

The Influence of Green Knowledge Sharing, Green Innovation, and Green Creativity on the Competitive Advantage of Green MSMEs

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Abstract

The increasing environmental concerns and the demand for sustainable business practices have encouraged green MSMEs to develop strategies that support long-term competitiveness. This study aims to analyze the influence of green knowledge sharing, green innovation, and green creativity on the competitive advantage of Green MSMEs in the Special Region of Yogyakarta. The sample in this study is 100 respondents who are owners or managers of green MSMEs in the Special Region of Yogyakarta, which were determined using purposive sampling techniques. The analysis method used in this study is multiple linear regression analysis. The results show that green knowledge sharing, green innovation, and green creativity have positive and significant effects on the competitive advantage of green MSMEs in the Special Region of Yogyakarta. This study concludes that green knowledge sharing, innovation, and creativity play important roles in strengthening the competitive advantage of green MSMEs. The contribution of this study provides practical insights for green MSMEs to improve sustainable business strategies and supports the development of green entrepreneurship.

Keywords

Competitive Advantage, Green Creativity, Green Innovation, Green Knowledge Sharing.

1. Introduction

The development of green-based Micro, Small, and Medium Enterprises (MSMEs) in the Special Region of Yogyakarta Province (Daerah Istimewa Yogyakarta/DIY) has shown significant growth in recent years. Green MSMEs have become one of the important sectors supporting the implementation of the green economy through environmentally friendly products, such as natural dye batik, eco-prints, nature-based handicrafts, and organic food and beverages. This development is driven by increasing public awareness of environmental issues and growing market demand for sustainable products (Thakkar, 2021; Sumarlin & Nuvriasari, 2024). However, along with this growth, green MSMEs also face increasingly competitive business conditions that require them to develop strategies to maintain their position in the market (Alfarizi & Sari, 2024; Qomariyah & Nuvriasari, 2025).

In a competitive business environment, green MSMEs need to possess a sustainable competitive advantage. Competitive advantage refers to an organization's ability to create greater value than competitors through innovation, operational efficiency, and product or service differentiation (Lin & Chen, 2017; Awwad et al., 2022; Doucouré & Diagne, 2023). For green MSMEs, competitive advantage is not only measured by economic performance but also by the ability to integrate environmental values into business strategies (Kusumaryoko, 2024). Therefore, the development of sustainability-oriented capabilities becomes an important aspect in strengthening the competitiveness of green MSMEs.

One of the strategic resources that can support competitive advantage is green knowledge sharing. Green knowledge sharing refers to the process of exchanging environmentally related knowledge among organizational members regarding sustainable practices, resource management, and efforts to reduce environmental impacts (Lin & Chen, 2017; Pérez & Ramirez, 2025). Effective knowledge sharing enables organizations to improve operational efficiency, enhance learning processes, and encourage the development of environmentally friendly innovations that contribute to competitive advantage (Saleem et al., 2024).

In addition to knowledge sharing, green innovation plays an essential role in creating sustainable competitiveness. Green innovation involves the development of products, processes, technologies, or business models designed to minimize environmental impacts while improving business efficiency (Xie et al., 2019; Alshammari & Alshammari, 2023). Through green innovation, MSMEs can create product differentiation, reduce operational costs, and respond to consumer preferences for sustainable products, thereby strengthening their competitive position in the green market (Muangmee et al., 2021; Jiang et al., 2020).

Furthermore, green creativity is also considered a critical factor in achieving competitive advantage. Green creativity refers to the ability of individuals or organizations to generate creative ideas that are environmentally oriented and support sustainability practices (Jiang et al., 2020; Ding et al., 2023; Agyapong et al., 2024). Creative capabilities enable MSMEs to develop unique solutions and

innovative approaches that are difficult for competitors to imitate, ultimately contributing to sustainable competitive advantage (Setyaningrum et al., 2023; Saleem et al., 2024).

