

Green Innovation Practices in Micro Small and Medium-sized Enterprises: Does It Affect Competitive Advantage and Business Performance?

Maulida Nurul Innayah¹, Bima Cinintya Paratama², Ghefira Hanifah³, Melani Awalia⁴, Dany Nofrizal Petra⁵

maulidanurul@ump.ac.id

Faculty of Economics and Business, Universitas Muhammadiyah Purwokerto, Indonesia^{1,2,3,4,5}

Abstract. Despite the recognized importance of green innovation in organizations, it is not clear how the green innovation practice drives the success of Micro, Small, and Medium-Sized Enterprises (MSMEs). Using survey data collected from 105 MSMEs, this study aimed to examine the effect of green process innovation in creating Competitive Advantage and MSMEs' business performance. We found that green process innovation has a positive effect on MSMEs' business performance. Additionally, we discovered that competitive advantage mediates the relationship between green process innovation and MSMEs' business performance. The resource-based theory provides a foundation for understanding how green innovation practices are crucial in driving MSMEs' business performance. The implementation of environmentally sustainable practices enhances the sustainable competitive advantage. This, in turn, leads to better overall MSMEs' business performance.

Keywords: Green Process Innovation, Competitive Advantage, MSMEs Business Performance

1. Introduction

Micro Small and Medium-sized Enterprises (MSMEs) are becoming an increasingly discussed subject for global executives, policymakers, and government officials. Interest in this subject among academics has increased, with an emphasis on MSMEs [1]. According to [2] would account for 61% of the GDP, or IDR 9,580 trillion, while providing 97% of jobs for all workers. This demonstrates that MSMEs are one of the industries that contribute significantly to the Indonesian economy, indicating the need for more focus on the growth of MSMEs in all regions, including the Banyumas Regency area. MSMEs are the economic sector that is growing the fastest, and research shows that they are becoming more flexible and adaptable than larger companies. [3] MSMEs are less competitive in their development than large enterprises, nonetheless. [4] assert that MSMEs, both domestically and internationally, are technologically oriented and need strong marketing to get a competitive advantage. Therefore, MSMEs must follow the changing market demands and must involve environmental conservation in the production and innovation process to produce environmentally friendly products. Therefore, MSMEs can continue to carry out production and innovation to gain profits by doing green innovation.

MSMEs may be able to continue their production and innovation endeavors while upholding environmental sustainability through the use of green innovation. One of the key strategic instruments for MSMEs to develop sustainably is green innovation [5]. Green innovation, according to [6], is a tool for product-related innovation that includes technological advancements that can reduce energy use, prevent pollution, recycle trash, design environmentally friendly products, or improve corporate environmental management. MSMEs may fulfill the demands of modern consumers and produce products with added value by implementing a green innovation strategy. MSMEs will have a competitive edge thanks to this added value from green innovation [5]. However, the truth is that MSMEs know very little about green innovation. MSMEs frequently disregard environmental sustainability, which increases pollution and results in the wasteful use of raw materials. Examples of this include the disposal of waste and rubbish that is not recycled [7]. In addition to being beneficial for the environment, using green innovation ideas in MSMEs can boost earnings and enhance competitiveness and business performance.

2. Literature Review and Hypothesis Development

2.1 Resource-based Theory (RBT)

Resource-based theory (RBT) is a useful framework for understanding and anticipating the factors driving competitive advantages and business performance [8]. According to RBV, one way to think of green process innovation is as a kind of organizational resource [9]. The application of green process innovation will give the business a stronger competitive edge because it is process-oriented.

