: (1) Green accounting has no significant effect on sustainability performance (P = 0.826), indicating that the allocation of environmental costs is still limited to short-term administrative compliance; (2) Green innovation has a positive and significant effect on sustainability performance (p = 0.000), proving that environmentally friendly product and process innovations are effective in reducing waste; (3) Green competitive advantage has a positive and significant effect and is the most dominant determinant of sustainability performance (p = 0.000, path coefficient = 0.628). The implications of this study confirm that hotel management must transform its ecological commitment into a market differentiation strategy in order to achieve holistic sustainability.

INTRODUCTION

The orientation of the global business paradigm in the modern era has undergone a radical and fundamental shift. Companies are no longer permitted to focus exclusively on maximizing short-term financial profitability (the "single bottom line"); rather, they are morally and legally obligated to expand their operational accountability to include social and environmental sustainability. The concept of the Triple Bottom Line (Profit, People, Planet), proposed by John Elkington, emphasizes that the sustainability of a business entity can only be achieved through a harmonious balance between economic prosperity, improved social well-being, and the consistent preservation of environmental quality (Bhatia & Kumar, 2022). This requirement is particularly crucial for industries that make extensive use of natural resources in their daily operations, including the tourism and hospitality sectors.

The hospitality industry plays a dual and contradictory role in the context of regional development. On the one hand, the hospitality sector serves as a highly reliable driver of the macroeconomy through its contribution to Local Government Revenue, the creation of multi-level job opportunities, and the attraction of investment in the tertiary sector. However, on the other hand, hotels are considered one of the major contributors to domestic environmental degradation. Hotel operations, which run 24 hours a day, excessively consume clean water, use massive amounts of electricity for lighting and air conditioning (AC) systems, and generate greenhouse gas emissions from boiler systems, as well as generating solid waste (food waste and plastic amenities) and liquid waste in the form of leftover laundry detergent in very large volumes every day (Irwansyah et al., 2022).

This dynamic is clearly evident in East Kalimantan Province. As a region designated as the main corridor and strategic buffer for the Nusantara National Capital (IKN), East Kalimantan has experienced an extraordinary surge in economic activity. According to data from Badan Pusat Statistik (BPS) for 2024, the Room Occupancy Rate (ROR) for star-rated hotels in East Kalimantan recorded exponential growth, reaching 67%, placing the province among the top performers in terms of national hotel occupancy growth. The influx of ministry officials, diplomatic delegations, multinational business executives, and skilled workers heading to the IKN region has a direct impact on the high demand for premium accommodations in supporting cities such as Balikpapan and Samarinda.

Nevertheless, the rapid growth of the hospitality industry in East Kalimantan has given rise to negative externalities in the form of a threat of a local ecological crisis. The international convention on Green Hotels has been ratified, but its actual implementation at the local operational level still faces significant obstacles. Many hotel management teams are caught in a dilemma between allocating funds for environmental protection and meeting monthly profit targets. To address these issues, modern management literature offers several strategic tools, including the implementation of Green Accounting, the acceleration of Green Innovation, and the development of a Green Competitive Advantage. These three internal tools are regarded as the key drivers for improving a company's Sustainable Performance.

Although the theoretical significance of these three variables has been widely discussed, at the empirical level there remains a significant research gap in the form of inconsistent findings. Previous research on the impact of green accounting on corporate performance has yielded conflicting conclusions. Researchers such as Pratiwi & Rodiah (2024) found that the recognition of environmental costs has a significant positive impact on business sustainability. Conversely, the findings of studies by Santoso & Handoko (2025) and Hafidz & Arika (2025) revealed the contradictory fact that the implementation of green accounting actually has no tangible effect; indeed, it tends to reduce short-term financial performance due to the excessively high initial investment costs for companies.

Furthermore, the mechanisms by which Green Innovation and Green Competitive Advantage interact to support sustainability performance in the hospitality sector—whose

operational characteristics differ from those of the manufacturing industry—still require comprehensive empirical verification. The hospitality industry is heavily reliant on consumers' perceptions of comfort; therefore, it must be ensured that the implementation of green technology does not compromise the quality of essential services. Based on the above background, this study aims to empirically test and analyse the influence of Green Accounting, Green Innovation and Green Competitive Advantage on sustainability performance in star-rated hotels in East Kalimantan Province, using a Structural Equation Modelling (SEM) approach.

