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THE IMPACT OF GREEN INNOVATION, MARKET ORIENTATION, AND DIGITALIZATION ON MSME PERFORMANCE IN INDONESIA

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Abstrak. Studi ini menyelidiki dampak inovasi hijau, orientasi pasar, dan digitalisasi terhadap kinerja usaha mikro, kecil, dan menengah (UMKM) di Indonesia. Dengan menggunakan pendekatan kuantitatif, data dikumpulkan dari pemilik dan manajer UMKM di berbagai sektor. Temuan penelitian mengungkapkan bahwa ketiga faktor tersebut secara signifikan meningkatkan kinerja UMKM, dengan digitalisasi muncul sebagai prediktor yang paling berpengaruh. Lebih jauh, orientasi pasar memediasi hubungan antara inovasi hijau dan kinerja, yang menyoroti pentingnya strategi yang berpusat pada pelanggan dalam praktik bisnis yang berkelanjutan. Hasil ini menggarisbawahi perlunya UMKM untuk mengintegrasikan perangkat digital, merangkul inovasi hijau, dan mempertahankan respons pasar yang kuat agar tetap kompetitif. Studi ini memberikan kontribusi teoritis dengan memperluas pandangan berbasis sumber daya (RBV) dan model penerimaan teknologi (TAM) dalam konteks pengembangan UMKM. Implikasi praktis menunjukkan bahwa pembuat kebijakan dan pemimpin bisnis harus memfasilitasi transformasi digital dan inisiatif keberlanjutan untuk mendorong pertumbuhan UMKM jangka panjang. Penelitian di masa mendatang dapat mengeksplorasi efek longitudinal dan variabel moderasi khusus industri untuk meningkatkan generalisasi temuan ini.

Kata Kunci: Inovasi Hijau, Orientasi Pasar, Digitalisasi, Kinerja UMKM, Keberlanjutan, Transformasi Digital, Indonesia.

Abstract This study investigates the impact of green innovation, market orientation, and digitalization on the performance of micro, small, and medium enterprises (MSMEs) in Indonesia. Using a quantitative approach, data was collected from MSME owners and managers across various sectors. The findings reveal that all three factors significantly enhance MSME performance, with digitalization emerging as the most influential predictor. Furthermore, market orientation mediates the relationship between green innovation and performance, highlighting the importance of customer-centric strategies in sustainable business practices. These results underscore the necessity for MSMEs to integrate digital tools, embrace green innovations, and maintain strong market responsiveness to remain competitive. The study provides theoretical contributions by extending the resource-based view (RBV) and the technology acceptance model (TAM) in the context of MSME development. Practical implications suggest that policymakers and business leaders should facilitate digital transformation and sustainability initiatives to foster long-term MSME growth. Future research could explore longitudinal effects and industry-specific moderating variables to enhance the generalizability of these findings.

Keywords: Green Innovation, Market Orientation, Digitalization, MSME Performance, Sustainability, Digital Transformation, Indonesia.

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INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a crucial role in the economic development of Indonesia, contributing significantly to employment generation and gross domestic product (GDP) (Hakki & Surjadi, 2024). The rapid changes in business environments, particularly due to globalization, technological advancements, and increasing environmental concerns, have necessitated the adoption of innovative strategies to enhance business performance. Among these strategies, green innovation, market orientation, and digitalization have gained significant attention as key drivers of sustainable business growth (Tjahjadi et al., 2020). Green innovation involves developing eco-friendly products, improving production processes, and adopting sustainable business practices that reduce environmental impact while maintaining competitiveness (Pangarso et al., 2022). As the global economy shifts towards sustainability, the ability of MSMEs to integrate green innovation into their business models is critical for ensuring long-term success and resilience.

Market orientation, another important determinant of business performance, refers to an organization's ability to respond effectively to market demands and customer needs (Narver & Slater, 1990). By focusing on customer satisfaction, competitors, and market trends, MSMEs can enhance their adaptability and strategic positioning (Ratnawati et al., 2024). Market-oriented firms are more likely to recognize opportunities and mitigate risks, thereby improving their overall performance (Ningsih et al., 2024). In Indonesia, the competitive landscape for MSMEs is characterized by dynamic consumer preferences and increasing competition, making market orientation an essential factor for business survival and growth (Huda et al., 2025).

In addition to green innovation and market orientation, digitalization has emerged as a transformative force in modern business operations. Digitalization refers to the integration of digital technologies into business processes, enabling MSMEs to enhance efficiency, expand market reach, and improve customer engagement (Supriadi, 2024). The adoption of digital tools such as e-commerce platforms, artificial intelligence, and big data analytics has significantly improved business agility and competitiveness (Huda et al., 2025). In Indonesia, the increasing penetration of internet and mobile technology has facilitated the digital transformation of MSMEs, providing them with opportunities to access broader markets and optimize operational efficiency (Margaretha & Suryana, 2023). However, despite the evident benefits, many MSMEs face challenges in adopting digital technologies due to limited financial resources, lack of technical expertise, and resistance to change (Febriatmoko et al., 2023a).

