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Role Green Consumers in Mediating Relationship Between Environmental Awareness, Green Product Innovation, and Green Creativity on Competitive Advantage of SMEs

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Abstract

The purpose this research is to test the concept of a green scope that has the potential to be adopted in achieving competitive advantage for SMEs. This is an explanatory study that tests the relationships between variables using a quantitative approach. In this study, the relationships among these variables will be explained through the relationship between Environmental Awareness, Green Process Innovation, and Green Product Innovation on the Competitive Advantage of SMEs through mediation by Green Consumer. The population in this study consisted of all MSME actors in Kendal Regency, totaling 16,508 units. Primary data was used, obtained directly by the researcher through distributing questionnaires in a hybrid manner. This study revealed that environmental awareness and green process innovation have a positive and significant effect on both competitive advantage and green consumer variables. Meanwhile, green product innovation has not been proven to affect either competitive advantage or green consumer. In mediation testing, the green consumer variable was proven to mediate the relationship between environmental awareness and green process innovation on competitive advantage, but the results were different for the relationship between green product innovation and competitive advantage. Research results encourage SMEs to have an understanding of and concern for the environment

Keywords: *Environmental Awareness; Green Process Innovation; Green Product Innovation; Green Consumer; Competitive Advantage of SMEs*

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INTRODUCTION

SMEs as catalyst for the Indonesian economy (Putra 2024). Its role in driving the national economy (Piliang 2024) it is very important as his contribution to the country's Gross Domestic Product (Anon 2025) as well as in absorbing the workforce. According to data from the Ministry of Cooperatives and Small and Medium Enterprises, there are currently 65 million micro, small, and medium enterprises abbreviated as MSMEs. (Anon 2024c). On the other hand, the growth of MSMEs is also accompanied by an increase in the amount of waste generated by MSMEs. Data from SIPSN indicates that throughout the year 2024, the waste accumulation in Indonesia reached 27.74 million tons (Anon 2024a) with MSMEs being the largest contributors to plastic waste. This is certainly not in line with the Indonesian

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government's programs related to environmental preservation, as this commitment is demonstrated through policies concerning regulations and environmental budget management. The challenge for most companies, including MSMEs, today is the awareness of environmental sustainability among the public, and the issue of greenwashing is an inevitability (Anon 2024d), The community is starting to realize the importance of environmental sustainability for long-term survival, they can assess eco-friendly products.

From another perspective, many MSME actors face unfortunate fates, their businesses do not run smoothly leading to stagnation or even bankruptcy. Based on the data (ADB 2023), Almost 80% of MSME actors in Asia close their businesses in the third year after they are established. This data is certainly very ironic, considering that business sustainability is a hope for all business actors, including MSMEs. This means that only 20% of MSMEs can achieve business sustainability. Business sustainability can be achieved if the business has a competitive advantage (Mehmood, Kiani, and Rashid 2025).

In order to create a competitive advantage for MSMEs and efforts to preserve the environment amidst greenwashing issues, strategic steps need to be taken, such as: increasing MSME actors' awareness of the importance of environmental consciousness in their businesses. This is important considering the public's awareness of the importance of environmental preservation, so they will consider green products in their consumption behavior (Alam and Islam 2021). Next, small and medium enterprises need to implement environmentally friendly technology and production processes in order to create competitive advantages and achieve sustainable goals (Tu and Wu 2021). Finally, MSME actors need to produce green product innovation to achieve competitive advantage and have a positive impact on the environment (Skordoulis et al. 2022).

Previous research states that environmental awareness has a significant positive impact on competitive advantage (Tan et al. 2022)(Kuo, Fang, and LePage 2022). Other research states that green process innovation has a significant positive impact on competitive advantage (Zameer et al. 2021) (AL-Shboul 2023). In another study, it was stated that green product innovation has a significant positive impact on competitive advantage (Andersén 2021) (Hang et al. 2022). This research uses green consumer as a mediating variable; green consumers are important considering the growing awareness of environmental sustainability in society, which can assess who is genuinely green and who merely claims to be green, which will affect their consumption decisions.

Based on the above study, the formulation of the problem in this research is how to create Competitive Advantage for MSME actors through Environmental Awareness, Green Process Innovation, and Green Product Innovation. The objective of this research is to test the concept of a potential green scope that can be adopted to create competitive advantage in MSMEs. The results of this study are expected to strengthen the competitiveness of MSME actors and achieve government programs related to environmental sustainability.