Green Accounting is the integration of environmental protection aspects into conventional accounting systems. Through green accounting, management is able to identify, measure, allocate, and report costs related to managing environmental impacts (such as wastewater treatment costs, Environmental Impact Assessment (EIA) certification costs, and investments in energy-efficient technology). This precise cost measurement protects companies from financial penalties imposed by regulators while promoting efficient material allocation (eco-efficiency). Based on this argument, the first hypothesis is proposed:
H1: Green accounting has a positive and significant effect on sustainability performance.

Green Innovation encompasses improvements to products (the creation of eco-friendly guest rooms, the use of organic food ingredients) and operational processes (the installation of water recycling systems, the use of smart lighting sensors) aimed at minimizing environmental damage (Chen et al., 2006). Green innovations directly contribute to lower energy and water consumption, reduce long-term operating costs, and increase appeal to the eco-conscious tourist market segment. Therefore, the second hypothesis is proposed:
H2: Green innovation has a positive and significant impact on sustainability performance.

Green Competitive Advantage is a competitive advantage achieved by a company by successfully positioning itself as an environmentally friendly entity in the eyes of consumers compared to its competitors (Sudirman et al., 2024). Hotels with a strong green reputation will enjoy high customer loyalty, the ability to charge premium room rates (a premium pricing strategy), and easier access to green financing from modern financial institutions. This strong market position directly supports the stability of the company's economic, social, and environmental dimensions. Therefore, the third hypothesis is proposed:
H3: Green competitive advantage has a positive and significant effect on sustainability performance.

METHODS

This study employs a quantitative causal-explanatory research design to test the cause-and-effect relationship among the hypothesized variables. The population in this study consists of all star-rated hotels officially registered with the East Kalimantan Regional Chapter of the Indonesian Hotel and Restaurant Association (PHRI). The sampling technique used a non-probability sampling method with a purposive sampling approach. The established sample inclusion criteria are: (1) Hotels classified as 3-, 4-, and 5-star; (2) Located within the

administrative region of East Kalimantan Province; (3) Have been in active and continuous operation for at least the past 5 years through 2026.

Based on these criteria, a sample of 45 eligible hotels was selected. From each hotel in the sample, three respondents were selected from the top and middle management levels who were deemed the most representative and knowledgeable about the company's strategic environmental policies, namely: General Manager (GM), Financial Controller, and Human Resources Development (HRD) Manager. Thus, the total number of respondents (observation units) in this study is 45 × 3 = 135 respondents. Primary data was collected through the distribution of paper and electronic questionnaires (Google Forms) using a 1–5 Likert scale.

Data analysis was conducted using a Partial Least Squares-based Structural Equation Modeling (PLS-SEM) approach with the assistance of SmartPLS version 4 software. The PLS-SEM approach was chosen because it does not require strict assumptions of multivariate normality and is highly reliable in estimating research models that integrate multiple latent variables simultaneously (Sarstedt et al., 2020). The analysis process consists of an evaluation of the measurement model (outer model) to test the validity and reliability of the instrument, followed by an evaluation of the structural model (inner model) to test hypotheses using path coefficients and statistical significance values.

RESULT AND DISCUSSION

1. Evaluation of the Measurement Model (Outer Model)

An evaluation of the outer model was conducted to ensure that all indicators used were valid and reliable in representing their latent variables. The criteria for testing convergent validity require that the factor loading for each indicator be greater than 0.70 and that the Average Variance Extracted (AVE) be above 0.50 (Sarstedt et al., 2020). Reliability was assessed using Cronbach's Alpha and Composite Reliability (CR), with a minimum threshold of 0.70.

Table 1. Matrix of Construct Validity and Reliability Evaluation Results

Leave It Variable	Cronbach's Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)	Interpretation
Green Accounting	0.852	0.858	0.537	Reliable
Green Innovasion	0.900	0.904	0.626	Reliable
Green Competitive Advantage	0.972	0.974	0.780	Reliable
Sustainability Performance	0.970	0.971	0.736	Reliable

Source: Primary Data Processed Using SmartPLS v4 (2026)

Based on the data presented in Table 1, all latent constructs demonstrate highly satisfactory empirical quality. The AVE values for all variables are above 0.537, indicating that more than 50% of the indicator variance can be explained by the respective latent

construct. The reliability indicators are also very strong, with the lowest Cronbach's Alpha and Composite Reliability values being 0.852 and 0.858, respectively (for the Green Accounting variable), far exceeding the conservative criterion of 0.70.