Several previous studies have demonstrated that green knowledge sharing, green innovation, and green creativity positively influence competitive advantage (Xie et al., 2019; Setyaningrum et al., 2023; Saleem et al., 2024). However, previous findings also show inconsistencies, indicating that the influence of these variables may not always be significant, particularly in MSMEs that face limitations in resources, technology, and implementation capacity (Muangmee et al., 2021; Yousaf et al., 2022). This inconsistency indicates the existence of an empirical gap that requires further investigation.

Although the Special Region of Yogyakarta has strong potential as a center for sustainability-based MSMEs, studies examining the role of green knowledge sharing, green innovation, and green creativity in building competitive advantage among green MSMEs in this region remain limited. Therefore, this study offers novelty by integrating these three sustainability-oriented capabilities into a single research model within the context of green MSMEs in DIY. This research aims to analyze the influence of green knowledge sharing, green innovation, and green creativity on the competitive advantage of green MSMEs in the Special Region of Yogyakarta. This research is expected to make an empirical contribution in supporting the implementation of the green economy strategy in Yogyakarta in 2025 and to become a recommendation material for MSME actors in strengthening the competitiveness of sustainability-based businesses.

2. Literature Review and Hypothesis Development

2.1. The Effect of Green Knowledge Sharing on Competitive Advantage

Green knowledge sharing is the process of exchanging environmentally friendly knowledge among individuals within an organization related to sustainable operational practices, resource management, and efforts to minimize the environmental impact of business activities (Chang & Hung, 2021; Pérez & Ramirez, 2025). Green knowledge sharing reflects an organization's ability to distribute, apply, and utilize environmental knowledge to support innovation, improve sustainable performance, and strengthen competitiveness. In the context of MSMEs, effective knowledge sharing enables business actors to understand and implement environmentally responsible practices in their operational activities (Ahmad et al., 2023).

Green knowledge sharing can be measured through indicators such as understanding environmentally friendly business practices, waste and resource management, sharing knowledge related to green technology, environmental impact management, and the application of environmental knowledge in product or process development. As a strategic resource, green knowledge sharing enables MSMEs to

transform environmental knowledge into operational capabilities and sustainable solutions. Effective knowledge-sharing practices improve operational efficiency, enhance green product quality, and create added value that is difficult for competitors to imitate (Saleem et al., 2024). Moreover, green knowledge sharing supports the development of green innovation capabilities and sustainable performance through the exchange and application of environmental knowledge within organizations (Al-Faouri, 2023; Martínez-Falcó et al., 2024). Therefore, green knowledge sharing plays an important role in strengthening the competitive advantage of green MSMEs (Anik & Sulisty, 2021).

H1: Green knowledge sharing has a positive and significant effect on the competitive advantage.

2.2. The Influence of Green Innovation on Competitive Advantage

Green innovation refers to innovations in products, processes, and managerial practices that aim to reduce environmental impacts, improve energy efficiency, and create sustainability value for organizations (Alshammari & Alshammari, 2023; Xie et al., 2019). Green innovation reflects an organization's efforts to integrate environmentally friendly principles into business operations and strategic decision-making. In the context of green MSMEs, innovation becomes an important capability to respond to environmental challenges while maintaining business competitiveness.

Green innovation can be measured through several indicators, including environmentally friendly product innovation, energy-efficient production process innovation, waste and emission reduction, the use of recycled materials, the implementation of clean technology, and the development of green services (Muangmee, 2021; Nassani et al., 2022). Through the implementation of green innovation, MSMEs can improve resource efficiency, reduce operational costs, and develop products that align with increasing consumer preferences for sustainable products. Furthermore, green innovation contributes to competitive advantage by creating product differentiation, enhancing operational effectiveness, and generating sustainable value that strengthens market position (Baeshen et al., 2021).

Green innovation enables MSMEs to produce environmentally friendly products with unique characteristics and added value that are difficult for competitors to imitate (Xie et al., 2019; Muangmee et al., 2021). Green innovation also strengthens competitive advantage by improving environmental performance and supporting sustainable business practices (Novitasari & Agustia, 2023; Zhu et al., 2023). Therefore, green innovation is considered a key factor in developing competitive advantage among green MSMEs. Therefore, green innovation is considered a key factor in developing competitive advantage among green MSMEs.