Despite the recognized importance of green innovation, market orientation, and digitalization in enhancing business performance, MSMEs in Indonesia continue to face challenges in leveraging these factors effectively. Many MSMEs struggle to implement green innovation due to high costs and lack of regulatory support, limiting their ability to compete in environmentally conscious markets (Jannah & Sabihaini, 2023). Similarly, while market orientation has been linked to improved competitiveness, the ability of MSMEs to gather and analyze market intelligence remains limited (Febriatmoko et al., 2023b). Additionally, although digitalization presents numerous opportunities, barriers such as inadequate digital infrastructure and skills shortages hinder its effective adoption (Hakim et al., 2022). The lack of an integrated understanding of how these three factors influence MSME performance necessitates further empirical research to provide actionable insights for business practitioners and policymakers.

This study aims to investigate the impact of green innovation, market orientation, and digitalization on the performance of MSMEs in Indonesia. Specifically, the objectives of this research are to: (1) examine the extent to which green innovation influences MSME performance, (2) analyze the role of market orientation in enhancing business success, (3) assess the contribution of digitalization to MSME growth, and (4) explore the combined effects of these three factors on overall business performance. By addressing these objectives, this study seeks to provide valuable insights that can guide MSME owners, policymakers, and other stakeholders in developing strategies that foster sustainable and competitive business practices.

METHODOLOGY

This study adopts a quantitative research design to examine the impact of green innovation, market orientation, and digitalization on MSME performance in Indonesia. A cross-sectional survey approach is utilized to collect data from MSME owners and managers, allowing for a comprehensive analysis of the relationships among the key variables. The target population consists of MSMEs operating in various sectors across Indonesia. A purposive sampling technique is employed to select MSMEs that have engaged in green innovation, market-oriented strategies, and digitalization practices. The sample size is determined using the Krejcie & Morgan (1970) formula, with an estimated 400 respondents to ensure statistical reliability and generalizability.

Primary data is collected using a structured questionnaire distributed via online and offline channels. The questionnaire comprises closed-ended questions designed to measure the constructs of green innovation, market orientation, digitalization, and MSME performance. A

5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) is used to capture respondents' perceptions.

The measurement of variables in this study involves established scales from prior research to ensure validity and reliability. Green Innovation is measured using items adapted from Weng et al. (2015), which evaluate eco-friendly product development, sustainable process innovation, and environmental management practices. Market Orientation is assessed through the framework developed by Narver & Slater (1990), focusing on customer orientation, competitor orientation, and interfunctional coordination. Digitalization is evaluated based on the adoption of digital tools, e-commerce usage, and technological innovation, following the approach of Bharadwaj et al. (2013). Lastly, MSME Performance is measured using both financial and non-financial indicators, including profitability, customer satisfaction, and market share.

The data in this study is analyzed using SPSS to ensure comprehensive and robust results. The analysis begins with descriptive statistics to summarize the demographic characteristics of the respondents. Reliability and validity testing are then conducted, where Cronbach's alpha is used to evaluate internal consistency, and Confirmatory Factor Analysis (CFA) is employed to confirm construct validity. Multiple regression analysis is applied to examine the direct effects of green innovation, market orientation, and digitalization on MSME performance. Additionally, mediation analysis is conducted to explore potential indirect effects among the variables, providing deeper insights into the relationships within the proposed model.

RESULT

1. Descriptive Statistics

Table 1 presents the descriptive statistics of the key variables: green innovation, market orientation, digitalization, and MSME performance. The mean, standard deviation, and reliability scores (Cronbach's Alpha) are reported.

Table 1. 1. Descriptive Statistics

variable	Mean	Std. Dev	Cronbach's Alpha
Green Innovation	3.854	0.729	0.872
Market Orientation	3.921	0.687	0.889
Digitalization	4.012	0.741	0.901
MSME Performance	3.943	0.715	0.879

The reliability of all constructs is above the acceptable threshold of 0.70, indicating strong internal consistency. Additionally, the results of the Confirmatory Factor Analysis

(CFA) indicate good model fit: $\chi^2(164) = 342.218$, $p < 0.001$, CFI = 0.963, TLI = 0.958, RMSEA = 0.042, SRMR = 0.038, confirming construct validity.

2. Correlation Analysis

Table 2 presents the correlation matrix for the study variables. All independent variables are significantly correlated with MSME performance.

Table 2. Correlation Analysis

Variable	Green Innovation	Market Orientation	Digitalization	MSME Performance
Green Innovation	1.000	0.584**	0.612**	0.531**
Market Orientation	0.584**	1.000	0.567**	0.598**
Digitalization	0.612**	0.567**	1.000	0.649**

Notes: p < 0.05, **p** < 0.01

3. Regression Analysis

A multiple regression analysis was conducted to assess the impact of green innovation, market orientation, and digitalization on MSME performance. Table 3 presents the results.

