

Analysis of Green Creativity and MSMEs Performance with Green Innovation as Mediating

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Abstract

This research examines the influence of green creativity and MSMEs performance with green innovation as a mediating variable among MSMEs in Bantul Regency. The study population comprised MSMEs in Bantul Regency, with samples selected using nonprobability sampling through a purposive sampling approach. Data were collected via questionnaires from 56 MSMEs respondents. The relationships between variables were tested and analyzed using Partial Least Square - Structural Equation Modeling (PLS-SEM). The findings reveal that green creativity positively influences financial performance, although it shows no significant effect on environmental performance. However, the study demonstrates that green innovation positively and significantly mediates the relationship between green creativity and both environmental and financial performance. Regarding the implementation of green creativity, the author suggests that companies enhance the application of new environmentally friendly ideas to support sustainable environmental goals. SMEs are encouraged to continuously develop new ideas, such as combining materials with natural fibers in leather crafts or using leaves in the production of dyes.

Keywords: Green Creativity, Green Innovation, Environmental Performance, Financial Performance



INTRODUCTION

Environmental sustainability issues have emerged as a crucial focus for industry practitioners and academics, as industrial activities present substantial environmental challenges (Kraus, Burtscher, Vallaster, & Angerer, 2018). The presence of MSMEs in a region can accelerate development and contribute to the improvement of the local economy. However, the expansion of industrial activities also has the potential to create new environmental challenges. Increased productivity can result in byproducts, including waste, which may negatively impact the surrounding environment.

The implementation of *Sustainable Development Goals* in 2016 established a framework for directing global sustainability initiatives (Darus, Mohd Zuki, & Yusoff, 2020). Goal 12 of the SDGs, which focuses on sustainable consumption and production patterns, has motivated Indonesian companies to implement environmentally conscious operating practices. However, the implementation of these SDG initiatives remains limited among businesses, primarily due to insufficient resource management awareness and budgetary constraints (Faqihah M Itsnaini, 2021).

Green creativity, characterized by the generation of novel ideas for environmentally sustainable products and processes, serves as the foundation for green innovation. Organizations demonstrating high levels of creativity tend to develop stronger competitive advantages and positive customer perceptions, leading to enhanced operational efficiency and profitability (Agyapong et al., 2024; Kraus et al., 2018). Green innovation comprises the development of new products and processes with environmental orientation (Wahyuni Sappali, Kuntadi, Luki Karunia, STIA LAN Jakarta, & Author Winda Wahyuni Sappali, 2023). Empirical research indicates that creativity influences organizational performance both directly and indirectly through green innovation (Agyapong et al., 2024; Chen & Chang, 2013). Studies conducted by Ma (2022) and Song & Yu (2018) confirm significant relationships between green creativity and green innovation, while Weng (2015) demonstrate that innovative environmental practices enhance business performance.

The Special Region of Yogyakarta, particularly Bantul Regency, faces considerable waste management challenges, generating 158,430.04 tons of annual waste. According to BPS data (2023), MSMEs in Bantul are distributed across various sectors: 38% in food production, 35% in general crafts, 14% in chemicals and building materials, with the remainder in metals, services, clothing, and leather industries. While Bantul has received recognition for its waste management efforts through the Adipura certificate, maintaining consistent implementation remains challenging due to resource limitations.

In the context of sustainability and the development of MSMEs in Bantul Regency, it is important to explore the relationship between green creativity, green innovation, and the performance of MSMEs. Issues emerge regarding whether green creativity can influence the environmental and financial performance of MSMEs. Additionally, it is necessary to investigate whether green creativity contributes to the enhancement of green innovation in the operational practices of MSMEs. On the other hand, green innovation itself needs to be analyzed to understand its impact on the environmental and financial performance of MSMEs. Furthermore, it is essential to

comprehend whether green innovation can serve as a mediator linking green creativity with environmental and financial performance.

By addressing these questions, this research fills a critical gap in understanding the relationship between green creativity and green innovation, as well as their impact on environmental and financial performance in MSMEs in Bantul Regency. It provides valuable insights into optimizing MSMEs performance. This study helps MSMEs maximize production and achieve more profitable performance while remaining environmentally friendly. Furthermore, it serves as a foundation for future research exploring the connection between eco-friendly creative thinking and MSMEs performance across various contexts and sectors in Indonesia.

