

## Green Innovation for Enhanced Competitiveness and Financial Performance: A Study of Ultra-Micro and Micro Craft Businesses in Indonesia

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### Abstract

*This study investigates the relationship between green innovation, competitiveness, and financial performance in ultra-micro and micro craft businesses in West Java, Indonesia. Using a quantitative exploratory approach, data were collected via structured surveys from 403 craft business units, involving both business owners and managers. The survey employed a Likert scale to assess green innovation, competitiveness, and financial performance. Partial least squares structural equation modeling (PLS-SEM) was used to analyze the data. The findings reveal that business competitiveness mediates the impact of green innovation on financial performance. However, green innovation has no significant effect on financial performance. Additionally, business size significantly moderates the relationship between competitiveness and financial performance, with larger businesses better able to leverage competitive advantages for financial success. The study recommends that craft businesses invest in sustainable practices and scale up operations to enhance their competitiveness and achieve long-term financial growth. These insights are valuable for policymakers and business owners alike.*

**Keywords :** *Green Innovation, Competitiveness, Financial Performance, Business Size, Resource Based View*

## INTRODUCTION

The ultra-micro and micro-scale industries, particularly in developing countries like Indonesia, play a vital role in driving economic growth and employment. These industries form the backbone of Indonesia's economy, contributing significantly to GDP and providing jobs for millions of people. In recent years, the government's emphasis on empowering these sectors has intensified, yet challenges remain, particularly regarding financial performance and sustainability. Previous studies indicate that firms in the ultra-micro and micro sectors often struggle with limited access to capital, inefficient processes, and low competitiveness, which ultimately hinders their financial success (Soesetio et al., 2024b). Globally, small businesses that fail to adapt to evolving market demands, including environmental sustainability, risk losing their competitive edge (Garad & Khalifa, 2024). In Indonesia, where craft industries have strong cultural and economic significance, there is an urgent need to explore innovative strategies like green innovation to enhance both competitiveness and financial outcomes. Addressing this issue is crucial for ensuring the long-term sustainability and success of the ultra-micro and micro craft industries in the increasingly competitive market.

The relationship between green innovation, competitiveness, and financial performance has been well-documented, but it is still evolving, especially in the context of small-scale businesses. Green innovation refers to the implementation of environmentally friendly processes and products, which not only meet regulatory demands but also cater to the growing consumer

preference for sustainable goods. Studies suggest that green innovation enhances competitiveness by improving operational efficiency, reducing costs, and differentiating products in the marketplace (Liu et al., 2024). As competitiveness improves, businesses can capture larger market shares and command higher prices, which positively affects their financial performance. In micro and ultra-micro businesses, these effects are amplified due to the size and flexibility of these enterprises, which allow them to implement innovative practices more swiftly than larger firms. However, the benefits of green innovation on financial performance are not always linear, as certain types of green innovations may offer limited financial returns depending on the firm's strategic orientation and the type of market it serves (Jia & Kassim, 2024). Thus, the relationship between these variables (green innovation, competitiveness, and financial performance) needs further exploration, especially in the craft industry of Indonesia.

This study focuses on business actors in three major craft centers in West Java, Indonesia, which are Cirebon, Tasikmalaya, and Bandung. These regions were selected due to their strong historical and cultural significance in the craft industry and their role in the country's economic growth. West Java is home to numerous ultra-micro and micro enterprises that specialize in traditional crafts, including batik, wood carving, and textile production, which are in high demand both domestically and internationally. However, these businesses face significant challenges related to competitiveness and sustainability in the face of increasing global competition. The choice of these regions is strategic because they represent a blend of cultural heritage and economic potential, making them ideal for investigating how green innovation can improve competitiveness and financial performance. Additionally, previous studies have often focused on larger MSMEs, overlooking the unique challenges and opportunities faced by micro and ultra-micro businesses in this sector. By focusing on West Java, this research provides an opportunity to fill that gap and offer insights that are relevant to a broader spectrum of small-scale enterprises in Indonesia.