2.2.1 Green Process Innovation and Business Performance

A business reduces waste produced during the production process by utilizing green innovation techniques [10]. A business that creates, manufactures, and markets eco-friendly products will make more money [11]. The environment and company performance both benefit from green process innovation [12]. Innovation that is environmentally friendly should be pursued since it might present a business with strategic prospects [10]. Based on the explanation above, the hypothesis proposed is as follow:

Hypotheses 1: Green process innovation has a positive and significant effect on business performance

2.2.2 Competitive Advantage and Business Performance

Competitive advantage and value generation are closely related concepts. This is so because a company's competitive advantage shows how well it can make business decisions to establish a stable position in relation to its rivals [12]. The ability of a business to function better than its rivals is referred to as its competitive advantage [13]. When a company operates in a market or industry that generates economic value and offers customers greater value, it has a competitive edge. This can be accomplished by delivering exclusive benefits in place of higher prices, or by selling at a discount to competitors who are providing comparable benefits [14]. Research by [15] proves that competitive advantage has a positive and significant effect on business performance. Based on the explanation above, the hypothesis proposed is as follow:

Hypotheses 2: Competitive advantage has a positive and significant effect on business performance

2.2.3 Green Process Innovation and Competitive Advantage

Even if the rivals are unable to attain the benefits that the company employing the competitive strategy achieves, they are still unable to copy the approach employed by the company to gain a competitive advantage [16]. Businesses create innovations and competitive advantages that are uncommon, valuable, non-replaceable, and inimitable by utilizing special resources [17]. A competitive advantage that lasts will be achieved by successful innovation, making it harder for rivals to copy the strategy [18]. Businesses can use GPI to increase productivity and efficiency in the production process, which will reduce costs for them [19]. As a result, businesses can utilize GPI to get a competitive edge [20]. A prior study by [21] also highlighted the firm's RBV and discovered that a company's capacity for green innovation gives it a competitive edge.

Based on the explanation above, the hypothesis proposed is as follow:

Hypotheses 3: Green process innovation has a positive and significant effect on competitive advantage

2.2.4 Green Process Innovation, Competitive Advantage and Business Performance

Competitive advantage is positively impacted by green product innovation. Environmentally friendly product innovation and sustained competitive advantage are directly tied, claims [22]. The impact of green innovation on a company's competitive advantage is further demonstrated by research by [21]. Businesses that exploit sustainable competitive advantages record outstanding business execution [23]. This is consistent with earlier research [15], which found that firm performance is impacted by competitive advantage. Based on the explanation as mentioned above, it is anticipated that the relationship between green process innovation and business performance can be mediated by competitive advantage. In light of the foregoing reasoning, the theory put forth is as follow:

Hypotheses 4: Competitive advantage mediates the relationship between green process innovation and business performance

3. Research Methods

3.1 Population and Sample

The study's population comprises MSMEs located in Banyumas Regency. Central Java, Indonesia. There has yet to be an absolute number of MSMEs in Banyumas. According to data from the [25] there are 89,553 MSMEs in the Banyumas Regency. In deciding the study's sample size, this study uses the ten times rule [25]. Therefore, 105 respondents are selected as the sample size. As many as 105 out of 150 questionnaires sent to the respondents were returned, giving an informed rate reply of 70%. Purposive and stratified random sampling was employed because this is the best approach to obtain a sample to represent the population. The questionnaire uses a Google form sent to respondents internally via email and social media. This study uses a measurement instrument modified from earlier research to assess the study's variables using a five-point Likert scale: 1 represents strongly disagreeing, and 5 represents strongly agreeing.

3.2 Variable Measurement

The measurement for Innovation in green processes was borrowed from [26] which consists of four main indicators, which are as follows: reduces the consumption, reuse materials, reduces materials, lowers the amount of trash or hazardous material emissions. The measurement for competitive advantage was adapted from [27] which consists of three main dimensions, which are as follows: product uniqueness, product quality and competitive price. The measurement for MSME Business Performance comprises three main dimensions, which are as follows: financial performance, product performance, market performance. The measurement for MSME Business Performance was adapted from [27].

4. Result And Discussion

4.1 Respondent Profile

The overall demographic information of the study respondents is shown in Table 1.

Table 1. Demographic Profiles

	Profile	Frequency (n)	Percentage (%)
Gender	Female	39	37%
	Male	66	63%
Number of employees	< 5	80	76%

Monthly revenue	5-19	21	20%
	20-99	3	3%
	>99	1	1%
	< IDR 166 million	73	70%
	IDR 166 million - 1.250 million	30	28%
	IDR 1.250 million - 4.166 million	2	2%

4.2 Analysis of the Validity and Reliability

Table 2 presents a summary of the instruments used in the study. Table 2 shows the loading factor describes the relationship between the latent variable and the evaluated indicator. Data analysis shows that the CR of the measurement model is at a value of 0,880 to 0965 for each variable, exceeding the suggested CR value of CR > 0.700 [25].