LITERATURE REVIEW

MSMEs Performance

MSMEs performance plays a crucial role in driving development and progress in a complex and competitive business environment. Sustainable performance is the primary goal of every company, as it enables them to adapt to various challenges and achieve effective and efficient outcomes. Therefore, MSMEs performance assessment and measurement are essential for companies seeking to enhance their operations and maintain competitiveness in the global market (Taouab & Issor, 2019). (Agyapong et al., 2024) identifies at least two key dimensions about MSMEs performance: 1) Environmental performance, according to (Kamila Ramadhani, Saputra, & Wahyuni, 2022) environment performance refers to a company's assessment of its efforts in environmental empowerment and awareness, both within its operational areas and beyond; and 2) Financial performance, according to (Süreyya YILMAZ ÖZEKENCİ, 2024) financial performance refers to the evaluation of a company's ability to generate profits and manage its financial assets effectively over a specific period. This evaluation plays a significant role not only for current and potential managers, creditors, and investors but also for other companies within the same sector.

Green Creativity

Green creativity theory primarily examines as the creation of original concepts that promote the development of environmentally friendly products, services, processes, and practices (Chen & Chang, 2013). Green creativity can emerge from a company's internal willingness and capability to generate new ideas, methods, promotions, implementations, evaluations, and solutions that align with environmental objectives while maintaining business performance (Agyapong et al., 2024; Li Ma, Azhar Ali, Mohsin Shahzad, 2022). (Agyapong et al., 2024) evaluated five forms of green creativity: (1) new green ideas, (2) new methods and processes, (3) the ability to drive and promote new eco-friendly ideas, (4) the initiation and implementation of new eco-friendly ideas, and (5) the evaluation of new green ideas.

Green Innovation

Green innovation refers to the application of innovative and modern technology designed to enhance the efficiency of processes and products by reducing energy consumption, preventing pollution, and conserving natural resources (Xie, Hoang, & Zhu, 2022). In recent years, green

innovation has gained widespread attention from the academic community, driven by the increasing scarcity of resources, growing environmental concerns, and significant ecosystem changes (Kawai, Strange, & Zucchella, 2018). ((Chen, 2008; Chiou et al., 2011; Weng dan Lin, 2008) categorize green innovation as two types: green product innovation and green process innovation. Based on this classification, there are six form of green innovation: (1) Selection of environmentally friendly materials (2) Efficiency in material usage (3) Consideration of product composition (4) Reduction of hazardous substance emissions (5) Energy consumption efficiency (6) Reduction in raw material usage.

METHOD

This study aims to empirically examine the impact of green creativity on environmental and financial performance, with green innovation as a mediating factor in MSMEs in Bantul Regency. A quantitative approach is employed, the data analysis technique used in this research is descriptive data analysis. A questionnaire is a set of written questions in which respondents are asked to provide their answers, usually with clearly predefined options (Uma Sekaran and Roger Bougie, 2013). The Likert scale is used to measure the extent to which a subject agrees or disagrees. The questionnaire is designed using a 1-5 scale to obtain interval-scale data (Uma Sekaran and Roger Bougie, 2013).

In this study, descriptive analysis is used to identify and analyze the characteristics of MSMEs, including the business name, the age of the MSMEs with a minimum operational period of two years, and a minimum of one employee. The goal is to generate data that aligns with the criteria and needs of the research (Uma Sekaran and Roger Bougie, 2013). This study uses purposive sampling, where samples are selected based on the criteria of the studied variables. In data analysis for research, researchers use tools to explore the relationships between MSME performance, green creativity, and green innovation as mediating. This study uses Partial Least Squares Structural Equation Modeling (PLS-SEM), which is a non-parametric method for structural equation modeling. PLS-SEM path analysis does not have restrictions on sample size and is better at handling non-normal data compared to other SEM methods (Hair et al., 2020).

ANALYSIS AND DISCUSSION

Respondent Description

This research focuses on Micro, Small, and Medium Enterprises (MSMEs) located in Bantul Regency, Special Region of Yogyakarta, that fulfill specific qualifications. The selected MSMEs have implemented green practices, such as environmental synergy efforts, and have carried out wastewater treatment, which is particularly important for those that are still using synthetic dyes, through the installation of wastewater treatment plants (IPAL). In addition to that, these businesses have adopted the 3R principles, which consist of reuse, reduce, and recycle.

