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# Competitive Advantage of Environmental Management and Green Innovation

*Ventaja competitiva en la gestión medioambiental e innovación ecológica*

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### ABSTRACT

Environmentally-based management is a topic that is being widely discussed in various publications. This study uses the mixed method with questionnaire; it is distributed to 110 respondents, also interviewing 3 informants from the management of BUMDES. The result of this study shows that environmental management and green innovation can have a positive and significant effect on the competitive advantage and performance of the company. It is hoped that the result of this study can help the government and BUMDES managers to further develop environmental management and green Innovation.

**Keywords:** BUMDES/BUMDES (Village-Owned Enterprises), Competitive Advantage, Environmental Management, Green Innovation.

### RESUMEN

La gestión basada en el medio ambiente es un tema que se está discutiendo ampliamente en varias publicaciones. Este estudio utiliza el método mixto con cuestionario; el mismo se distribuye a 110 encuestados, entrevistándose además a 3 informantes de la gerencia de BUMDES. El resultado de este estudio muestra que la gestión ambiental y la innovación ecológica pueden tener un efecto positivo y significativo en la ventaja competitiva y el desempeño de la empresa. Se espera que el resultado de este estudio pueda ayudar al gobierno y a los gerentes de BUMDES a desarrollar aún más la gestión ambiental y la innovación ecológica.

**Palabras clave:** BUMDES/BUMDES (Empresas propiedad de la aldea), Gestión ambiental, Innovación ecológica, Ventaja competitiva.

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## **INTRODUCTION**

In the last few years, the topic of environmental-based company management has been widely discussed in various pieces of literature. Environmental-based management is also adopted by many institutions under the auspices of the government, such as Village-Owned Enterprises (BUMDES). The development of good BUMDES in Indonesia is shown by BUMDES in Yogyakarta. Yogyakarta has dozens of BUMDES and hundreds of MSMEs under their management and supervision. BUMDES management always prioritizes culture and environmental use and gains profit while keeping and preserving local wisdom. This makes the development very interesting to be studied and analyzed.

In BUMDES's development, competition is one of the obstacles and challenges that must be conquered. Therefore, companies need to have a competitive advantage, which is the company's strategic advantages compared to other companies. Some pieces of literature discussed competitive advantage and found that it could provide a positive and significant effect on firm performance (Anwar et al.: 2018, pp.998-1025). Anwar et al. (2018) analyzed the role of competitive advantage in SMEs and found that competitive advantage can contribute to firm performance, and even to the economic growth of a country.

Various pieces of literature have proven that competitive advantage has an important role in the company and that it must be developed. One of the aspects that need to be considered in developing competitive advantages is environmental management. Environmental management is the management of a company that saves energy and natural resources, minimizing environmental problems caused by company activities, and protecting the natural environment.

Environmental issues attract a lot of attention from companies to the community. This situation becomes an opportunity for companies to increase competitiveness. Besides environmental management, the environmental-based management aspects that are also widely discussed by the previous pieces of literature are green innovation. Green innovation is all actions taken by stakeholders that contribute to environmental impacts and able to achieve certain ecological purposes. Several studies have proven that by developing green innovation, companies are able to achieve higher competitive advantages. Therefore, this study will discuss the application of environmental management and green innovation in BUMDES management and analyze the effect on competitive advantage and firm performance.

## **LITERATURE REVIEW**

### **Environmental Management and Competitive Advantage**

Environmental management is defined as equipment, method, and procedures used in the production, product design, and product distribution mechanism that save energy and natural resources, minimize environmental problems caused by human activities and protect the natural environment. Another definition describes environmental management as an organized effort of all organizations with the main goal of enabling it to comply with existing environmental laws and to continue to increase their impact on the environment.

Environmental management is also described as a part of a management system that includes organizational structures, responsibilities, practices, procedures, processes, and resources intended to achieve and maintain specific environmental behaviours that can reduce the impact caused by company's operations in the natural environment. The discussion of environmental management is also described as a voluntary implementation of practices and innovation, such as designing or changing operations, processes, and products to prevent negative environmental impact.

The importance of environmental management is proven by the company efforts with limited markets and locations, especially companies that operate in the countryside which provide products with the label 'good quality', 'green', or 'ethical'. Thus, environmental quality attributes are prevalent, and business strategies and competitiveness are important for the company (Arthur & Yamoah: 2019; Sukier et al.: 2020). Whereas,

Amores-Salvadó et al. (2015) found that companies that adopt environmental management can achieve competitive advantages in the form of costs and differentiation.