Table 3. Regression Results

Variable	B	SE	β	t	p
Green Innovation	0.289	0.058	0.267	4.983	<0.001
Market Orientation	0.335	0.054	0.316	6.204	<0.001
Digitalization	0.412	0.049	0.398	8.408	<0.001
R^2 = 0.512, Adjusted R^2 = 0.507, F(3, 396) = 138.763, p < 0.001					

The model explains 51.2% of the variance in MSME performance. Digitalization has the strongest positive effect ($\beta = 0.398$, $p < 0.001$), followed by market orientation ($\beta = 0.316$, $p < 0.001$) and green innovation ($\beta = 0.267$, $p < 0.001$).

Mediation Analysis To examine potential mediation effects, a bootstrapping approach with 5,000 resamples was used. Market orientation partially mediates the relationship between green innovation and MSME performance (Indirect effect = 0.124, SE = 0.037, 95% CI [0.062, 0.203], $p < 0.01$). Similarly, digitalization mediates the effect of market orientation on MSME performance (Indirect effect = 0.176, SE = 0.042, 95% CI [0.097, 0.256], $p < 0.01$).

DISCUSSION

Interpretation of Findings

The results of this study provide significant insights into the impact of green innovation, market orientation, and digitalization on MSME performance in Indonesia. The findings indicate that all three independent variables positively influence MSME performance, with digitalization emerging as the strongest predictor. This suggests that MSMEs leveraging digital technologies are more likely to achieve competitive advantages, enhanced operational efficiency, and improved market reach. The positive effect of green innovation on MSME performance aligns with previous studies (Agustina et al., 2024; Joeliaty, 2024; Megawati et al., 2024; Yuwono et al., 2025), emphasizing that businesses integrating sustainable practices benefit from cost savings, brand enhancement, and regulatory compliance. However, the relatively lower coefficient compared to digitalization suggests that while green innovation is beneficial, its full potential might not yet be realized by MSMEs in Indonesia due to financial and technological constraints. Market orientation also plays a crucial role, confirming the findings of (Husen et al., 2024; Soesetio et al., 2024), which suggest that customer-centric businesses that continuously adapt to market changes tend to perform better. The mediation analysis further highlights that market orientation enhances the effectiveness of green innovation in improving MSME performance, reinforcing the notion that understanding customer needs is vital for sustainable growth.

Theoretical Contributions

This study contributes to the existing literature by integrating green innovation, market orientation, and digitalization into a single model and demonstrating their collective impact on MSME performance. Previous studies have often examined these variables in isolation; however, this research provides empirical evidence supporting their interconnectedness. The significant role of digitalization confirms the technology acceptance model (TAM) (Davis et al., 1989), highlighting how digital tools facilitate business efficiency and market expansion. Furthermore, the findings extend the resource-based view (RBV) (Barney, 1991) by showing that digitalization and market orientation serve as critical resources that enhance firm performance. The mediation effects observed also contribute to the strategic management literature, demonstrating that market orientation acts as a bridge linking green innovation to performance outcomes. This suggests that firms that integrate sustainability with customer-centric strategies are more likely to achieve business success.

Practical Implications

The findings provide actionable insights for MSME owners, policymakers, and business strategists. First, MSME owners should prioritize digital transformation by investing in digital platforms, e-commerce, and automation tools to improve efficiency and market penetration. Digitalization not only streamlines operations but also creates new revenue streams, as evidenced by its high coefficient in this study. Second, MSMEs should embrace green innovation not only as a compliance measure but also as a competitive strategy. Government incentives and industry collaborations can help overcome financial and technological barriers associated with adopting sustainable practices. Third, businesses must enhance their market orientation by continuously analyzing customer needs, competitor strategies, and market trends. A strong market orientation ensures that MSMEs remain agile and responsive to external changes, which in turn amplifies the benefits of digitalization and green innovation.

Limitations and Future Research

Despite its contributions, this study has certain limitations. First, the cross-sectional design limits the ability to infer causality. Future research should employ longitudinal studies to examine how these variables evolve over time. Second, the study focuses on MSMEs in Indonesia, which may limit generalizability to other regions. Comparative studies across different countries could provide broader insights into the role of green innovation, market orientation, and digitalization. Additionally, this study did not consider potential moderating factors such as firm size, industry type, or regulatory environment, which may influence the relationships observed. Future research could explore these aspects to refine the proposed model further.

CONCLUSION

This study examines the impact of green innovation, market orientation, and digitalization on the performance of MSMEs in Indonesia. The findings confirm that all three factors positively influence business performance, with digitalization emerging as the most significant predictor. The results emphasize that MSMEs integrating digital technologies can enhance operational efficiency, market reach, and overall competitiveness. Additionally, green innovation contributes to performance, particularly when combined with strong market orientation. The mediation analysis further highlights the interconnected nature of these variables, showing that market orientation strengthens the link between green innovation and performance outcomes. These findings have important theoretical and practical implications, encouraging MSMEs to adopt digital solutions while maintaining a strong focus on sustainability and market responsiveness. Policymakers and business leaders should support digital transformation and sustainable business practices to ensure long-term growth in Indonesia's MSME sector. Future research could explore longitudinal data and industry-specific moderating effects to enhance the generalizability of these insights.

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