

The Effect of Innovation Ability and Green Innovation on Business Performance Moderated by Competitive Advantage

*Innovation Ability
and Green
Innovation*

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ABSTRACT

Indonesia's property sector grapples with fierce competition and rising expectations for sustainable practices, making it tough for housing developers to boost business performance. Developers must sharpen innovation skills and embrace green approaches to stay ahead. This study investigates how innovation capability and green innovation affect business performance among housing developers under Real Estate Indonesia's West Java branch, with competitive advantage acting as a potential moderator. Using a quantitative explanatory design, data came from online questionnaires completed by 144 purposively selected managers. Partial Least Squares–Structural Equation Modeling analyzed the responses via SmartPLS. Results show that innovation capability significantly and positively drives business performance. Green innovation has a positive yet insignificant impact. Competitive advantage strongly and directly enhances performance. However, it does not meaningfully moderate the links from innovation capability or green innovation to performance. Superior performance hinges mainly on strong internal innovation and a solid competitive edge. Green initiatives need deeper strategic embedding to unlock their full potential. These insights equip West Java developers with clearer paths to craft smarter innovation strategies and build lasting advantages in a demanding market.

Keywords: Business Performance, Competitive Advantage, Green Innovation, Housing Developers, Innovation Capability.

INTRODUCTION

Indonesia's rapidly growing population, expected to exceed 283 million by 2024, creates significant demand for housing, putting pressure on the supply of affordable homes. The Ministry of Public Works and Public Housing reports a national housing backlog of about 12.7 million units, with 700,000–800,000 new households added annually, highlighting the property sector's importance to the national economy and the need for sustainable housing. Studies indicate that green innovation can help firms, including small and medium enterprises, improve performance under these pressures (Anik & Sulisty, 2021; Luthfiyah & Moko, 2024; Achmad & Wiratmadja, 2025). Beyond quantity, the property industry also faces challenges in delivering quality and sustainable homes. Digital transformation across industries, including property, demands greater innovation through smart technologies and digital processes, which also influence consumer behavior (Porter & Heppelmann, 2020). In this context, tools such as Building Information Modeling (BIM) and smart home technologies have become essential for efficient home planning and construction, while competitive advantage is crucial for translating these innovations into tangible benefits, particularly in emerging markets

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(Zameer et al., 2022; Putri & Riyanto, 2023; Soesetio et al., 2024; Idrees & Andrianarivo, 2025; Putri & Khusnah, 2025).

Sustainability is a major focus for industries, as the construction sector contributes significantly to global greenhouse gas emissions and waste (UNEP, 2022). Traditional construction in Indonesia remains energy-intensive, prompting the adoption of green innovations to improve enterprise performance, especially in developing countries (Takyi et al., 2024b; Pradana et al., 2024; Awan et al., 2025). Changing consumer behavior, with over 60% of Millennials and Gen Z valuing sustainability, makes environmental innovation key for competitive advantage (Hart & Dowell, 2011; Richards, 2023). Yet in West Java, only 12.4% of developers apply green innovations, limiting performance.

Experts emphasize the importance of innovation capability as a dynamic skill for identifying opportunities, utilizing resources, and creating value in changing markets (Teece, 2021). Green innovation reduces energy costs, enhances reputation, and improves operational efficiency (Cheng et al., 2022). Firm resources contribute to sustained competitive advantage while environmental strategies further strengthen it (Barney, 1991; Hart, 1995). Dynamic capabilities support firms in enhancing green innovation performance (Teece, 2017; Riaz et al., 2024; Fatiha et al., 2025; Mu'min et al., 2025). In West Java, low adoption of green innovation among REI developers limits market responsiveness and performance, highlighting the need to examine the role of competitive advantage in translating innovation into tangible results.