H2: Green innovation has a positive and significant effect on the competitive advantage.

2.3. The Influence of Green Creativity on Competitive Advantage

Green creativity refers to the ability of individuals or organizations to generate creative ideas that are sustainability-oriented and environmentally friendly (Jiang et al., 2020; Ding et al., 2023). Green creativity reflects an organization's capability to encourage the development of innovative ideas that support sustainability, create environmental value, and improve green performance (Song et al., 2020). In the context of green MSMEs, creativity plays an important role in responding to environmental challenges and developing unique business strategies.

Green creativity can be measured through several indicators, including creative ideas related to environmentally friendly products, the ability to creatively solve environmental problems, the development of green product designs, the creation of processes that support sustainability, and the effectiveness of implementing green solutions (Saleem et al., 2024). Through green creativity, MSMEs can generate unique environmental-based ideas and solutions that are difficult for competitors to imitate. This capability enables businesses to develop product and process differentiation, improve sustainability practices, and strengthen their competitive position in the market (Jiang et al., 2020; Ding et al., 2023; Setyaningrum et al., 2023).

Green creativity also helps firms transform environmental knowledge and ideas into green solutions that are valuable, difficult to imitate, and capable of creating sustainable competitive advantage. Previous studies indicate that green creativity contributes to improving green innovation capability and strengthens firms' ability to achieve environmental and market advantages (Shafiq et al., 2023; Zhang, 2024). Therefore, green creativity becomes an important strategic resource that supports the creation of sustainable competitive advantage. Various studies have confirmed that green creativity is a significant predictor of competitive advantage in green MSMEs.

H3: Green creativity has a positive and significant effect on the competitive advantage.

The suggested study paradigm, which looks at how green knowledge sharing, green innovation, and green creativity affect competitive advantage, is shown in Figure 1. According to the model, there are three positive linkages that should increase competitive advantage: green knowledge sharing (H1), green innovation (H2), and green creativity (H3). This suggests that companies are more likely to achieve greater competitive performance if they have stronger innovation skills, improved knowledge exchange, and more inventive approaches to environmental practices.

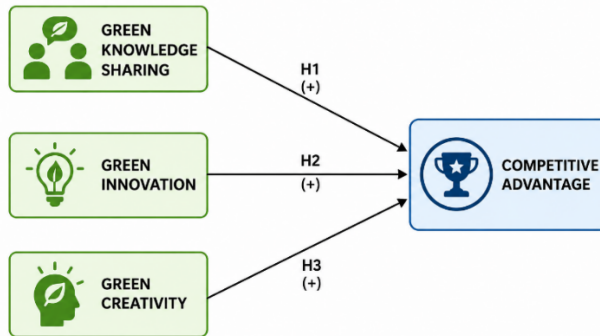


Figure 1. Research Framework

3. Methods

This research is a quantitative investigation that employs numerical information and statistical methods to explore the connections between different variables. It falls under the explanatory category, aimed at elucidating the cause-and-effect dynamics and evaluating hypotheses (Sugiyono, 2016). The study was conducted among green MSMEs located in the Special Region of Yogyakarta, utilizing primary data obtained through questionnaires distributed to the owners or managers of these enterprises, while secondary data was collected from official documents and related publications. The population for this research encompasses all owners or managers of green MSMEs within the Special Region of Yogyakarta, which is limitless. A non-probability sampling method was implemented, specifically purposive sampling, resulting in a sample of 100 respondents who met the predetermined criteria of having been operational for a minimum of three years and producing products that are environmentally sustainable.