To further improve the validity of the study instrument, the researchers have conducted a convergent validity analysis, which is determined based on the AVE value. The recommended AVE analysis for each variable must have a value greater than 0.50 [25]. The findings of the AVE analysis of each study variable are shown in Table 2, and all variables have good convergent validity (AVE > 0.50). Reliability tests were conducted, and Table 2 displays the reliability test results for each study variable. This reliability value is acceptable because, according to [25].

Table 2. Validity and Reliability Test

Measurement items	SFL	α	CR	AVE
Green Process Innovation (GPI)		0,806	0,885	0,720
ir business process reduces the consumption of water, electricity, coal, or oil.	0,792			
ir business recycles and reuses materials or parts.				
ir business process reduces the use of raw materials.	0,868			
ir business process effectively reduces the emission of hazardous substances or waste.	0,882			
Competitive Advantage (CA)		0,877	0,915	0,730
2 can create products with interesting variants.	0,864			
2 can create products with combinations according to consumer demand.	0,847			
e quality of our product cannot be found in competing products.				

e quality of our product is not easy for competitors to imitate.				
are always offering competitive prices compared to the competitors.	0,846			
are always offering the same or even lower prices than competitors.	0,878			
Business Performance (BP)		0,946	0,957	0,787
profit achievement has increased in the last three years.	0,910			
increase in business capital in the last three years.	0,923			
the number of products produced increased in the last three years.	0,881			
product requests increased in the last three years.	0,826			
sales growth has increased in the last three years.	0,928			
customers have increased in the last three years.	0,851			

Note: SFL = Standardized Factor Loadings. α = Cronbach's alpha. CR = Composite Reliability. AVE = Average Variance Extracted.

Furthermore, assessing the discriminant validity, the square roots of the AVE of MSME Performance (0.884), human capital (0.677), and Green Process Innovation (0.710) were more than the correlations between the constructs (Table 3). Thus, all measures exceeded the recommended threshold for discriminant validity.

Table 3. Discriminant Variables

Variables	BP	CA	GPI
Business Performance (BP)	0,887		
Competitive Advantage (CA)	0,853	0,854	
Green Process Information (GPI)	0,727	0,755	0,849

4.3 Model Fit

The analysis Goodness-of-Fit (GFI) shows that the structural model developed has a satisfactory fit value (Hair et al., 2014).

Table 4. Goodness-of-Fit

Variable	Adjusted R-Square
BP	0,739
CA	0,565

4.4 The Results of Hypothesis Testing

Table 5 shows the direct and indirect relationship between the variables being studied. First, it was found that green process innovation had a favorable effect on corporate performance. ($p=0.013$; $\beta=0,194$). At the 5% level, this discovery is significant. H1 is therefore supported. Next, business performance benefits from competitive advantage ($\beta=0,706$; $p=0.000$). At the 5% level, this discovery is significant. H2 is therefore supported. Next, competitive advantage benefits from green process innovation ($\beta=0,755$; $p=0.000$). At the 5% level, this discovery is significant. H3 is therefore supported. Ultimately, the indirect impact demonstrates that the association between green process innovation and business performance is mediated by competitive advantage ($\beta = 0,533$; $p = 0.000$). At the 5% level, this discovery is significant. H4 is therefore supported.

Table 5. The Results of Hypothesis Testing

Variables	β	P Value
GPI -> BP	0,194	0,013
CA -> BP	0,706	0,000
GPI -> CA	0,755	0,000
GPI -> CA -> BP	0,533	0,000

The first hypothesis (H1) in the study claims that business performance is significantly and favorably impacted by green process innovation. The survey's findings demonstrate that green process innovation significantly improves business performance. This study is widely supported by previous studies conducted by [26] and [10] which states that green process innovation has a positive and significant effect on business performance.