While the role of green innovation in enhancing both competitiveness and financial performance has been explored in various sectors, there is a noticeable gap when it comes to the ultra-micro and micro craft industries, especially in Indonesia. Research has shown that green innovation can significantly improve competitiveness by streamlining processes and increasing product quality, which in turn leads to better financial performance (Soesetio et al., 2024a). A study by Guo (2022) stated that green technology innovation can significantly improve company performance, both in terms of financial performance and environmental performance. This study also found that market competitiveness as an intermediary variable also significantly affects company performance. Research conducted by Rezende et al. (2019) found that in the long term, green innovation contributes significantly to improving the financial performance of companies. Shuwaikh et al. (2023) showed that investment in green innovation has a positive impact on financial performance. Studies also suggest that while green innovation tends to improve financial performance, the effects can vary depending on the quality of the innovation and the firm's context (Jia & Kassim, 2024). However, the extent to which these benefits apply to ultra-micro and micro enterprises is still unclear, as smaller businesses may face different challenges compared to their larger counterparts. Thus, this research aims to address these gaps by examining how green innovation influences competitiveness and financial performance in the

context of Indonesia's ultra-micro and micro-scale craft industries, while also considering the moderating role of business size.

Numerous studies have explored the influence of green innovation on financial performance through competitiveness. Novitasari & Agustia (2023) found that competitive advantage positively mediates the influence of green innovation on company performance. Soesetio et al. (2024a) also found that green innovation does not have a direct effect on financial performance but rather through competitiveness. However, a gap remains regarding the examination of business size in moderating the impact of competitiveness on financial performance, particularly in ultra-micro and micro enterprises. The novelty of this study lies in its focus on the ultra-micro and micro craft industries in West Java, an area that has not been widely researched, despite its significant contribution to Indonesia's economy. This research is expected to offer new insights that can help small-scale businesses improve their financial performance through innovative, environmentally sustainable practices. The primary objective of this research is to verify the relationship between green innovation and financial performance through competitiveness and to explore the moderating effect of business size on this relationship. This will be achieved using a mediation model, employing the PLS SEM method. The findings of this study are conducted to provide valuable implications for policymakers, entrepreneurs, and stakeholders in their efforts to empower MSMEs to thrive in a competitive market and adopt green practices.

## RESEARCH METHODS

This study adopted a quantitative exploratory research design, utilizing a survey-based approach to test the proposed hypotheses. According to Creswell (2013), quantitative exploratory research is suitable for identifying relationships between variables. The research involved structured data collection through a questionnaire, which was divided into two main sections: Section A collected demographic data, and Section B utilized a nine-point Likert scale (ranging from 1 = strongly disagree to 9 = strongly agree) to measure the key variables of green innovation, competitiveness, and financial performance. Business size was determined based on the total value of the business's assets. The sample consisted of 403 craft business units located in various regions of West Java Province. This included 369 business owners and 34 managers representing the owners. Given the limited access to technology among some respondents, 103 completed the survey offline during face-to-face interactions, allowing researchers to gather additional qualitative insights where applicable. This dual approach ensured a high response rate and captured diverse perspectives. Financial performance was measured using four items, competitiveness was assessed through six items, and green innovation was evaluated with six items, all of which were adapted from validated scales in previous literature. The content and construct validity of the survey items were reviewed by field experts to ensure alignment with the research objectives. For data analysis, Excel was used for preliminary demographic analysis, while the research hypotheses were tested through partial least squares structural equation modeling (PLS-SEM) using Smart-PLS version 3.0. PLS-SEM was chosen due to its ability to

handle complex models with multiple constructs and small sample sizes, as recommended by Hair et al. (2021).

## RESULTS AND DISCUSSION

### Descriptive Analysis on Participants

Table 1 presents the demographic breakdown of the respondents in terms of gender, age, and education level. Out of the total respondents, 276 (68.49%) are male, while 127 (31.51%) are female. Regarding age distribution, the largest group falls between 31 and 40 years old, comprising 186 respondents (46.15%), followed by 131 respondents (32.51%) aged 30 years or younger. Meanwhile, 82 respondents (20.35%) are in the 51 to 60-year-old range, and a minimal number of respondents 2 individuals or (0.50%) are over 60 years old.

Table 1. Demographic Characteristic

Demographic Factor		Frequency	Percent
Detail	Measurement		
<b>Gender</b>	Male	276	68.49
	Female	127	31.51
<b>Age</b>	≤ 30 years old	131	32.51
	31 – 40 years old	186	46.15
	41 – 50 years old	82	20.35
	51 – 60 years old	2	0.50
	> 60 years old	2	0.50
<b>Education Level</b>	Elementary School (SD/Equivalent)	7	1.74
	Junior High School (SMP/Equivalent)	31	7.69
	Senior High School (SMA/Equivalent)	170	42.18
	Higher Education (Diploma/S1/S2/S3)	195	48.39

Source: secondary data processed, 2024.