The other criteria used to determine the eligibility of MSMEs for this study include having operated for a minimum period of two years, maintaining complete financial records, and employing at least one worker. Based on direct field observations conducted by the researchers,

there were 56 MSMEs identified that met all of these criteria and were thus included in the research sample.

Table 1. MSMEs Description

MSMEs Characteristic	Category	Total	Percentage
Business age	2-4 years	2	3.57
	>4-6 years	7	12.5
	>6 years	47	83.93
	Total	56	100
Number of employees	<5 person	20	35.71
	5-19 person	22	39.29
	20-99 person	14	25
	Total	56	100
Green Practice	Natural Dyes	9	16.07
	IPAL	5	8.93
	3R	19	33.93
	Natural Dyes & IPAL	2	3.57
	IPAL & 3R	5	8.93
	Natural Dyes & 3R	6	10.71
	Natural Dyes, IPAL, & 3R	10	17.86
Total	56	100	

Sources: Primary data processed, 2025

MSMEs in Bantul Regency with an operational age of more than six years dominate at 83.93%, while those aged between two and six years account for only 16.07%. In terms of the number of employees, most MSMEs have fewer than 20 employees (75%), with the majority falling within the range of five to 19 employees (39.29%). Meanwhile, in the implementation of green practices, 33.93% of MSMEs apply the 3R principle, 16.07% use natural dyes, and 8.93% utilize wastewater treatment plants (IPAL). Some MSMEs combine multiple green practices, with 17.86% implementing natural dyes, IPAL, and 3R simultaneously.

Validity and Reliability Test

To determine whether the questionnaire is valid, this study employs a validity test. Validity is measured using the Average Variance Extracted (AVE) value for each variable. The test is considered significant if the construct value is above 0.50 (Hair, Joseph F. & Hult, G. Tomas M., Ringle, Christian M. Sarstedt, 2020).

After conducting a trial with 56 participants, the researcher obtained results through the Cronbach's alpha test, as shown in Table 2. above. The obtained value was above 0.70, indicating that the constructs used are reliable. Therefore, the validity test results for the green creativity, green innovation, environmental performance, and financial performance variables confirm that these variables are both valid and reliable for use in this study.

Based on Table 2, all variables meet validity criteria with AVE values above 0.50, including Green Creativity (0.677), Green Innovation (0.579), Environmental Performance (0.647), and Financial Performance (0.737) (Hair, 2020). Additionally, reliability is confirmed as all Cronbach's Alpha values exceed 0.70, ranging from 0.817 to 0.881. Thus, the questionnaire is both valid and reliable for this study.

Table 2. Validity and Reliability Test

Variable	AVE	Cronbach's alpha
Green Creativity (GC)	0.677	0.880
Green Innovation (GI)	0.579	0.854
Environment Performance (EP)	0.647	0.817
Financial Performance (FP)	0.737	0.881

Sources: Primary data processed, 2025

Coefficient of Determination (R^2)

The purpose of the inner model test is to predict the relationship between variables. R-Square values of 0.75, 0.50, and 0.25 indicate whether the model is strong, moderate, or weak, respectively (Hair, Joseph F. & Hult, G. Tomas M., Ringle, Christian M. Sarstedt, 2020). The R-Square results are presented in Table 3. A value close to 1 indicates that the independent variable effectively predicts the dependent variable. Based on Table 3, the R-square values for green innovation (0.567), financial performance (0.500), and environmental performance (0.527) are all moderate. (Hair, Joseph F. & Hult, G. Tomas M., Ringle, Christian M. Sarstedt, 2020) state that in social research, an R^2 of 0.50 is strong, as social phenomena are influenced by many uncontrollable factors, making this value sufficient to indicate a well-fitting model.

Table 3. Validity and Reliability Test R-square (R^2)

Variable	R-square
Green Innovation (GI)	0.567
Environment Performance (EP)	0.527
Financial Performance (FP)	0.500

Sources: Primary data processed, 2025

Hypothesis Testing

The inner model test assesses the impact of the independent variable on the dependent variable. In this study, a hypothesis is considered acceptable if it meets the following criteria ((Hair, Joseph F. & Hult, G. Tomas M., Ringle, Christian M. Sarstedt, 2020): 1) In the context of statistical testing, a hypothesis is accepted if the t-statistic > 1.96 for a 5% alpha level. 2) Meanwhile, in probability testing, the hypothesis is accepted if the p-value < 0.05 .