The second hypothesis (H2) shows that The performance of businesses is positively and significantly impacted by competitive advantage. The study's findings demonstrate a strong and positive correlation between business performance and competitive advantage. The study's findings are consistent with those of [28] and [29], who discovered a strong and positive correlation between business success and competitive advantage.

The third hypothesis (H3) in this study is Competitive advantage is positively and significantly impacted by green process innovation. A survey that examined this relationship revealed that green process innovation can positively and significantly impact competitive advantage. The study's findings are consistent with earlier research, including those of [30] and [31], who discovered that green process innovation increased competitive advantage.

The fourth hypothesis (H4) in this study demonstrates how the relationship between green process innovation and corporate performance is mediated by competitive advantage. The study's survey results suggest that the relationship between green process innovation and corporate performance may be mediated by competitive advantage. Support for this study comes from [31], which discovered how competitive advantage mediated the association between green process innovation.

5. Conclusions

This study found that green process innovation has a significant positive effect on business performance. The results of this study also demonstrate how a competitive edge significantly improves the success of a corporation. The mediation test's findings indicate that the association

between green process innovation and business performance is mediated by competitive advantage. There are a number of limitations to this study. Firstly, the results cannot be broadly generalized because the study was limited to Banyumas Regency. Second, as shown by the coefficient values of the study's results, additional factors also affect business performance and competitive advantage model 1 and model 2 of 0.739 and 0.565.

Based on the limitations above, this study provides several theoretical and practical suggestions; First, further research can expand the target objects of MSMEs not only in one district so that they can be generalized. Second, further research can add other variables such as human capital because it has been proven to improve business performance [27; 32]. Further research can also add financial literacy variables which have been proven to have an effect on improving business performance [33; 34].

References

- [1] Mafini, C., & Omoruyi, O. "Logistics Benefits and challenges : The Case of SMEs in a South African Local Municipality". *The Southern African Journal of Entrepreneurship and Small Business Management*, vol. 6, pp. 145–167, 2016. <https://doi.org/10.4102/sajesbm.v6i1.38>
- [2] Kementerian Koordinator Bidang Perekonomian Republik Indonesia. Dorong UMKM Naik Kelas dan Go Export, Pemerintah Siapkan Ekosistem Pembiayaan yang Terintegrasi. Accessed 31 July 2024. Available: <https://www.ekon.go.id/publikasi/detail/5318/besar-umkm-naik-besar-dan%20go-export-government-cepatkan%20ekosistem-pembayaran-yang-terintegraf>
- [3] Kumar, V. "Evolution of Marketing as a Discipline: What Has Happened and What to Look Out For". *Journal of Marketing*, vol. 79, no. 1, pp. 1–9, 2015. <https://doi.org/10.1509/jm.79.1.1>
- [4] Tom, E. E., Alfred, U. J., & Akwaya, O. P. "Marketing Problems and the Performance of Selected Small and Medium Enterprises (SMEs) in Southern Senatorial District of Cross River State, Nigeria". *American International Journal of Contemporary Research*, vol. 5, no.5, pp. 70–76, 2015.
- [5] Hidayanita, N. "Pengaruh Green Innovation terhadap Kinerja Inovasi dan Keunggulan Kompetitif yang Dimediasi oleh Managerial Environmental Concern (Studi Kasus pada UMKM Batik di Pekalongan)". *Seminar Nasional Ekonomi Bisnis (SENESIS)*, pp. 398–408, 2023.
- [6] Chen, Y.-S., Lai, S.-B., & Wen, C.-T. "The Influence of Green Innovation Performance on Corporate Advantage in Taiwan". *Journal of Business Ethics*, vol. 67, no. 4, pp. 331–339, 2006. <https://doi.org/10.1007/s10551-006-9025-5>
- [7] Koirala, S. "SMEs: Key Drivers of Green and Inclusive Growth". *OECD Green Growth Papers*, vol. 3, pp. 3–56, 2019.
- [8] Barney, J., Ketchen, D., & Wright, M. (2011). *The Future of Resource-Based Theory*. *Journal of Management - J MANAGE*, 37, 1299–1315. <https://doi.org/10.1177/0149206310391805>
- [10] Tjahjadi, B., Soewarno, N., Hariyati, H., Nafidah, L. N., Kustiningsih, N., & Nadyaningrum, V. "The Role of Green Innovation Between Green Market Orientation and Business Performance: Its Implication for Open Innovation". *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 6, no. 173, pp. 1–18, 2020. <https://doi.org/10.3390/joitmc6040173>
- [11] Kammerer, D. "The Effects of Customer Benefit and Regulation on Environmental Product Innovation. Empirical Evidence from Appliance Manufacturers in Germany". *Ecological Economics*, vol. 68, no. 8–9, pp. 2285–2295, 2009. <https://doi.org/10.1016/j.ecolecon.2009.02.016>
- [12] Sari, S. M., Yunizar, & Sartika, D. "Determinants of MSME's Competitive Advantage: Do Digital Competency and Entrepreneurial Orientation Matter?". *AdBispreneur: Jurnal Pemikiran Dan Penelitian Administrasi Bisnis Dan Kewirausahaan*, vol. 5, no. 1, pp. 63–72, 2017. <https://doi.org/https://doi.org/10.24198/adbispreneur.v5i1.26999>
- [13] García, A. N., Rey-Moreno, M., & Pires de Lima, P. d'Alte B. "Competitive Advantages as a Complete Mediator Variable in Strategic Resources, Dynamic Capabilities and Performance Relations in The Car Sales Sector". *Journal of Business*, vol. 10, no. 1, pp. 24–37, 2018. <https://doi.org/10.21678/jb.2018.875>