In terms of education level, the majority of respondents have completed higher education (Diploma/S1/S2/S3), with 195 individuals (48.39%). Additionally, 170 respondents (42.18%) have completed senior high school (SMA or equivalent), while smaller percentages (7.69%) hold qualifications from junior high school (SMP or equivalent), and 1.74% have completed only elementary school (SD or equivalent). This distribution reflects the diverse educational backgrounds of the craft business owners and managers in the study, emphasizing the varying levels of formal education that may influence business practices and decision-making processes in the craft industry.

### Measurement Model and Hypothesis Testing Result Analysis

Table 2. Factor Loading, Construct Reliability, Validity and Multicollinearity

Variables	Indicators	Factor Loading	Cronbach Alpha	Composite Reliability	AVE	VIF
	FP1	0.902	0.926	0.947	0.818	3.242

<b>Financial Performance</b>	FP2	0.915				3.663
	FP3	0.886				2.923
	FP4	0.915				3.104
<b>Competitiveness</b>	FC1	0.835	0.909	0.932	0.733	2.231
	FC2	0.855				2.487
	FC3	0.856				2.488
	FC4	0.844				2.458
	FC5	0.889				2.945
<b>Green Innovation</b>	GI2	0.717	0.854	0.896	0.634	1.545
	GI3	0.829				1.976
	GI4	0.846				2.254
	GI5	0.828				2.096
	GI6	0.752				1.648

Source: secondary data processed, 2024.

Table 2 displays the findings of the factor loading, cronbach's alpha (CA), composite reliability (CR), average variance extracted (AVE) and variance inflation factors (VIF). The loading factor measures the extent to which a measurement variable contributes to a latent variable; value above the minimum threshold of 0.70, the stronger the relationship between the two (Hair Jr. et al., 2014). Cronbach's alpha and composite reliability are used to evaluate the internal consistency of measurement instruments; values above 0.7 are considered adequate to indicate good reliability. AVE, on the other hand, measures the proportion of variance explained by the latent variable in the measurement variables, with values above 0.5 indicating good convergent validity. Lastly, VIF is used to assess multicollinearity among independent variables; VIF values greater than 10 may indicate strong multicollinearity, which can affect the accuracy of the regression model. By understanding and analyzing these indicators, researchers can ensure that the models used are valid and reliable. The indicators for the financial performance construct display high reliability, as evidenced by Cronbach's alpha values exceeding the accepted threshold of 0.70 and loading factors for all items above 0.70. Similarly, the items measuring competitiveness and green innovation exhibit strong reliability, with Cronbach's alpha values above the commonly accepted threshold of 0.70. The composite reliability values are even higher, suggesting superior internal consistency. The average variance extracted (AVE) values are moderate (above 0.50), indicating that the items adequately capture a substantial proportion of variance within each construct.

Table 3. Discriminant Validity Fornell-Larcker Criterion

<b>Variables</b>	<b>Financial Performance</b>	<b>Competitiveness</b>	<b>Green Innovation</b>
<b>Financial Performance</b>	<b>0.904</b>		
<b>Competitiveness</b>	0.245	<b>0.856</b>	
<b>Green Innovation</b>	0.074	0.265	<b>0.796</b>

Source: secondary data processed, 2024.

To assess discriminant validity, it is essential to compare the correlations between constructs with the square root of the AVE for each construct. Discriminant validity ensures that each construct is distinct from the others in the study. Table 3 presents the results of the measurement model’s validity testing using the Fornell-Larcker criterion. Discriminant validity is typically established by ensuring that the square root of each AVE value is greater than the highest correlation between the construct and other latent variables.