2. Evaluation of the Structural Model (Inner Model)

The evaluation of the inner model aims to assess the predictive power of the structural model that was built. Based on the data analysis results, the Coefficient of Determination (R^2) for the endogenous variable Sustainability Performance (Y) was recorded at 0.557 (Adjusted $R^2 = 0.547$). This means that the combined contribution of the variables Green Accounting, Green Innovation, and Green Competitive Advantage accounts for 55.7% of the variability in the sustainability performance of the hospitality industry in East Kalimantan. Meanwhile, the remaining 44.3% is influenced by external factors or other variables outside this theoretical model (such as environmental leadership, local regulations, or management compensation).

To provide a clear visual representation of the causal pathways and parameter estimates among the constructs, the following flowchart of the structural model—generated from the PLS-SEM algorithm—is presented:

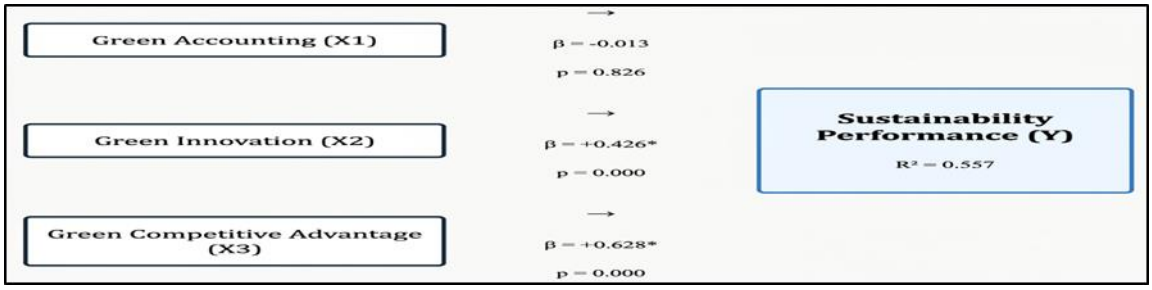

Figure 1. Visual Illustration of the Structural Model Path Diagram (Inner Model) Based on the Analysis Results

3. Hypothesis Testing and Path Coefficients

Significance tests for the path coefficients were conducted using the *bootstrapping* procedure with 5,000 subsamples. The decision criteria for rejecting or accepting a hypothesis were based on a comparison of the t-statistic value with the critical t-value (1.96 for a 5% significance level) and a p-value less than 0.05.

Table 2. Results of Path Parameter Estimation and Hypothesis Testing

	***Original sample* (O)**	***Sample mean* (M)**	***Standard deviation* (STDEV)**	**T *statistics* (O/STDEV)**	**P *values***
X1 -> Y	-0.013	-0.028	0.060	0.220	0.826
X2 -> Y	0.426	0.434	0.072	5.884	0.000
X3 -> Y	0.628	0.625	0.080	7.849	0.000

4. Discussion of Empirical Findings

a. Green Accounting and Sustainability Performance

Based on the summary of the test results in Table 2, the first hypothesis (H1) was decisively rejected. The path coefficient value was a very small negative number ($\beta = -0.013$) with a t-statistic of 0.220 and a p-value of 0.826, well above the 0.05 significance level. These findings indicate that the partial implementation of Green Accounting has been shown to have no direct impact or contribution to improving sustainability performance in the hospitality industry in East Kalimantan Province.

Empirical evidence from the field reveals that the adoption of green accounting practices at star-rated hotels in East Kalimantan remains limited to a level of merely defensive, normative administrative compliance. Hotel management allocates funds for environmental protection (such as waste disposal fees, periodic groundwater quality testing fees, and environmental permit fees) solely to comply with formal legal regulations from the local Environmental Agency in order to avoid penalties that could result in the closure of the business. These expenses are not strategically integrated into a separate *Material Flow Cost Accounting* (MFCA) system, but are instead directly charged to and consolidated under the General Operating Expenses line item in the company's conventional financial statements. As a result, green accounting fails to serve as a decision-making tool for reducing material inefficiencies. The results of this study support the findings of Santoso & Handoko (2025) and Hafidz & Arika (2025), who identified the "ecological cost paradox"—namely, that environmental accounting reports prepared under duress do not have an immediate impact on a corporation's profitability or internal sustainability.

b. The Significant Contribution of Green Innovation as a Mechanism for Efficiency

The results of the statistical tests provide empirical support for accepting the second hypothesis (H2). The path from Green Innovation to Sustainability Performance shows a positive path coefficient of 0.426, with a t-statistic of 5.884 and a p-value of 0.000 ($p < 0.01$). This validly demonstrates that the intensity of green innovation implementation is positively and linearly correlated with improvements in a hotel's sustainability performance.