Salvadó et al. (2015) also analyzed the relationship between environmental management and competitive advantage in the hotel industry and found positive and significant results given by environmental management on competitive advantage. Environmental management itself is described in four dimensions, namely operational systems, information systems, strategic systems, and technical systems. Lopex et al. (2015) describe environmental management in two dimensions, namely the organizational aspect and technical aspect. Some pieces of literature prove that environmental management has a significant effect on competitive advantage. Whereas, competitive advantage is defined as the company's strategic advantage compared to its competing companies in the industry, which enables it to perform better. The measurement of competitive advantage in several pieces of literature uses cost and differentiation (Anwar et al.: 2018, pp.998-1025).

## **H1: Environmental management has a positive and significant effect on competitive advantage**

### **Green Innovation and Competitive Advantage**

Green innovation is all steps taken by stakeholders in the company that are relevant to promote the development and application of processes, products, techniques, and management systems that contribute to the environment and achieve certain ecological purposes. Green innovation can be classified into three main categories as green product innovation, green process innovation, and green managerial innovation. As for the explanation for green innovation is explained in two dimensions, namely green process innovation and green managerial innovation.

Related to the importance of green innovation, Apak and Atav (2015) added that green innovation and green technology is considered an important stage for companies seeking to gain international competitiveness in the global market. While from a different aspect, Li et al. (2019) discussed the relationship between environmental regulation and green innovation. The result shows that the relationship is moderated positively by company size and moderated negatively by the level of internationalization. In contrast, the relationship between state competitiveness and green innovation is moderated negatively by company size and moderated positively by the level of internalization.

In detail, it is explained that the ability of green innovation from a company has a positive and significant effect on the competitiveness of a company, but different components have different effects on the competitiveness of a company. Product differentiation has a mediating effect on the relationship between company green innovation and competitiveness, and the mediating effect is different depending on the components of the capability of green innovation. The company scale positively moderates the relationship between the company's green innovation and the company's competitiveness through product differentiation.

Ar (2012) explained that green product innovation has a positive and significant effect, both on firm performance and competitive advantage. On the other hand, managerial environmental concern only moderates the relationship between green product innovation and firm performance. Several previous studies have explained the relationship between green innovation and competitive advantage (Li et al.: 2019, pp.1-11). In several pieces of literature, competitive advantage is measured using two dimensions, namely, cost leadership and differentiation.

## **H2: Green innovation has a positive and significant effect on competitive advantage**

### **Competitive Advantage and Firm Performance**

In the previous discussion, it is stated that a competitive advantage can be built by increasing environmental management and green innovation. Competitive advantage is defined as the ability to get investment returns consistently above the average for the industry. In contrast, Anwar et al. (2018) describe competitive advantage as the strategic advantage of a company towards other companies in one industry. By

having a good competitive advantage, the company will be able to improve its performance continuously (Cantele & Zardini: 2018, pp.166-176; Rahman & Ramli: 2014, pp.129–137).

Firm performance is defined in various perspectives. Anwar et al. (2018) defined firm performance from the perspective of financial performance, which consists of financial efficiency stages such as the return of investment and returns on equity, and profit measures such as return on sales and net profit margin, profit, turnover, or return on investment. Bobillo et al. (2010) described firm performance from three aspects, namely accounting-based, market-based, and operational. Rahman and Ramli (2014) described firm performance from two perspectives, namely financial in the form of profit and sales, and non-financial in the form of customer satisfaction and product or service quality.

Related to the relationship between competitive advantage and firm performance, Anwar et al. (2018) stated that competitive advantage in SMEs could increase firm performance, and if the firm performance of the SMEs increases, it can also increase the economic development of a country. In addition to being a trigger for increasing firm performance, competitive advantage can be a positive and significant mediation for the relationship between environmental protection and financial performance.

On the other hand, Bobillo et al. (2010) stated that business network, financial network, and political network have a positive and significant contribution to the performance of the new business and competitive advantage. Competitive advantage is a strong mediator between the financial network and the performance of the new business, as well as between the business network and the performance of the new business, respectively. However, in the case of the relationship between political networks and new business performance, a competitive advantage only plays a part in the role of partial mediation. Agreeing with several previous studies, Rua et al. (2018) stated that competitive advantage, which consists of cost and differentiation, is able to provide a positive and significant effect on firm performance.

### **H3: Competitive advantage has a positive and significant effect on firm performance**

#### **Environmental Management and Firm Performance**

Besides having an effect on competitive advantage, environmental management can also have a positive and significant effect on firm performance directly. Potrich et al. (2019) found that environmental management system positively moderates the relationship between environmental product innovation and company market performance. In contrast, Potrich et al. (2019) studied about proactive environmental management in the company level and mentioned three dimensions that build environmental management, which is organizational, operational, and communicational dimension.