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METHODOLOGY

This research is an explanatory study that examines the relationships between variables using a quantitative approach. In this study, these variable relationships will be explained through the relationship between Environmental Awareness, Green Process Innovation, and Green Product Innovation towards Competitive Advantage of SMEs through mediation by Green Consumers. The population consists of all objects or individuals that have characteristics that are the focus of the research (Wibisono 2015). The population in this study is all actors in SMEs in Kendal Regency, totaling 16,508 units (Anon 2024b). In sampling, this study uses purposive sampling technique. The sampling criteria used are as follows:

1. MSMEs that are domiciled in Kendal district
2. MSMEs that have been operational for at least 1 year
3. MSMEs that have implemented sustainable and environmentally friendly business practices

The number of samples in this study is based on the sample size that is determined to be at least 10 times the number of indicators used (Roscoe 1975). From the 5 variables used in this study, there are a total of 17 indicators, so the minimum sample size in this study is 170 respondents. This sample size meets the sample criteria, which is more than 30 samples and less than 500 samples (Sekaran and Bougie 2011).

The research data uses primary data obtained directly by the researcher (Creswell and Creswell 2018). Primary data was obtained through the distribution of questionnaires in a hybrid manner, both offline and online. For online respondents, distribution was done via Google Forms. The results of the questionnaire distribution were then classified into a Likert scale that has been engineered to facilitate the processing and analysis of research data. The Likert scale in this study is as follows: 1) point 5 for Strongly Agree (SS); 2) point 4 for Agree (S); 3) point 3 for Neutral (N); 4) point 2 for Disagree (TS); and 5) point 1 for Strongly Disagree (STS).

The variables and measurements of the research are as follows.

Table 1. Variables and Measurements of Research Variables

Variable	code	measurement	Reference
Competitive Advantage of SMEs	CA1	Eco-friendly products set us apart from competitors and create superior value in the eyes of customers.	(Stonehouse and Snowdon 2007)
	CA2	Our products are affordably priced because they use recycled materials.	
	CA3	Our eco-friendly products are easy to distribute.	

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Green Consumer	GC1	Our customers are looking for eco-friendly products/recycled packaging.	(Liang 2024)
	GC2	We use eco-friendly products.	
	GC3	We utilize leftover eco-friendly products.	
Environmental Awareness	EA1	Our eco-friendly products increase customers' willingness to buy.	(Song, Qin, and Yuan 2019)
	EA2	Attention to the environment becomes a motivator for customer purchases.	
	EA3	Customers prioritize buying environmentally friendly products.	
Green Process Innovation	GPc1	We are reducing the consumption of resources and energy with the aim of energy efficiency.	(Xie, Huo, and Zou 2019)
	GPc2	We use recycled materials	
	GPc3	We participate in promoting environmental campaigns.	
	GPc4	We use equipment to control pollution.	
	GPc5	We adopt pollution control projects and technologies.	
Green Product Innovation	GPd1	We made changes to the product design to avoid pollution.	(Xie et al. 2019)
	GPd2	We improve and design environmentally friendly product packaging.	
	GPd3	We are making design modifications to the product with the aim of energy efficiency.	

This research was statistically tested using SmartPLS. PLS is characterized as the most suitable technique for predictive or exploratory modeling research. PLS is a multivariate statistical data analysis method that can be used for testing with multiple response and explanatory variables simultaneously (Garson 2016). There are three stages of testing in the research, namely Outer Model Test, Inner Model Test, and Hypothesis Testing.

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The outer model is a test to determine the feasibility of research instruments. This test uses convergent validity, discriminant validity, and composite reliability tests. The criteria for the convergent validity test is that the loading factor should be ≥ 0.70, indicating a relationship between the indicators and the latent variable. The discriminant validity test has the criterion that if the Average Variance Extracted value for each construct is ≥ 0.50, then the research variable has adequate discriminant validity. The composite reliability test can be assessed through the Composite reliability value and the Cronbach's Alpha value. A criterion is considered reliable if the Composite reliability value is above 0.70 and the Cronbach's Alpha value is above 0.60 (Garson 2016).