According to Jaenudin et al. (2023), green innovation influences competitive advantage and firm value, but in Indonesian SMEs, this link needs more testing. Similarly, Chatterjee et al. (2021) note that high-performance strategies often miss the moderating role of advantage in innovation outcomes. Baquero (2024) points out that ambidextrous green innovation affects sustainable performance, moderated by green absorptive capacity, yet this is underexplored in housing sectors. Akhtar et al. (2024) find green absorptive capacity and climate moderate green innovation's effect on performance, but in property contexts like West Java, gaps remain. Alshammari and Alshammari (2023) show green innovation impacts sustainability through abilities and strategies, highlighting the need for local studies. Nuryakin and Maryati (2022) and Pratiwi and Rodiah (2024) see green competitive advantage mediating marketing orientation and performance in SMEs, but not fully in real estate. Owusu et al. (2024) stress that corporate social responsibility and green innovation foster performance, moderated by advantage, yet Indonesian data is limited. Shehzad et al. (2024) link green entrepreneurship and absorptive capacity to redefine advantage, but empirical evidence in developing markets is scarce.

This study argues that innovation by itself is not enough to improve business performance; it must be supported by strong competitive advantages. The research gap lies in understanding how these factors interact in the Indonesian property industry, especially among West Java developers, where adoption is low and performance lags. The aim of this study is to examine the influence of innovation capability and green innovation on the business performance of West Java REI developers, with competitive advantage as a moderating variable. This work hopes to add to knowledge on how innovation turns into sustainable performance and give practical advice for developers in Indonesia's changing property market.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Factors Influencing Business Performance

Innovation capability is vital for companies to grow and sustain in competitive environments. Salman et al. (2021) define it as the ability to develop and use technology for efficient production, emphasizing innovation as a structured organizational skill. Muanfhun et al. (2023) add that it turns knowledge and ideas into new products, processes, and systems that deliver long-term value. Thanh et al. (2022) see it as the skill to create products, services, and management practices for competitive advantage, while Gulsen et al. (2023) highlight combining knowledge, skills, and resources for innovative

teamwork. Phi et al. (2024) describe it as a strategic asset, and Ludivine et al. (2024) as a hard-to-copy resource enhancing product and service development. In housing development, innovation capability appears in design efficiency, improved construction processes, and the adoption of suitable technologies. It also plays an important role in boosting business performance (Wijaya et al., 2024).

Green innovation is increasingly important as companies balance financial goals with environmental responsibilities (Andayani et al., 2025). Rizwan et al. (2023) define it as changes in products, services, and processes that reduce environmental harm and conserve resources. Chen et al. (2006), as cited by Mohsin et al. (2019), view it as innovations in hardware and software for energy savings, pollution control, waste recycling, eco-friendly design, and environmental management. Siqi et al. (2022) describe it as ecological innovation involving organizational systems, culture, and management changes, while Kemp and Pearson (2007), as cited by Lu et al. (2020), define it as adopting new products, processes, or methods that lower environmental impact. In housing development, it appears in eco-friendly materials, energy-efficient designs, construction waste management, and sustainable project practices. Takyi et al. (2024a) link green innovation to enterprise performance, and Pradana et al. (2024) show it improves competitive advantage and business outcomes. This study defines green innovation as developing and applying sustainable products, processes, and practices to reduce energy use and ecological harm (Rizwan et al., 2023; AL-Shboul, 2023).

Business performance measures how well a company reaches its goals. Zafer et al. (2022) define it as achievements in market share, sales growth, and profits. Bambang et al. (2023) add that it comes from using resources effectively. Veronika et al. (2023) stress that it includes not only financial measures but also non-financial ones like efficiency, service quality, and growth. Alni et al. (2023) include indicators such as revenue, profit, market share, customer satisfaction, and employee engagement. This study sees business performance as overall goal achievement, shown in financial and non-financial results.

H1: Innovation capability has a positive and significant effect on business performance.

H2: Green innovation has a positive and significant effect on business performance.

H3: Competitive advantage has a positive and significant effect on business performance.