The inner model test is conducted to evaluate the influence of independent variables on the dependent variable. This analysis is essential in determining whether the hypothesized relationships within a research model hold true based on empirical data. In the context of this

study, the validity of each hypothesis is assessed through specific statistical and probability criteria.

A hypothesis is deemed acceptable if it fulfills the following requirements: first, based on statistical testing, the t-statistic must exceed 1.96 at a 5% significance level. Second, from a probability standpoint, the p-value should be less than 0.05. Meeting these criteria indicates that the relationship between variables is statistically significant, thereby supporting the proposed hypothesis (Hair, Joseph F. & Hult, G. Tomas M., Ringle, Christian M. Sarstedt, 2020).

Table 4. Direct Effect Result (Path Coefficient)

Variable	T-Statistic	P-Value
Green Innovation (Z) → Finance Performance (Y2)	3.378	0.001
Green Innovation (Z) → Environment Performance (Y1)	4.579	0.000
Green Creativity (X) → Green Innovation (Z)	6.415	0.000
Green Creativity (X) → Finance Performance (Y2)	3.054	0.002
Green Creativity (X) → Environment Performance (Y1)	1.054	0.292

Source: Primary data processed, 2025

Table 5. Indirect Effect Result

Variable	T-Statistic	P-Value
Green Creativity (X) → Green Innovation (Z) → Finance Performance	2.757	0.006
Green Creativity (X) → Green Innovation (Z) → Environment Performance	3.377	0.001

Source: Primary data processed, 2025

There are seven tests as follows:

Hypothesis 1: The Influence of Green Creativity on Environmental Performance

Table 4. shows that green creativity does not have a significant effect on environmental performance, with t-statistic of 1.054 (< 1.96), and a p-value of 0.292 (> 0.05). Based on this test result, green creativity is not significantly influential, as indicated by the t-statistic and p-value. Therefore, Hypothesis 1, which states that green creativity has a significant positive effect on environmental performance, is rejected/not supported.

Hypothesis 2: The Influence of Green Creativity on Financial Performance

Table 4. shows that green creativity has a significant positive effect on financial performance, with a t-statistic of 3.05 (> 1.96) and a p-value of 0.002 (< 0.05). Therefore, Hypothesis 2, which states that green creativity has a significant positive effect on financial performance, is accepted/supported.

Hypothesis 3: The Influence of Green Creativity on Green Innovation

Table 4. shows that green creativity has a significant positive effect on green innovation, with a t-statistic of 6.41 (> 1.96) and a p-value of 0.000 (< 0.05). Therefore, Hypothesis 3, which states that green creativity has a significant positive effect on green innovation, is accepted/supported.

Hypothesis 4: The Influence of Green Innovation on Environmental Performance

Table 4. shows that green innovation has a significant positive effect on environmental performance, with a t-statistic of 4.57 (> 1.96) and a p-value of 0.000 (< 0.05). Therefore, Hypothesis 4, which states that green innovation has a significant positive effect on environmental performance, is accepted/supported.

Hypothesis 5: The Influence of Green Innovation on Financial Performance

Table 4. shows that green innovation has a significant positive effect on financial performance, with a t-statistic of 3.37 (> 1.96) and a p-value of 0.001 (< 0.05). Therefore, Hypothesis 5, which states that green innovation has a significant positive effect on financial performance, is accepted/supported.

Hypothesis 6: The Influence of Green Creativity on Environmental Performance through Green Innovation

Table 5. shows that the t-statistic is 3.37 (> 1.96) and the p-value is 0.001 (< 0.05). Therefore, Hypothesis 6, which states that green innovation mediates the relationship between green creativity and environmental performance, is accepted/supported.

Hypothesis 7: The Influence of Green Creativity on Financial Performance through Green Innovation

Table 5. shows that the t-statistic is 2.75 (> 1.96) and the p-value is 0.006 (< 0.05). Therefore, Hypothesis 7, which states that green innovation mediates the relationship between green creativity and financial performance, is accepted/supported.