- [14] Xuhua, H., Elikem, O. C., Akaba, S., & Brown, D. W. "Effects of Business-to-Business E-Commerce Adoption on Competitive Advantage of Small and Medium-Sized Manufacturing Enterprises". *Economics and Sociology*, vol. 12, no. 1, pp. 80–99, 2019. <https://doi.org/10.14254/2071-789X.2019/12-1/4>
- [15] Agus, Limakrisna, N., & Muharam, H. "Increasing the Business Performance of Food Processing MSMEs in Cirebon by Creating Competitive Advantages through Entrepreneurship Orientation, Dynamic Capabilities, and Market Orientation". vol. 2 no. 4, pp. 53–70, 2023. <https://doi.org/10.56943/joe.v2i4.437>
- [16] Danso, A., Adomako, S., Amankwah-Amoah, J., Owusu-Agyei, S., & Konadu, R. "Environmental Sustainability Orientation, Competitive Strategy and Financial Performance. Business Strategy and the Environment", vol. 28, no. 5, pp. 885–895, 2019. <https://doi.org/https://doi.org/10.1002/bse.2291>
- [17] Gürlek, M., & Tuna, M. "Reinforcing Competitive Advantage through Green Organizational Culture and Green Innovation". *The Service Industries Journal*, vol. 38, no. 7–8, pp. 467–491, 2018. <https://doi.org/https://doi.org/10.1080/02642069.2017.1402889>
- [18] Wu, W., Wu, W., Wu, K., Ding, C., & Fan, C. "Green Innovation, Corporate Environmental Ethics, and Competitive Advantages of Chinese Automobile Industry During COVID-19: Corporate Environmental Management as Moderator". *Frontiers in Psychology*, vol. 13, pp. 1–11, 2022. <https://doi.org/10.3389/fpsyg.2022.832895>
- [19] Rehman, S. U., Kraus, S., Shah, S. A., Khanin, D., & Mahto, R. V. "Analyzing The Relationship Between Green Innovation and Environmental Performance in Large Manufacturing Firms". *Technological Forecasting and Social Change*, vol. 163, pp. 1–6, 2021. <https://doi.org/10.1016/j.techfore.2020.120481>
- [20] Chang, C.-H. "How to Enhance Green Service and Green Product Innovation Performance? The Roles of Inward and Outward Capabilities. Corporate Social Responsibility and Environmental Management", vol. 25, no. 4, pp. 411–425, 2018. <https://doi.org/https://doi.org/10.1002/csr.1469>
- [21] Leonidou, L. C., Leonidou, C. N., Fotiadis, T. A., & Zeriti, A. "Resources and Capabilities as Drivers of Hotel Environmental Marketing Strategy: Implications for Competitive Advantage and Performance". *Tourism Management*, vol. 35, pp. 94–110, 2013. <https://doi.org/10.1016/j.tourman.2012.06.003>
- [22] Gaya, H. J., Struwig, M., & Smith, E. E. "Creating a Sustainable Competitive Advantage at a High Performing Firm in Kenya". *African Journal of Business Management*, vol. 7, no. 21, pp. 2049–2058, 2013. <https://doi.org/10.5897/AJBM2013.6974>
- [23] Dinas Komunikasi dan Informatika Kabupaten Banyumas, "Data dan Informasi Kabupaten Banyumas Volume 8, 2024". Accessed 31 July 2024. Available: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://static.banyumaskab.go.id/website/file/website_26032407562366021d379175a.pdf
- [24] Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. "Partial Least Squares Structural Equation Modeling (PLS-SEM): An Emerging Tool in Business Research". *European Business Review*, vol. 26, no. 2, pp. 106–121, 2014. Available: <https://doi.org/10.1108/EBR-10-2013-0128>
- [25] Achi, A., Adeola, O., & Achi, F. C. "CSR and green process innovation as antecedents of micro, small, and medium enterprise performance: Moderating role of perceived environmental volatility", *Journal of Business Research*, vol. 139, pp. 771–781, 2022. <https://doi.org/10.1016/j.jbusres.2021.10.016>
- [26] Rokhman, M. T. N., Ratnawati, R., & Rahayu, Y. N. "Relationship Between Human Capital and MSME's Performance with Competitive Advantage As a Mediation". *Jurnal Aplikasi Manajemen*, vol. 21, no.1, pp. 191–204, 2023. <https://doi.org/10.21776/ub.jam.2023.021.1.14>
- [27] Sasmito, T., Nugroho, M., & Shihab Ridwan, M. "The impact of organizational capability, external networking, entrepreneurship, competitive advantage, and corporate social responsibility (CSR) on performance". *Uncertain Supply Chain Management*, vol. 11, no. 2, pp. 833–842, 2023. <https://doi.org/10.5267/j.uscm.2022.12.007>
- [28] Agus, A., Limakrisna, N., & Muharram, H. "Increasing the Business Performance of Food Processing MSMEs in Cirebon by Creating Competitive Advantages through Entrepreneurship