The Moderating Effect of Competitive Advantage

Competitive advantage means a company builds a lasting superior position over rivals (Ali et al., 2024). Ishmael et al. (2022) say it is the ability to create a hard-to-copy position. Innocent et al. (2023) add that it shows market superiority. Hanung et al. (2024) explain that it happens when a company creates value that customers recognize. Christopher et al. (2022) note that it comes from using resources to lower costs, grab opportunities, and handle threats. In this study, competitive advantage is the company's skill to create customer value and optimize resources for a sustainable, strong market position. Barney (1991) provides the resource-based view foundation for sustained competitive advantage through unique resources, while Hart (1995) extends it with the natural-resource-based view, linking environmental strategies to lasting edges in competitive settings.

Competitive advantage can act as a mechanism that turns innovation results into better market performance. Aljanabi (2022) suggests that without a good competitive strategy, innovation may not reach full performance benefits. Nguyen et al. (2024) show that adaptive competitive strategies help innovation lead to optimal outcomes. Novitasari and Agustia (2023) find that competitive advantage mediates the impact of green innovation on firm performance, while Wang (2019) and Wang et al. (2021) show that organizational green culture influences performance and advantage through green innovation. In the property sector, competitive advantage may strengthen how innovation capability and green innovation affect performance by positioning innovations as clear customer benefits (Sugiharto & Alhazami, 2023).

H4: Competitive advantage moderates the effect of innovation capability on business performance.
H5: Competitive advantage moderates the effect of green innovation on business performance.

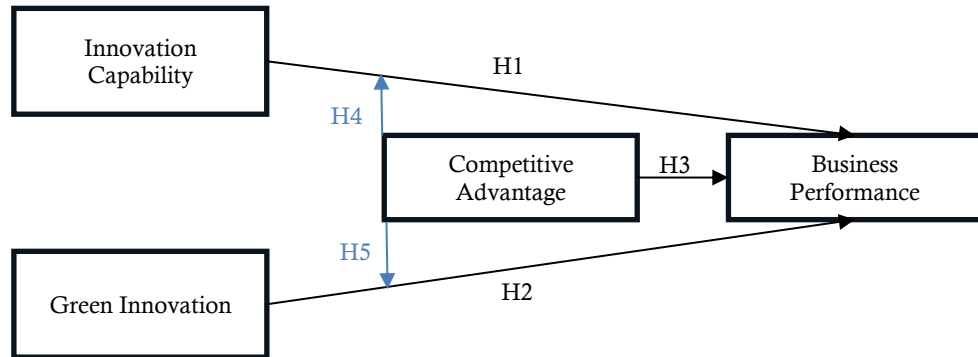


Figure 1. Research Framework

This study uses a framework based on the Resource-Based View (RBV) and Natural Resource-Based View (NRBV) to explain how internal capabilities like innovation capability and green innovation drive business performance. Competitive advantage serves as a moderator to test if it strengthens these links in the context of housing developers. The model includes direct paths from innovation capability and green innovation to business performance, plus a direct path from competitive advantage to performance. Moderation effects are tested through interaction terms. According to Teece (2017), dynamic capabilities support innovation in changing environments, while Takyi et al. (2024a) and Owusu et al. (2024) emphasize contextual factors in green innovation-performance links, often moderated by advantage in emerging markets. This framework helps examine the mechanisms of West Java REI developers. Figure 1 illustrates the proposed relationships among the variables.

RESEARCH METHODS

This study employed a quantitative approach with an explanatory design to test the causal relationships between the latent constructs through numerical measurements and statistical analysis (Creswell & Creswell, 2021; Hair et al., 2022). This method was selected because it allows for objective hypothesis testing and identification of the strength of relationships among variables based on empirical data. The explanatory design specifically helped explain how innovation capability and green innovation influence business performance, as well as the moderating role of competitive advantage in the structural model.

The population of this study consisted of all housing development companies actively registered as members of Real Estate Indonesia (REI) West Java, totaling 217 companies. The research focused on the companies' strategic activities related to innovation capabilities, green innovation implementation, competitive advantage, and business performance. The unit of analysis was individual managers at the strategic level, including owners, directors, and project or operational managers, as these respondents have the authority to make key decisions and possess a comprehensive understanding of the company's innovation policies, sustainability practices, and overall performance.