The inner model is used to assess the feasibility of the structural model with the R Square (R2) test. The R2 test is a determination coefficient test used to measure the extent to which an endogenous construct can be explained by an exogenous construct. The criteria used are based on the R2 value; an R2 value of 0.67 is considered strong, an R2 value of 0.33 is considered moderate, and an R2 value of 0.19 is considered weak. In this hypothesis testing, statistical multivariate analysis is performed through Smart PLS using the Estimation of Path Coefficients (β) and T Statistics approach. The criteria used are that if the sig value ≤ 0.05 and the t statistic value ≥ t table, then the hypothesis can be accepted. However, if the sig value ≥ 0.05 and the t statistic value ≤ t table, then the hypothesis can be rejected.

RESULTS AND DISCUSSION

This study adopts a reflective measurement model, where the variables Competitive Advantage, Green Consumer, Environmental Awareness, Green Process Innovation, and Green Product Innovation are measured reflectively. The evaluation of the reflective model includes: 1. loading factor, the loading factor results must be above 0.7 according to (Hair et al. 2014). Meanwhile, (Chin 2001) argued that a loading factor above 0.6 is still acceptable. 2. The composite reliability value must be above 0.7 (Hair et al. 2012) 3. *Cronbach's alpha*4. AVE. We present the results of our evaluation in Table 3 as follows: This research adopts a reflective measurement model, where the variables of Competitive Advantage, Green Consumer, Environmental Awareness, Green Process Innovation, and Green Product Innovation are measured reflectively. The evaluation of the reflective model includes: 1. loading factor, the loading factor result must be above 0.7 according to (Hair et al. 2014). Meanwhile, according to (Chin 2001), a loading factor above 0.6 is still tolerable. 2. The composite reliability value must be above 0.7 (Hair et al. 2012). 3. Cronbach's alpha 4. AVE. The results of our evaluation are presented in table 3 as follows:

Table 3. Model measurement evaluation

Indicators	outer loading	cronbach's alpha	composite reliability	AVE
CA1	0,910	0,713	0,833	0,627
CA2	0,731			
CA3	0,721			

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GC1	0,899	0,928	0,955	0,875
GC2	0,963			
GC3	0,943			
EA1	0,854	0,922	0,951	0,867
EA2	0,969			
EA3	0,966			
GPc1	0,733	0,887	0,916	0,689
GPc2	0,937			
GPc3	0,718			
GPc4	0,943			
GPc5	0,792			
GPd1	0,869	0,792	0,979	0,707
GPd2	0,827			
GPd3	0,825			

Source: processed by researchers in 2025

Based on the table 3 above, variable of competitive advantage is measured by three valid measurement items with outer loading values ranging from 0.721 to 0.910, which means that these three measurement items are valid reflections of competitive advantage measurement. The reliability level of the variable is acceptable as indicated by Cronbach's alpha and composite reliability above 0.7, or reliable. The level of convergent validity as indicated by the AVE value of 0.627 > 0.5 has met the criteria for good convergent validity. Among the three measurement items, the CA1 measurement has the highest outer loading value (0.910), indicating that the environmentally friendly product item is the differentiator and creates superior value in the eyes of consumers, making it the most important component in competitive advantage. Competitive advantage is greatly reflected in how companies or entrepreneurs produce environmentally friendly products that are different from competitors.

The green consumer variable is measured by three valid measurement items with outer loading values between 0.899 and 0.963, indicating that these three measurement items are valid in reflecting the measurement of green consumers. The reliability level of the variable is acceptable as indicated by a Cronbach's alpha and composite reliability above 0.7, which means it is reliable. The level of convergent validity, indicated by an AVE value of 0.875>0.5, meets the criteria for good convergent validity. Among the three measurement items, the measurement GC2 has the highest outer loading value (0.963), indicating that the item on using environmentally friendly products is the most important component in being a green consumer.

The variable of environmental awareness is measured by three valid measurement items with outer loading values between 0.854 and 0.969, which means that these three measurement items are valid in reflecting environmental awareness measurement. The reliability level of the variable is acceptable as indicated by Cronbach alpha and composite reliability above 0.7 or reliable. The convergent validity level indicated by the AVE value of 0.867>0.5 meets the criteria for good convergent validity. Among the three measurement items, the measurement EA2 has

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the highest outer loading value (0.969) indicating that the item of concern for the environment is the most important component of environmental awareness.

The variable of green process innovation is measured by five valid measurement items with outer loading values between 0.718 and 0.943, which means that all five measurement items are valid and reflect the measurement of green process innovation. The reliability level of the variable is acceptable, indicated by a Cronbach's alpha and composite reliability above 0.7, or reliable. The level of convergent validity indicated by an AVE value of 0.689 > 0.5 meets the requirements for good convergent validity. Among the five measurement items, the measurement GPc4 has the highest outer loading value (0.943), indicating that having adequate equipment to control pollution is the most important component in green process innovation.