The tool used for gathering data was a questionnaire that employed a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). This questionnaire included statements aimed at assessing the variables of green knowledge sharing (X1), green innovation (X2), green creativity (X3), and competitive advantage (Y). The specific definitions of the variables in this research are as follows: Green knowledge sharing refers to the exchange of eco-friendly knowledge among individuals within the organization (Pérez & Ramirez, 2025). Green innovation involves the creation of sustainable products, processes, and management practices (Xie et al., 2019; Alshammari & Alshammari, 2023). Green creativity signifies the capacity to generate ideas focused on sustainability, and competitive advantage is defined as the ability of firms to achieve greater value than their rivals through differentiation and operational efficiency (Barney, 1991; Jiang et al., 2020; Awwad et al., 2022; Saleem et al., 2024).

The evaluation of the research instrument encompasses both validity and reliability assessments using SPSS. The validity assessment employs the product-

moment correlation method, where an item is considered valid if the computed r value exceeds the table value of r (0.196) and achieves a significance level of less than 0.05. The reliability assessment applies Cronbach's Alpha, which has a threshold of 0.60; the tool is deemed reliable when the Cronbach's Alpha figure is greater than 0.60. Additionally, a classical assumption analysis was conducted that included a normality assessment using the Kolmogorov-Smirnov test, a multicollinearity evaluation via the Variance Inflation Factor (VIF) and Tolerance, and a heteroscedasticity assessment through the Glejser approach. The data analysis technique used was multiple linear regression analysis with the equation $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$. Hypothesis testing was carried out with a partial t -test at a significance level of 0.05, while the determination coefficient (R^2) was used to find out how much contribution independent variables make in explaining dependent variables.

4. Results

Before delving into the results of hypothesis testing, this research initially reveals the outcomes associated with the impact of environmental knowledge exchange, eco-friendly innovation, and environmental creativity on competitive edge. The study was carried out to assess how much internal resources focused on sustainability enhance the competitiveness of environmentally conscious MSMEs in the Special Region of Yogyakarta. Each hypothesis is discussed by contrasting the empirical results of this research with prior studies to analyze the alignment of the findings and to offer a more thorough comprehension of the connection between the variables.

Table 1. Validity & Reliability Test

Variable	Statement	r Count	r Table	Significance	Cronbach Alpha	Remarks
Green Knowledge Sharing	X1.1	0.813	0.1966	0.000	0.799	Valid & Reliable
	X1.2	0.774				
	X1.3	0.761				
	X1.4	0.774				
	X1.5	0.709				
	X1.6	0.412				
Green Innovation	X2.1	0.822	0.1966	0.000	0.809	Valid & Reliable
	X2.2	0.829				
	X2.3	0.789				
	X2.4	0.791				
	X2.5	0.805				
	X2.6	0.288				
Green Creativity	X3.1	0.550	0.1966	0.000	0.697	Valid & Reliable
	X3.2	0.607				
	X3.3	0.655				

Variable	Statement	r Count	r Table	Significance	Cronbach Alpha	Remarks
Competitive Advantage	X3.4	0.739	0.1966	0.000	0.691	Valid & Reliable
	X3.5	0.670				
	X3.6	0.555				
	Y.1	0.633				
	Y.2	0.654				
	Y.3	0.693				
	Y.4	0.676				
	Y.5	0.664				
	Y.6	0.576				

The validity test results presented in Table 1 show that all questionnaire items for the variables green knowledge sharing, green innovation, green creativity, and competitive advantage have an r count value greater than the r table value of 0.1966 and a significance value (p) below 0.05. These findings indicate that all items used in the questionnaire are valid and appropriate as research instruments. Furthermore, the reliability test results show that the Cronbach's Alpha values for all variables exceed the minimum threshold of 0.60, indicating that the measurement instruments are consistent and reliable for use in this study.

Table 2. Normality Test

One-Sample Kolmogorov-Smirnov Test	Unstandardized Residual
N	100
Normal Parameters	
Mean	0.0000000
Std. Deviation	1.57491131
Most Extreme Differences	
Absolute	0.062
Positive	0.062
Negative	-0.049
Test Statistic	0.062
Asymp. Sig. (2-tailed)	0.200
Monte Carlo Sig. (2-tailed)	0.444
99% Confidence Interval	
Lower Bound	0.431
Upper Bound	0.457

The normality test results presented in Table 2 show that the residual data in this study are normally distributed. The One-Sample Kolmogorov-Smirnov test produces a test statistic value of 0.062 with an Asymp. Sig. (2-tailed) value of 0.200, which is greater than 0.05. In addition, the Monte Carlo Sig. (2-tailed) The value of 0.444 also exceeds the significance level of 0.05. These results indicate that the

residuals meet the normality assumption, meaning the data are suitable for further statistical analysis.