A non-probability sampling technique with purposive sampling was applied to ensure that the selected respondents were relevant key informants capable of providing accurate and insightful information about the company's strategies. The inclusion criteria required respondents to hold a managerial position (such as owner, director, or operational/project manager) and to have at least three years of work experience in the company. These criteria were set to guarantee that the participants had sufficient in-depth knowledge of

the business processes, market dynamics, and innovation implementation within their organizations. Based on these criteria, a total of 144 respondents were selected and participated in the study, which meets the minimum sample size requirement for Partial Least Squares–Structural Equation Modeling (PLS-SEM), typically ten times the maximum number of structural paths in the model.

Primary data were collected through a structured online questionnaire distributed via Google Forms. This method proved effective for reaching respondents across 15 cities and regencies in West Java Province while ensuring standardized data collection. All questionnaire items were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The research instrument was developed by adapting validated indicators from previous studies and tailoring them to the specific context of the housing development industry.

Data analysis was conducted using the Partial Least Squares–Structural Equation Modeling (PLS-SEM) approach with the assistance of SmartPLS software. PLS-SEM was chosen because it is well-suited for predictive research involving latent constructs and does not require strict assumptions of multivariate normality. The analysis process included two main stages: first, evaluation of the measurement model (outer model) through tests of convergent validity (outer loadings > 0.70 and AVE > 0.50), construct reliability (Cronbach’s alpha and composite reliability > 0.70), and discriminant validity (using Fornell–Larcker criterion and Heterotrait–Monotrait ratio); second, evaluation of the structural model (inner model) through assessment of the coefficient of determination (R^2), predictive relevance (Q^2), effect size (f^2), and hypothesis testing via bootstrapping to obtain t-statistics and p-values.

RESULTS

This section presents the findings from the data analysis conducted on the 144 responses from managers of REI West Java housing developers. The results begin with respondent profiles, followed by evaluations of the measurement and structural models using PLS-SEM. These analyses confirm the reliability and validity of the constructs before testing the proposed hypotheses.

Table 1. Respondent Profile

Profile	Categories	Frequency	Percentage (%)
Project Location	Bandung	25	16.7%
	West Bandung	4	3.5%
	Bekasi	33	22.9%
	Bogor	30	20.8%
	Cianjur	4	2.8%
	Cimahi	2	1.4%
	Cirebon	17	11.8%
	Depok	2	1.4%
	Karawang	7	4.9%
	Kuningan	3	2.8%
	Majalengka	2	1.4%
	Subang	1	0.71%
	Sukabumi	2	1.4%
	Sumedang	2	1.4%
	Tasikmalaya	7	4.9%
Company Size	Small	43	29.9%
	Medium	79	54.9%
	Big	22	15.3%
Company Age	<5 years	3	2.1%
	5-10 years	45	31.3%
	>10 years	96	66.7%
Position	Owner	58	40.3%
	Chief Executive Officer (CEO)	23	16%
	Operations Manager	3	3.5%
	General Manager	57	39.6%

Profile	Categories	Frequency	Percentage (%)
Work Experience	Project Manager	1	0.7%
	<3 years	3	2.1%
	3-6 years	7	4.9%
	>6 years	134	93.1%

The respondent profiles are summarized in Table 1. In terms of project locations, the largest group came from Bekasi (22.9%, 33 respondents), followed by Bogor (20.8%, 30 respondents) and Bandung (16.7%, 25 respondents). Other locations included Cirebon (11.8%, 17 respondents), Karawang (4.9%, 7 respondents), and Tasikmalaya (4.9%, 7 respondents), with smaller shares from areas such as West Bandung, Cianjur, Kuningan, Cimahi, Depok, Majalengka, Subang, Sukabumi, and Sumedang. Regarding company size, most respondents were from medium-sized companies (54.9%, 79 respondents), followed by small (29.9%, 43 respondents) and large (15.3%, 22 respondents). In terms of company age, the majority had operated for more than 10 years (66.7%, 96 respondents), while 31.3% (45 respondents) had 5–10 years, and only 2.1% (3 respondents) had less than 5 years. Positions were dominated by owners (40.3%, 58 respondents) and general managers (39.6%, 57 respondents), with chief executives (16.0%, 23 respondents), operational managers (3.5%, 3 respondents), and project managers (0.7%, 1 respondent) making up the rest. Work experience was strong, with 93.1% (134 respondents) having more than 6 years, 4.9% (7 respondents) 3–6 years, and 2.1% (3 respondents) less than 3 years. These profiles indicate that the sample mainly represents experienced managers from established medium-sized developers in key West Java areas.