Environmental management application, one of them in reducing pollution at the site, has a significant effect on the financial performance of short-term and long-term construction companies in multinational companies. From another point of view, environmental management that focuses on the logic of prevention has had a positive impact on its environmental performance. In addition, the application of this practice contributes to the emergence of benefits derived from the accumulation of greater employee experience in creating new projects that are designed to reduce residues and pollution

Huang et al. (2018) stated that not all types of environmental management are related to firm performance, and in order to maximize environmental management, companies need to conduct a controlling family. Related to the application of environmental management, if the practice is stronger, it can contribute to environmental performance on economic performance which will improve gradually.

The indicators of the application of environmental management are adopting environmental management systems, implementing environmental policy, setting up the environmental management department, developing environmental management plans, developing the future environmental strategy, adopting low-carbon technology, cooperating on environmental affairs, developing environmental performance incentives, developing the environmental knowledge training, signing green purchase agreements, the certifying environmental performance by independent agencies and participating in voluntary environmental activities.

Strengthening the relationship of environmental management with firm performance, Moliner et al. (2015) found that quality management and environmental management affect several dimensions of firm performance positively, and also found that the application of quality management facilitates skill development for environmental management in the hotel industry.

#### **H4: Environmental management has a positive and significant effect on firm performance**

##### **Green Innovation and Firm Performance**

Besides environmental management, another environmental-based management aspect that can have an effect on firm performance is green innovation (El-Kassar & Singhb: 2019). Green innovation can be described in the green process innovation and green product innovation. Green process innovation has a positive impact on green product innovation. Green process innovation and green product innovation can increase the financial performance of a company. In addition, green product innovation mediates the relationship between a green process innovation and financial performance of a company, while the green firm image moderates the relationship between a green process innovation and green product innovation.

Lin et al. (2019) stated that green strategic innovation positively affects the financial performance of a company. Interestingly, it is also found that company size moderates negative correlation between green strategic innovation and financial performance of the company. Small companies show greater investment returns of green innovation compared to large companies, which shows that these small companies tend to look for variation and visibility to access better resources.

Different results are shown in the study conducted by Rezende et al. (2019), who stated that there is no significant relationship between green innovation intensity and company financial performance in the years ahead, but a positive relationship will take place over the following years and become expressively higher after two years. Furthermore, the level of internationalization does not moderate this relationship. These findings provide empirical evidence that the return of green innovation depends on time, but not many of multinational companies are internationalized.

Another finding shows that green innovation has a significant effect on the financial performance of a company. It is indicated by the higher the green innovation, the higher the company profitability would be, and the lower the financial risk of the company. In addition, the findings support the theoretical statement that the higher the intensity of market resources, market turmoil, and technological turn oil, the stronger the relationship between green innovation and financial performance of the company would be.

#### **H5: Green innovation has a positive and significant effect on firm performance.**

### **METHODS**

The population of this study is Village-Owned Enterprises (BUMDes) in Yogyakarta. From various BUMDes in Yogyakarta, three BUMDes with the most SMEs and good development were chosen, namely Srimartani, Kampung Flory, and Panggung Harjo. This study uses mixed methods, which is a combination of quantitative and qualitative analysis. The quantitative data is sourced from primary data obtained through the questionnaire that distributed to 110 SMEs under the management of the BUMDes. The result from the questionnaire will be analyzed with Structural Equation Model using Smart-PLS (Partial Least Square) software.

Whereas, the qualitative data is obtained from the interview with three informants; the first informant is from the manager of Srimartani BUMDES; the second informant is the manager of Kampung Flory BUMDES, and the third manager is the manager of Panggung Harjo BUMDES. This study uses four variables with two exogenous variables, namely environmental management and green innovation, and two endogenous

variables, namely, competitive advantage and firm performance. The validity and reliability test results concluded that all items and variables are valid and reliable.

**RESULTS**

**Respondents' Profile and Characteristic**

Respondents' characteristic in this study is explained in several criteria, including gender, age, education, and income. The explanation of the respondents' characteristics can be seen in Table 1.