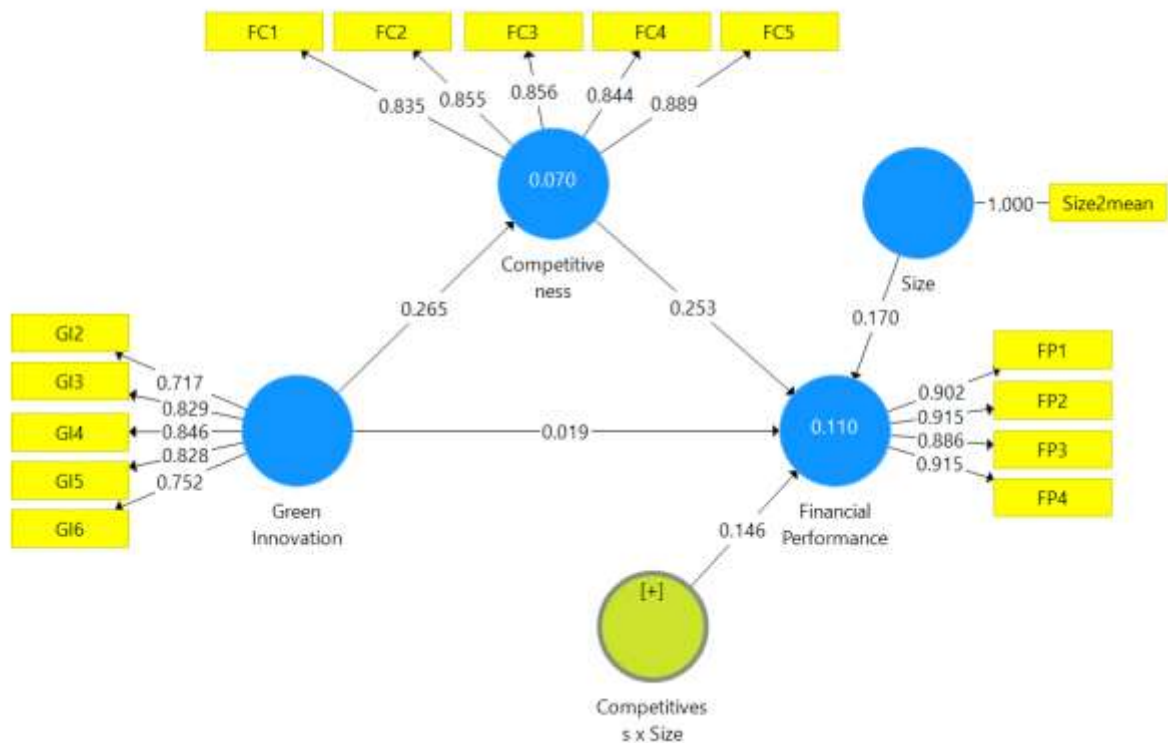


Figure 1. Measurement Model Analysis  
Source: secondary data processed, 2024.

Table 4. Structural Relationship Result

Equations	Coefficient	Standard Deviation	T Statistics	P Values
<b>Green Innovation → Competitiveness</b>	0.265	0.073	3.610	0.000
<b>Competitiveness → Financial Performance</b>	0.253	0.063	4.031	0.000
<b>Green Innovation → Financial Performance</b>	0.019	0.050	0.388	0.698
<b>Green Innovation → Competitiveness → Financial Performance</b>	0.067	0.025	2.628	0.009

<b>Competitiveness x Size → Financial Performance</b>	0.146	0.068	2.149	0.032
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Source: secondary data processed, 2024.

Table 4 presents the results of hypothesis testing for 5 hypotheses proposed, using a significance threshold of  $p < 0.05$ . Based on the data analysis conducted using SmartPLS, four of the proposed hypotheses are supported. The coefficient for the link between green innovation on competitiveness is 0.265, and p value is 0.000, which means that H1 is approved that green innovation has a significant positive value on business competitiveness. This finding suggests that green innovation positively impacts the competitiveness of ultra-micro and micro craft businesses support Tu & Wu (2021). Green innovation can help micro and ultra-micro businesses differentiate themselves in the market, gain new clients, and develop the company's competitiveness (Rodrigues & Franco, 2023). Green innovation not only enhances product value but also promotes operational efficiency by reducing waste and optimizing resource use. Consequently, businesses that invest in green innovation are better positioned to compete, leading to improved market standing and long-term sustainability. As the demand for eco-friendly products grows, the integration of green practices becomes a key driver of competitive advantage in the craft industry.

The link between competitiveness and financial performance produces a coefficient of 0.253 with a p value of 0.000, which means that H2 accepts that competitiveness affects financial performance support Le & Ikram (2022) and Madzimure (2020). This positive relationship suggests that craft ultra-micro and micro businesses that demonstrate higher levels of competitiveness are better positioned to enhance their financial outcomes. Competitiveness allows these businesses to differentiate themselves in the market, attracting more customers, increasing sales, and ultimately improving profitability (Madzimure, 2020). Moreover, competitive businesses tend to adopt more efficient production processes, invest in innovation, and respond more effectively to market demands, all of which contribute to stronger financial performance. Additionally, competitive businesses are more likely to develop stronger brand recognition and customer loyalty, which can lead to sustained revenue growth over time. This is particularly crucial in the craft sector, where the ability to offer unique, high-quality products that stand out in a crowded market is a key determinant of financial success.