Table 2. Validity Measurement Items (Convergent & Discriminant)

Variable	Loading Factor (Range)	CA	CR	AVE
Innovation Capability	0.726 – 0.979	0.892	0.895	0.782
Green Innovation	0.735 – 0.964	0.870	0.873	0.730
Business Performance	0.797 – 0.931	0.824	0.836	0.750
Competitive Advantage	0.711 – 0.989	0.826	0.841	0.811

The measurement model was evaluated first to ensure convergent and discriminant validity, as well as reliability. Convergent validity was assessed through outer loadings and Average Variance Extracted (AVE). All indicators showed strong loadings, and AVE values exceeded 0.50 for each construct. Construct reliability was confirmed with Cronbach’s alpha and Composite Reliability (CR) values above 0.70. Table 2 summarizes these results, with loading factors presented as ranges for brevity (innovation capability: 0.726–0.979; green innovation: 0.735–0.964; business performance: 0.843–0.931 for non-financial and 0.797–0.912 for financial sub-aspects, treated as one reflective construct; competitive advantage: 0.711–0.989). Note that business performance is modeled as a single higher-order reflective construct encompassing both financial and non-financial dimensions, consistent with the balanced scorecard approach used in this study.

Table 3. Discriminant Validity (Fornell-Larcker Criterion and HTMT Ratio)

Construct	Fornell-Larcker Criterion				HTMT Ratio			
	BP	CA	GI	IC	BP	CA	GI	IC
Business Performance (BP)	0.866							
Competitive Advantage (CA)	0.791	0.900			0.877			
Green Innovation (GI)	0.653	0.587	0.854		0.653	0.837		
Innovation Capability (IC)	0.712	0.704	0.689	0.910	0.791	0.870	0.827	

Based on Table 3, to ensure the constructs are empirically distinct, discriminant validity was evaluated using both the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. The Fornell-Larcker criterion compares the square root of each construct's Average Variance Extracted (AVE) on the diagonal with its correlations to other constructs off the diagonal, confirming that the diagonal values are higher, which indicates no overlap issues. Similarly, the HTMT ratios, which assess the ratio of between-trait correlations to within-trait correlations, were all below the conservative threshold of 0.90, further verifying that the constructs measure unique aspects without multicollinearity. These results provide a solid foundation for proceeding to the structural model evaluation, as the measurement model demonstrates clear separation among innovation capability, green innovation, competitive advantage, and business performance.

Table 4. Model Quality Criteria

Construct	R ²	Q ²	f ² (on BP)
Business Performance	0.682	0.421	-
Competitive Advantage	-	-	0.412
Innovation Capability	-	-	0.198
Green Innovation	-	-	0.032

Table 4 shows that, following the measurement model validation, the structural model was examined to gauge its explanatory and predictive capabilities. The coefficient of determination (R²) indicates how much variance in business performance is explained by the predictors, with a value of 0.682 suggesting substantial explanatory power according to established guidelines. Predictive relevance (Q²) was assessed via blindfolding, yielding a positive value above zero, which confirms the model's ability to predict out-of-sample data effectively. Additionally, effect sizes (f²) were calculated to measure the relative contribution of each predictor to the R², revealing large effects for competitive advantage, medium for innovation capability, and small for green innovation. Together, these metrics affirm that the model is robust and suitable for hypothesis testing, highlighting the key roles of the independent variables in driving business performance outcomes.