Green innovation initiatives carried out by star-rated hotels in East Kalimantan include product innovation and process innovation. In terms of processes, major hotels in Samarinda and Balikpapan have adopted water recycling systems to irrigate landscaped garden areas and implemented electrical systems based on smart card switches and sensors, replacing all lighting fixtures with energy-efficient LED technology, as well as optimizing the environmentally friendly inverter-based air-cooling system (chiller). On the product side, management has begun reducing the use of single-use plastic packaging (single-use amenities plastics) by replacing them with refillable soap dispensers and cornstarch-based straws. This update has proven to be a truly massive cost-reduction mechanism, capable of drastically cutting the hotel's monthly utility bills (electricity and water). This reduction in fixed costs improves daily profitability (the "Profit" dimension) while preserving the carrying capacity of

the hotel's surrounding environment (the "Planet" dimension). The results of this study are consistent with and reinforce the empirical conclusions of Pratiwi & Rodiah (2024).

c. Green Competitive Advantage as the Most Dominant Driver

The results of the structural analysis reveal that Green Competitive Advantage has the strongest, most significant, and most substantial positive influence on the sustainability performance of hotels in East Kalimantan; therefore, the third hypothesis (H3) is unconditionally accepted. extremely high t-statistic of 7.849 and a p-value of 0.000. The effect size measurement also confirmed an f^2 value of 0.827, which falls into the category of a very large effect.

The development blueprint for the Nusantara National Capital City (IKN), which promotes the slogan *Smart, Green, and Forest City*, requires all central government ministries, high-level state institutions, foreign embassies, and multinational corporations conducting official business trips or hosting large-scale business meetings (MICE) to mandatorily select and stay at accommodation facilities that hold official environmental certification or have a proven track record of environmental sustainability. This situation creates a strategic asymmetric advantage for star-rated hotels in East Kalimantan that already possess green competitive advantages (such as the Green Hotel Award from the Ministry of Tourism and Creative Economy or green building certification). These findings provide valid empirical evidence supporting the relevance of Barney's (1991) Resource-Based View, which states that unique, valuable, and difficult-to-imitate internal capabilities—in the form of a reputation for green excellence—have been shown to be effective in boosting overall corporate sustainability (Sudirman et al., 2024).

CONCLUSION AND RECOMMENDATIONS

Conclusion

This explanatory quantitative study, based on PLS-SEM structural modeling, successfully formulated comprehensive theoretical and practical conclusions regarding sustainability governance in the hospitality industry in East Kalimantan Province during the transition to the Nusantara National Capital City (IKN). Of the three green management instruments tested, the Green Competitive Advantage variable proved to be the most dominant driver in accelerating a hotel's sustainability performance, followed by the effectiveness of the Green Innovation variable. In contrast, Green Accounting practices were found to have not yet made a tangible contribution to improving sustainability performance. This is because the adoption of environmental accounting among local businesses remains confined to administrative formalities aimed solely at complying with normative legal regulations, and has not yet been transformed into a tool for strategic financial analysis in management.

Recommendations

Based on the empirical findings above, several practical recommendations have been formulated for stakeholders:

For Hospitality Industry Management: Management at star-rated hotels in East Kalimantan is strongly advised to radically reform their general ledger structure by separating environmental expense accounts into a distinct and systematic category. This is essential so that management can accurately monitor the cost efficiency of material flow. In addition, investment in green innovation (such as solar panel energy systems and electrical automation) must continue to be increased in order to secure a position of Green Competitive Advantage, which has proven to be the key to capturing market share among premium corporations in the IKN corridor.

For Local Governments and Regulators: The Tourism Office and the Environmental Agency at both the provincial and regency/city levels in East Kalimantan are advised not to act merely as passive supervisors (punitive regulators). Local governments need to formulate attractive fiscal incentive stimulus policies, such as providing a reduction in the Tax on Certain Goods and Services (PBJT) on hotel services for hotel entities that have successfully obtained official Green Hotel certification. This policy will spur local hospitality businesses to compete in adopting sustainable business models in order to realize the vision of Forest City IKN Nusantara.

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