The variable of green product innovation is measured by three valid measurement items with outer loading values ranging from 0.825 to 0.869, which means that all three measurement items are valid and reflect the measurement of green product innovation. The reliability level of the variable is acceptable, as indicated by Cronbach's alpha and composite reliability above 0.7, making it reliable. The convergent validity level shown by the AVE value of 0.707>0.5 has met the criteria for good convergent validity. Among the three measurement items, the measurement GPd1 has the highest outer loading value (0.869), indicating that the item regarding product design changes is the most important component in green product innovation.

Table 4. Fornell dan Lacker

	CA	GC	EA	GPc	GPd
CA	0,892				
GC	0,890	0,931			
EA	0,894	0,926	0,935		
GPc	0,866	0,902	0,907	0,830	
GPd	0,695	0,754	0,763	0,809	0,841

Source: processed by researchers in 2025

Based on the table 4 above, discriminant validity testing is a form of evaluation to ensure that variables are theoretically different and empirically proven. The Fornell-Larcker criterion states that the square root of AVE must be greater than the correlation between the variables. Based on the table above, the Competitive Advantage variable (0.892) has a square root of AVE that is greater than its correlation with green consumer (0.890). This result indicates that the discriminant validity of the Competitive Advantage variable is met. The green consumer variable (0.931) has a square root of AVE that is greater than its correlation with environmental awareness (0.926). This result indicates that the discriminant validity of the green consumer variable is met. The environmental awareness variable (0.935) has a square root of AVE that is greater than its correlation with green process

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innovation (0.907). This result indicates that the discriminant validity of the environmental awareness variable is met. Lastly, the green process innovation variable (0.830) has a larger AVE root correlation with green product innovation (0.809); this result indicates that the discriminant validity of the green process innovation variable is met.

Table 5 . Result of R Square Testing

	R Square	Adjusted R Square
Competitive Advantage	0,834	0,830
Green Consumer	0,886	0,884

Source: processed by researchers in 2025

Based on the data in Table 5, the competitive advantage variable has an R Square value of 0.834, indicating that the variables of green consumer, environmental awareness, green process innovation, and green product innovation can influence the competitive advantage variable by 83.4%, while 16.6% is explained by other variables not included in this study. The green consumer variable has an R Square value of 0.886, indicating that the variables of environmental awareness, green process innovation, and green product innovation can influence the interest variable by 88.6%, while 11.4% is explained by other variables not included in this study.

Table 6. Results of the Direct Influence Hypothesis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistic	P Value
EA -> CA	0,357	0,347	0,124	2,884	0,004
GPc -> CA	0,238	0,233	0,113	2,099	0,036
GPd -> CA	0,077	0,077	0,054	1,423	0,155
EA -> GC	0,577	0,580	0,086	6,681	0,000
GPc -> GC	0,350	0,342	0,086	4,065	0,000
GPd -> GC	0,045	0,051	0,056	0,801	0,423

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GC -> CA	0,406	0,412	0,122	3,339	0,001

Source: Processed By Researchers In 2025

Based on Table 6. First, the influence of the relationship between Environmental Awareness and Competitive Advantage has a positive and significant effect with a significance value of 0.004 which means the first hypothesis is accepted. Second, the influence of the relationship between green process innovation and competitive advantage has a positive and significant effect with a significance value of 0.036 which means the second hypothesis is accepted. Third, the influence of the relationship between green product innovation and competitive advantage has a positive but not significant effect with a significance value of 0.155 which means the third hypothesis is rejected. Fourth, the influence of the relationship between environmental awareness and green consumers has a positive and significant effect with a significance value of 0.000 which means the fourth hypothesis is accepted. Fifth, the influence of the relationship between green process innovation and green consumers has a positive and significant effect with a significance value of 0.000, which means that hypothesis five is accepted. Sixth, the influence of the relationship between green product innovation and green consumers has a positive but not significant effect with a significance value of 0.423, which means that hypothesis six is rejected. Seventh, the influence of the relationship between green consumers and competitive advantage has a positive and significant effect with a significance value of 0.001, which means that hypothesis seven is accepted.