Hypothesis testing used bootstrapping (5,000 subsamples) to evaluate path coefficients, t-statistics, and p-values. Table 5 reports the results. Competitive advantage had a strong positive direct effect on business performance ($\beta = 0.587$, $t = 5.554$, $p = 0.000$), supporting its role as a key driver. Innovation capability positively and significantly influenced business performance ($\beta = 0.402$, $t = 3.693$, $p = 0.000$), indicating that stronger internal innovation leads to better outcomes. Green innovation showed a positive but insignificant effect ($\beta = 0.116$, $t = 1.097$, $p = 0.273$), suggesting a limited direct impact in this context.

Table 5. Significance Testing (Hypothesis Testing)

Path	Original Sample	Sample Mean	STDEV	t-statistics	p-value
Innovation Capability -> Business Performance	0.402	0.406	0.109	3.693	0.000
Green Innovation -> Business Performance	0.116	0.118	0.106	1.097	0.273
Competitive Advantage -> Business Performance	0.587	0.584	0.106	5.554	0.000
Competitive Advantage X Innovation Capability -> Business Performance	-0.159	-0.158	0.119	1.342	0.180
Competitive Advantage X Green Innovation -> Business Performance	-0.143	-0.142	0.093	1.543	0.123

The moderating effects were not supported. The interaction between competitive advantage and innovation capability was negative and insignificant ($\beta = -0.159$, $t = 1.342$, $p = 0.180$), meaning competitive advantage did not strengthen (and slightly weakened) the IC-BP link. Similarly, the competitive advantage \times green innovation interaction was negative and insignificant ($\beta = -0.143$, $t = 1.543$, $p = 0.123$), showing no significant

moderation. These findings highlight that business performance among West Java REI developers is mainly driven by competitive advantage and innovation capability, while green innovation's direct contribution remains limited, and competitive advantage does not significantly moderate the innovation-performance relationships in this sample.

DISCUSSION

The findings of this study reveal that competitive advantage exerts the strongest and most significant direct influence on business performance among West Java REI housing developers ($\beta = 0.587$, $p = 0.000$). This result aligns with the resource-based view, which posits that firms achieve superior outcomes when they possess unique, difficult-to-imitate resources and positions in the market (Barney, 1991). In the context of Indonesia's property sector, where market pressures are intense, and many developers operate as small to medium-sized enterprises, a strong competitive position often built through reliable delivery, distinctive product features, and sustained market demand appears to be the primary driver of performance. According to Rachmawati (2023) and Owusu et al. (2024), competitive advantage plays a key role in translating strategic initiatives into environmental and overall performance, particularly in emerging markets where differentiation helps firms stand out amid cost-sensitive competition. Similarly, Novitasari and Agustia (2023) found that competitive advantage mediates green innovation effects on performance, reinforcing its central importance even when direct innovation links are weaker.

Innovation capability also demonstrates a positive and significant effect on business performance ($\beta = 0.402$, $p = 0.000$), supporting the idea that internal abilities to generate and implement new ideas, processes, and technologies directly enhance operational efficiency, adaptability, and customer responsiveness. This finding is consistent with dynamic capabilities theory, which views innovation capability as essential for sensing opportunities and reconfiguring resources in volatile environments (Teece, 2017). Wijaya et al. (2024) emphasize that innovation capabilities are crucial for improving business performance, especially in resource-constrained settings like Indonesian SMEs. Mu'min et al. (2025) further link technological and dynamic capabilities to green innovation outcomes in Indonesian manufacturing, suggesting parallel mechanisms in the property industry where digital tools like BIM and process improvements yield tangible gains, for many West Java developers, who are often medium-sized and focused on practical enhancements rather than radical changes, strengthening leadership support, learning systems, and resource allocation for innovation proves effective in driving measurable performance improvements.