Discussion

The findings of this study highlight the complex relationship between green creativity, green innovation, environmental performance, and financial performance in MSMEs in Bantul. While green creativity is being increasingly adopted, its direct impact on environmental performance remains statistically weak. This suggests that while some businesses are making efforts towards sustainability, their initiatives lack the effectiveness and consistency needed to create a significant impact. To strengthen this connection, MSMEs must refine their green creativity strategies and ensure better implementation.

On the other hand, green creativity demonstrates a strong and positive effect on financial performance. By fostering eco-friendly product development and cost-efficient processes, MSMEs can enhance their financial outcomes. This aligns with previous research (Agyapong et

al., 2024; Kalyar, Shoukat, & Shafique, 2020), which emphasizes the role of green creativity in driving unique and valuable offerings that contribute to profitability. Similarly, green creativity positively influences green innovation, reinforcing the idea that businesses that generate eco-friendly ideas are more likely to create innovative solutions that drive sustainability and performance improvements (Agyapong et al., 2024; Song & Yu, 2018).

Furthermore, green innovation emerges as a crucial factor in improving both environmental and financial performance. The study confirms that MSMEs that embrace green innovation can significantly enhance their environmental performance by conserving resources and reducing their ecological footprint (Fernando, Chiappetta Jabbour, & Wah, 2019; Huang & Li, 2017; Muangmee, Dacko-Pikiewicz, Meekaewkunchorn, Kassakorn, & Khalid, 2021). Additionally, green innovation contributes to financial performance by minimizing waste, increasing profitability, and strengthening corporate reputation (Lin, Tan, & Geng, 2013; Ullah, Khan, & Ahmad, 2022; Xie, Huo, & Zou, 2019). These findings emphasize the dual benefits of green innovation in achieving both sustainability and financial success.

The mediating role of green innovation is particularly important. The study finds that green creativity significantly influences environmental performance when mediated by green innovation. This suggests that while green creativity alone may not have a strong impact on environmental outcomes, its effectiveness improves when channeled through green innovation strategies (Agyapong et al., 2024; Weng et al., 2015). Similarly, green creativity enhances financial performance through green innovation by fostering the development of high-value, eco-friendly products that provide a competitive edge (Agyapong et al., 2024; Li Ma, Azhar Ali, Mohsin Shahzad, 2022). This underscores the importance of strategically integrating green creativity and innovation to achieve optimal business growth and sustainability.

To maximize its impact, MSMEs in Bantul should focus on effectively implementing green innovation as a bridge between creative eco-friendly ideas and tangible sustainability outcomes. MSMEs are expected to continue generating new ideas, such as combining materials with natural fibers in leather crafts or using leaves to create dyes. In addition to thinking of new green creativity, owners and managers of MSMEs are also expected to execute these green ideas. This will lead to green innovations that can improve product development efficiency, increase value, and boost profits for MSMEs while still considering a healthy and comfortable environment for the community around the production area, especially in Bantul Regency. By doing so, businesses can not only contribute to environmental goals but also enhance their competitive advantage and financial resilience in an increasingly sustainability-driven market.

CONCLUSION

Based on data analysis and hypothesis testing in this study on green creativity and MSMEs performance, with green innovation as a mediating variable in MSMEs in Bantul Regency, the following conclusions can be drawn: Green creativity does not have a significant effect on environmental performance, but it does have a significant effect on financial performance.

Additionally, green creativity has a significant positive effect on green innovation. The study found that green innovation has a significant positive effect on both environmental and financial performance. Furthermore, green innovation mediates the relationship between green creativity and environmental performance, as well as the relationship between green creativity and financial performance.

The research findings indicate that green creativity directly and indirectly influences environmental and financial performance through green innovation. Therefore, MSMEs should prioritize implementing green innovation alongside green creativity. Applying green creativity for environmental sustainability not only helps preserve the surrounding environment but also enables MSMEs to contribute to environmental goals while enhancing employees' creative thinking. Companies should continuously generate new ideas to support eco-friendly initiatives, improving environmental sustainability and optimizing financial performance. Beyond generating green ideas, MSMEs owners and managers should actively execute them to achieve green innovation. This can enhance product development efficiency, increase value and profitability, and maintain a healthy and sustainable environment for the surrounding community, particularly in Bantul.

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