Table 7. Results of the Mediation Hypothesis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistic	P Value
EA -> GC -> CA	0,234	0,234	0,066	3,570	0,000
GPc -> GC -> CA	0,142	0,145	0,066	2,166	0,031
GPd -> GC -> CA	0,018	0,022	0,026	0,697	0,486

Source: processed by researchers in 2025

Based on table 7, the hypothesis of mediation effect. First, the influence of the green consumer variable in mediating the relationship between environmental awareness and competitive advantage has a significance value of 0.000. This result shows that green consumer is proven to be able to mediate the relationship between environmental awareness and competitive advantage; based on this, hypothesis eight is accepted. Second, the influence of the green consumer variable in mediating the relationship between green process innovation and competitive advantage has a significance value of 0.031. This result shows that green consumer is proven to be

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able to mediate the relationship between green process innovation and competitive advantage; based on this, hypothesis nine is accepted. Third, the influence of the green consumer variable in mediating the relationship between green product innovation and competitive advantage has a significance value of 0.486. This result indicates that the green consumer is unable to mediate the relationship between green product innovation and competitive advantage, thus hypothesis ten is rejected.

Discussion

The results of this study reveal that environmental awareness statistically proves to influence the increase in the competitive advantage of companies as well as to encourage green consumers. This finding demonstrates that the more a company has a deep understanding of the environment and the environmental damage occurring, the issues related to it, and concrete steps to address these matters, the more consumers will shift from conventional products to green products. This finding also answers the doubts regarding the real impact of companies that care about the environment, where this research firmly concludes that the more a company cares about the environment, the more competitive advantage it will gain. This research also produced a finding, where in addition to the direct relationship between environmental awareness and competitive advantage and environmental awareness and green consumers, green consumers also prove to be a good mediator in mediating the relationship between environmental awareness and competitive advantage.

Another result of this research is that green process innovation has been statistically proven to influence the increase in competitive advantage of companies as well as to encourage green consumers. This result proves that the more companies implement green innovations in their production processes, the more consumers will shift from conventional products to green products. Additionally, and importantly, companies that implement green process innovation have been shown to enhance their competitive advantage. This signifies the importance of carrying out green innovation processes in order to create competitive advantages for companies. Similar to the variable of environmental awareness mentioned above, this study also found that in addition to the direct relationship between green process innovation and competitive advantage, as well as between green process innovation and green consumers, green consumers can also serve as a good mediator in mediating the relationship between green process innovation and competitive advantage.

Meanwhile, green product innovation in this research has proven to not significantly influence competitive advantage or green consumers. This finding provides new insight as the relationship between green product innovation and green consumers or competitive advantage has always shown maximum significance. This result is suspected to occur because the respondents used in this study are small and medium-sized enterprises (SMEs) located in Kendal regency, where they still use raw products from other producers, and thus are unable to fully implement green product innovation. The mediation results also indicate that green consumers are unable to mediate the relationship between green product innovation and competitive advantage.

CONCLUSION

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This research reveals that statistically, the variable of environmental awareness and the variable of green process innovation have a positive and significant effect on both the variable of competitive advantage and the variable of green consumer. This indicates that if a company has deep knowledge and concern for the environment and is willing to engage in green innovation processes, then the company will be able to influence green consumers and, most importantly, will be able to create a strong competitive advantage. Meanwhile, the variable of green product innovation has not been proven to affect either the variable of competitive advantage or the variable of green consumer. In the mediation test, the variable of green consumer has statistically proven to mediate the relationship between the environmental awareness variable and the green process innovation variable towards the competitive advantage variable, but it has not yet been proven to mediate the relationship between the green product innovation variable and the competitive advantage variable.

The research findings provide input and encourage micro, small, and medium enterprises (MSMEs) to understand and care about the environment by implementing green innovations in their production processes. This is deemed necessary, considering that a deep understanding of the environment and the care of MSME actors towards the environment has proven to drive the creation of good competitive advantages. With the creation of competitive advantages, it will certainly help MSME actors face very competitive industrial competition in the current digital era. This research also provides input for the government and related institutions to actively promote the importance of environmental conservation to MSME actors in order to create MSMEs with competitive advantages. The limitation of this study is that the respondents are only SMEs residing in Kendal Regency.

Further research should consider the use of a broader range of respondents so that the benefits of the research can also be felt on a national scale, not just regionally. Additionally, it is necessary to consider the use of moderating variables in moderating the relationship between green product innovation and competitive advantage among SMEs.

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