Table 3. Multicollinearity & Heteroskedasticity Test

Variable	Tolerance	VIF	Sig.
Green Knowledge Sharing	0.979	1.021	0.735
Green Innovation	0.977	1.023	0.500
Green Creativity	0.978	1.022	0.152

The test results presented in Table 3 indicate that all independent variables have met the multicollinearity assumption. The tolerance values for green knowledge sharing, green innovation, and green creativity are above 0.10, while the VIF values are below 10.00, indicating that there is no correlation between independent variables and no multicollinearity problem in the regression model. Furthermore, the Glejser test results show that the significance values for green knowledge sharing (0.735), green innovation (0.500), and green creativity (0.152) are all greater than 0.05. These findings confirm that the regression model does not have heteroscedasticity problems and is appropriate for further analysis.

Table 4. Multiple Linear Regression

Variable	B	Std. Error	Beta	t-statistics	Sig.	Conclusion
Constant	3.477	2.001	—	1.738	0.085	-
Green Knowledge Sharing	0.211	0.053	0.272	4.007	0.001	Accepted
Green Innovation	0.231	0.048	0.328	4.831	0.001	
Green Creativity	0.441	0.052	0.577	8.487	0.001	

The results of the multiple linear regression analysis presented in Table 4 show that the regression model is expressed as $Y = 3.477 + 0.211X_1 + 0.231X_2 + 0.441X_3 + e$. The constant value of 3.477 indicates that when green knowledge sharing, green innovation, and green creativity are assumed to be zero, the competitive advantage value remains at 3.477. All independent variables have positive regression coefficients, indicating that improvements in these factors contribute to an increase in the competitive advantage of green MSMEs.

The partial test results in Table 4 demonstrate that green knowledge sharing has a positive and significant effect on competitive advantage, with a t-statistic of 4.007 and a significance value of 0.001 (<0.05). Similarly, green innovation also shows a positive and significant influence, with a t-statistic of 4.831 and a significance value of 0.001. These findings indicate that effective knowledge exchange related to environmental practices and the implementation of green innovations can strengthen the ability of MSMEs to compete in the market.

Furthermore, green creativity has the strongest influence among the independent variables, as shown by the highest regression coefficient (0.441) and t-

statistic (8.487) with a significance value of 0.001. This result confirms that the ability of MSMEs to generate creative ideas, environmentally friendly products, and sustainable processes plays an important role in improving competitive advantage. Therefore, all hypotheses are accepted, as green knowledge sharing, green innovation, and green creativity significantly contribute to the competitive advantage of green MSMEs in the Special Region of Yogyakarta.

Table 5. Determination Coefficient

Measurement	Value
R	0.752
R Square	0.566
Adjusted R-Square	0.553
Std. Error of the Estimate	1.599

The results of the determination coefficient test presented in Table 5 show that the regression model has an R-Square value of 0.566 and an Adjusted R-Square value of 0.553. This indicates that the variables green knowledge sharing, green innovation, and green creativity are able to explain variations in competitive advantage by 55.3%. Meanwhile, the remaining 44.7% of competitive advantage is influenced by other factors outside the variables examined in this study. The R value of 0.752 indicates that the relationship between the independent variables and competitive advantage is relatively strong. Therefore, the model demonstrates that green knowledge sharing, green innovation, and green creativity provide a substantial contribution in explaining the competitive advantage of green MSMEs.