The link between green innovation and financial performance yields a coefficient of 0.019 with a p value of 0.698, which means that H3 is rejected, and that product innovation has little bearing on financial performance. This suggests that while green innovation may lead to more sustainable practices or products, it does not immediately translate into improved financial outcomes if this innovation does not improve competitiveness of ultra-micro and micro businesses. This result reject Nurdianti & Sarumpaet (2024), a study of manufacturing companies listed on the Indonesia Stock Exchange that found green process significantly improve financial performance by reducing waste, optimizing resource use, and lowering operational costs. Novitasari & Agustia (2023) explain that without the competitive edge it provides, the financial benefits of green innovation may not be fully realized.

Indirectly, green innovation has a significant positive value on financial performance through competitiveness with a coefficient of 0.067 with a p value of 0.009 which supports H4.

This indicates that while green innovation does not directly boost financial performance, it enhances a firm's competitiveness, which in turn drives financial outcomes. Green innovation can help companies overcome technological barriers, create differentiated products, optimize management systems, and create a good internal and external environment for companies, thereby comprehensively enhancing sustainable competitive advantages (Li et al., 2022). Although green innovation is generally a valuable strategy for business growth and performance improvement, if the innovation cannot create competitiveness, then good financial performance cannot be achieved because the company's competitiveness has a significant impact on financial performance (Le & Ikram, 2022; Madzimore, 2020). The increased competitiveness fostered by innovation eventually leads to better financial performance. This mediation effect underscores the importance of competitiveness as a key factor in realizing the financial benefits of green innovation. For example, in the micro, small, and medium enterprise (MSME) sector, particularly in craft industries, competitiveness has been found to fully mediate the relationship between green innovation and financial performance (Soesetio et al., 2024a).

In addition, size successfully moderates (strengthens) the influence of competitiveness on the financial performance of ultra-micro and micro craft businesses with a coefficient of 0.146 with a p value of 0.032. This result proves that larger firms typically have access to more substantial resources, both financial and human, which allows them to invest more effectively in competitive strategies that drive superior financial performance (Dietrich, 2012). For example, micro enterprises, compared to ultra-micro businesses, benefit more from their competitive advantages as they are more capable of innovating, securing internal financing, and scaling operations, thereby achieving better financial outcomes (Vasconcelos & Oliveria, 2018). As businesses grow, they can achieve economies of scale, reduce per-unit costs, and enhance operational efficiency. Additionally, larger micro businesses tend to have greater market reach, stronger brand recognition, and access to better distribution channels, all of which enable them to compete more effectively. These factors contribute to improving their financial performance, as they can respond more flexibly to market demands, invest in innovation, and adapt to changing consumer preferences. In contrast, ultra-micro businesses may struggle to maintain competitiveness due to limited resources and operational constraints

## CONCLUSION

The findings of this study confirm that green innovation positively affects the competitiveness of ultra-micro and micro craft businesses, which in turn significantly impacts their financial performance. Hypothesis testing shows a strong link between green innovation and competitiveness, indicating that adopting eco-friendly practices and sustainable production methods enables businesses to differentiate themselves in the marketplace, attract environmentally conscious consumers, and comply with regulatory demands. This competitiveness is crucial for craft businesses to thrive in a highly competitive market, particularly as consumer preferences shift towards more sustainable products. While green innovation does not directly improve financial performance (H3), it plays a vital role in enhancing competitiveness, which subsequently drives financial success. This mediation effect



highlights the importance of a competitive edge in translating innovative practices into tangible financial outcomes, suggesting that businesses must prioritize competitiveness to reap the full benefits of green innovation.

In light of these findings, it is recommended that ultra-micro and micro craft businesses invest in green innovations that enhance their competitive advantage, such as adopting sustainable production processes, minimizing waste, and optimizing resource use. Policymakers and business support organizations should focus on creating an enabling environment for these businesses by offering incentives for green practices and providing access to resources that can enhance their competitiveness. Additionally, business owners should recognize the importance of scaling up, as business size was found to moderate the relationship between competitiveness and financial performance. Larger micro enterprises, with their greater access to resources and market reach, are better positioned to capitalize on competitive advantages. Therefore, efforts to expand business scale, such as improving access to financing, training, and market opportunities, will further strengthen the competitiveness and financial performance of these businesses. Overall, fostering green innovation and enhancing competitiveness will help ultra-micro and micro craft businesses achieve long-term sustainability and financial success.

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