In contrast, green innovation shows only a positive but statistically insignificant direct effect on business performance ($\beta = 0.116$, $p = 0.273$). This outcome may reflect the specific characteristics of the West Java housing market, where many projects involve subsidized or low-cost housing with tight margins and limited pricing power, making it challenging for green practices such as eco-materials or energy-efficient designs to translate quickly into financial or market gains. According to Takyi et al. (2024a), green innovation practices influence enterprise performance in contextual ways, often requiring complementary factors like dynamic capabilities or market readiness to become significant. In emerging markets, including Indonesia, similar patterns appear where green innovation's impact on performance remains limited without strong integration or external pressures (as seen in studies on Indonesian SMEs, where adoption barriers hinder short-term results). The low adoption rate among REI developers (only 12.4% consistently implement green practices) further suggests that green efforts may currently function more as compliance or reputational tools rather than core performance drivers.

Interestingly, competitive advantage does not significantly moderate the relationships between innovation capability and business performance ($\beta = -0.159$, $p = 0.180$) or between green innovation and business performance ($\beta = -0.143$, $p = 0.123$). The negative direction of these interactions implies that in some cases, a strong competitive position might even slightly weaken the innovation-performance link, possibly because established

advantages reduce the urgency to leverage new innovations aggressively. This contrasts with expectations from prior work where competitive strategy moderates green innovation outcomes positively, but aligns with findings in emerging contexts where moderation is insignificant or context-dependent (Chen & Liu, 2018; Hayat & Qingyu, 2024). Tariq et al. (2019) and Ali et al. (2024) also note that access to finance or other contingencies can alter moderation effects, suggesting that in Indonesia's property sector, with its emphasis on cost control and location competitive advantage, it may operate more directly than as an amplifier of innovation.

These results contribute to theory by highlighting the primacy of competitive advantage and innovation capability in emerging-market property developers, while underscoring the contextual barriers to green innovation's immediate impact. Practically, developers should prioritize building distinctive market positions and internal innovation systems over isolated green initiatives unless supported by clear economic benefits like cost savings or buyer premiums. Managerial implications include focusing on leadership-driven innovation, selective green practices, and aligning efforts with customer-recognized value to maximize performance. Future research could explore longitudinal effects, mediating roles of green absorptive capacity, or comparisons across Indonesian regions to deepen understanding of these dynamics in sustainable housing development.

CONCLUSION

This study confirms that business performance among housing developers affiliated with Real Estate Indonesia (REI) West Java is primarily driven by competitive advantage and innovation capability. Competitive advantage shows the strongest and most significant positive effect, indicating that developers achieve better outcomes when they maintain a distinctive, hard-to-copy market position through reliable delivery, unique product features, and consistent demand strength. Innovation capability also significantly contributes to performance by enabling internal improvements in processes, technology adoption, and adaptability to market changes. In contrast, green innovation has only a positive but insignificant direct influence, suggesting that sustainability efforts have not yet translated into clear short-term performance gains in this context. Furthermore, competitive advantage does not significantly moderate the relationships between innovation capability or green innovation and business performance, implying that these innovation efforts operate more independently and may not be amplified by existing competitive strengths in the current market environment.

The findings carry several practical implications for housing developers in West Java. Companies should prioritize strengthening their competitive positioning through clear differentiation and reliable operations while continuously building internal innovation systems via leadership commitment, employee involvement, and targeted resource allocation. Green innovation should be implemented selectively, focusing on initiatives that offer immediate operational benefits such as cost savings from waste reduction or energy efficiency, rather than broad sustainability programs that may not yield quick returns in cost-sensitive segments. This research has limitations, including its reliance on self-reported data from a purposive sample limited to REI West Java members, the cross-sectional design that prevents causal inference over time, and the focus solely on housing developers without including other property sub-sectors or regions. Future studies could adopt longitudinal approaches to track changes over time, expand the sample to other Indonesian provinces or non-REI developers, explore additional mediators such as green absorptive capacity or organizational culture, and incorporate objective performance metrics like actual sales figures or financial reports to provide a more comprehensive understanding of these dynamics in the property industry.

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