5. Discussion

The first hypothesis testing results show that green knowledge sharing has a positive and significant effect on the competitive advantage of green MSMEs in the Special Region of Yogyakarta. This finding indicates that the exchange of environmentally friendly knowledge among MSME actors can improve business capabilities and strengthen competitiveness. The descriptive analysis shows that the green knowledge sharing variable obtained an average score of 3.89, which is categorized as high, with the dominant indicator being the belief that knowledge sharing contributes to the success of environmentally friendly businesses. This result is consistent with the findings of Lin and Chen (2017), who explained that knowledge sharing supports organizational performance by improving learning capabilities and knowledge utilization. Furthermore, Saleem et al. (2024) and Pérez and Ramirez (2025) found that green-oriented knowledge exchange can become a strategic resource that enhances efficiency and creates sustainable value, which aligns with the results of this study.

The second hypothesis testing results indicate that green innovation has a positive and significant effect on the competitive advantage of green MSMEs in the

Special Region of Yogyakarta. This result demonstrates that implementing environmentally friendly innovations enables MSMEs to improve efficiency, differentiate their products, and respond to market demands related to sustainability. The descriptive analysis shows that green innovation achieved an average score of 3.97 (high category), with the highest indicator being the ability of production processes to reduce waste. These findings support previous research by Xie et al. (2019), which stated that green innovation enhances competitiveness through environmental improvements and product differentiation. Similar conclusions were also reported by Muangmee et al. (2021) and Alshammari and Alshammari (2023), who found that green innovation contributes to competitive advantage by encouraging sustainable practices and operational improvements.

The third hypothesis testing results reveal that green creativity has a positive and significant effect on competitive advantage, with the strongest influence compared to other variables. This indicates that the ability of MSMEs to generate environmentally oriented ideas and creative solutions plays an important role in creating sustainable competitiveness. Based on the descriptive analysis, green creativity obtained an average score of 3.95 (high category), with the dominant indicator being the promotion of environmentally friendly ideas to other parties. This finding strengthens the results of Jiang et al. (2020), who stated that green creativity encourages organizations to develop unique solutions that are difficult for competitors to imitate. In addition, the findings are in line with Ding et al. (2023), Setyaningrum et al. (2023), and Saleem et al. (2024), which emphasize that green creativity contributes to innovation capability and long-term competitive advantage.

The findings confirm that green knowledge sharing, green innovation, and green creativity are important factors in increasing the competitive advantage of green MSMEs. The determination coefficient results show that these three variables simultaneously explain 55.3% of the variation in competitive advantage, while the remaining percentage is influenced by other factors outside this research model. These results support the Resource-Based View (RBV) theory, which explains that valuable, rare, and difficult-to-imitate resources, including sustainability-oriented knowledge, innovation, and creativity, can become strategic assets in building long-term competitive advantage.

6. Conclusion

Based on the results of this study, it can be concluded that green knowledge sharing, green innovation, and green creativity have a positive and significant effect on the competitive advantage of green MSMEs in the Special Region of Yogyakarta. Green knowledge sharing contributes to strengthening competitiveness through the exchange of environmentally friendly knowledge and practices among business actors. Green innovation improves competitive advantage by encouraging the development of sustainable production processes, waste reduction, and

environmentally friendly product improvements. Furthermore, green creativity becomes an important factor in creating unique ideas, solutions, and innovations that support the long-term competitiveness of green MSMEs.

This study provides practical implications for green MSME actors by emphasizing the importance of developing sustainability-based resources, particularly knowledge sharing, innovation, and creativity. MSME owners are encouraged to build a culture of sharing environmental knowledge, adopt green business practices, and continuously develop creative solutions to respond to market changes and sustainability demands. These findings also support the Resource-Based View (RBV) perspective, which highlights that valuable and difficult-to-imitate resources can become strategic advantages for businesses.

However, this study has several limitations. The research sample has not been proportionally classified based on business scale categories, including micro, small, and medium enterprises, so future studies are recommended to apply proportional sampling techniques to obtain more representative results. In addition, the independent variables in this study explain 55.3% of competitive advantage, indicating that other factors may contribute to MSME competitiveness. Therefore, future research is suggested to include additional relevant variables, such as green organizational culture, digital capability, or sustainability orientation, to provide a more comprehensive model.

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