Orientation, Dynamic Capabilities, and Market Orientation". *Journal of Entrepreneurship*, pp.53–70, 2023.
<https://doi.org/10.56943/joe.v2i4.437>

[30] Tu, Y., & Wu, W. "How Does Green Innovation Improve Enterprises' Competitive Advantage? The Role of Organizational Learning". *Sustainable Production and Consumption*, vol. 26, pp. 504–516, 2020. <https://doi.org/10.1016/j.spc.2020.12.031>

[31] Maziriri, E. T., & Maramura, T. C. "Green Innovation in SMES : The Impact of Green Product and Process Innovation on Achieving Sustainable Competitive Advantage and Improved Business". *Academy of Entrepreneurship Journal*, vol. 28, no. 1, pp. 1–14, 2022.

[32] Syarifah, I., Mawardi, M. K., & Iqbal, M. "Pengaruh Modal Manusia terhadap Orientasi Pasar dan Kinerja UMKM". vol. 23, no, 1, pp. 69–96, 2020.

[33] Mirdiyantika, A., Indriasari, I., & Meiriyanti, R. "Pengaruh Literasi Keuangan , Inklusi Keuangan dan Financial Technology terhadap peningkatan Kinerja UMKM di Kecamatan Bulakamba". *Jurnal Riset Manajemen Dan Ekonomi*, vol.1, no. 2, pp. 30–47, 2023.

[34] Wulandari, D. N. A., & Paramita, R.S. "Pengaruh Literasi Keuangan, Inklusi Keuangan, dan E-Commerce Terhadap Kinerja Keuangan UMKM (Coffee Shop) di Kabupaten Kabupaten Jember". *Jurnal Ilmiah Wahana Pendidikan*, vol. 9, pp.199–210, 2023.