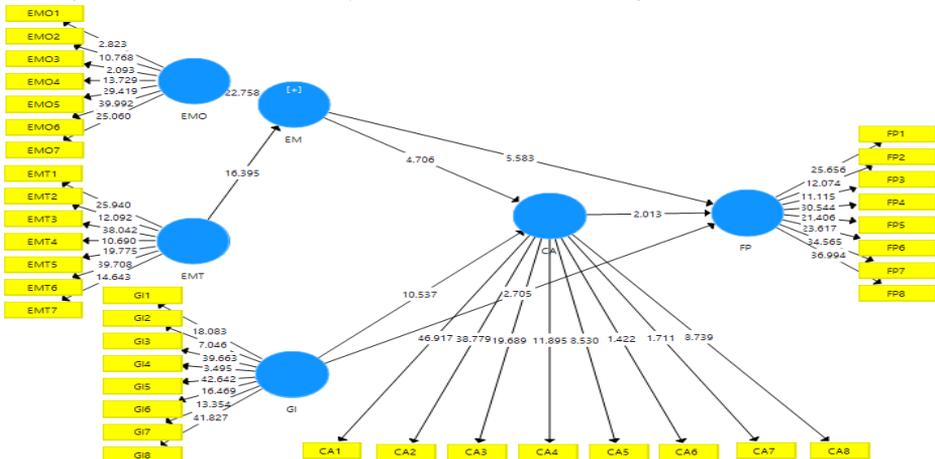
Gender	Frequency	Percentage
Male	32	58%
Female	78	42%
Age		
19-30 years old	26	44%
31-40 years old	40	27%
41-50 years old	44	29%
Education		
Elementary School	0	13%
Junior High School	36	24%
Senior High School	49	33%
Others	22	31%
Income		
< 1.000.000	61	67%
1.000.000– 5.000.000	35	23%
>5.000.000	14	9%
Total Respondent	110	100%

**Table 1.** Respondents' Characteristic

*Testing Hypotheses*

*Structural Equation Modeling*

This study tested five hypotheses on the inner model. There are two exogenous variables, namely environmental management and green innovation, and two endogenous variables, namely, competitive advantage and firm performance. The hypotheses test can be seen in Figure 1 and Table 2.



**Figure 1.** Inner Model

Construct	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
CA -> FP	0.237	0.245	0.118	2.013	0.045
EM -> CA	0.312	0.317	0.066	4.706	0
EM -> FP	0.488	0.492	0.087	5.583	0
GI -> CA	0.674	0.671	0.064	10.537	0
GI -> FP	0.264	0.255	0.098	2.705	0.007

Table 2. Path Coefficient

The inner model test result, as shown in Table 2 shows that from four path relationship, all paths are significant in  $\alpha = 0.05$ , so that all five of the research hypotheses can be accepted. The conclusions from Table 7 are as follows:

1. Competitive advantage has a positive and significant effect on firm performance. It is proven by the t-statistic value that is more than 1.96, which is 2.013, and the P-value that is less than 0.05, which is 0.045.
2. Environmental management has a positive and significant effect on competitive advantage. It is proven by the t-statistic value that is more than 1.96, which is 4.706, and the P-value that is less than 0.05, which is 0.000.
3. Environmental management has a positive and significant effect on firm performance. It is proven by the t-statistic value that is more than 1.96, which is 5.583, and the P-value that is less than 0.05, which is 0.000.
4. Green innovation has a positive and significant effect on competitive advantage. It is proven by the t-statistic value that is more than 1.96, which is 10.537, and the P-value that is less than 0.05, which is 0.000.

Green innovation has a positive and significant effect on firm performance. It is proven by the t-statistic value that is more than 1.96, which is 2.705 and the P-value that is less than 0.05, which is 0.007.

## DISCUSSION

Village-Owned Enterprises (BUMDes) has an important role in advancing the economy of the community. The good performance of BUMDes will improve the welfare of the community by opening jobs and increasing economic activities in the countryside. The performance of BUMDes, which continues to increase from year to year is certainly not something that just happens. A gradual process occurs, and certain factors can trigger an increase in competitive advantage and the performance of BUMDes in Yogyakarta.

The result of this study supports the first hypothesis that environmental management can have a positive and significant effect on competitive advantage on BUMDes in Yogyakarta. The result supports the study conducted by Arthur and Yamoah (2019), Amores-Salvadó et al. (2015), Singh et al. (2019), Salvadó et al. (2015), Chiu et al. (2018), Kim and Hoskisson (2015), Liao (2016). Good management is management that always pays attention to the environmental aspects. One of the environmental aspects is environmental management which includes two dimensions, namely organizational aspect and technical aspect. This is proven by the fact that BUMDes that attract a lot of market share are BUMDes that offer environmental-themed products or services. The results of this study are also supported by the informant's statement, which says that:

"We recognize and realize the competitive advantage of our business compared to the competitors outside the BUMDes. It is about the environmental concept that we offer, and it can bring many customers."  
(I1)

The result of this study also supports the second hypothesis which stated that green innovation can have positive and significant effect on competitive advantage. The result supports the previous studies conducted

by Apak and Atay (2015), Li et al. (2019), Ar (2012), Burki and Dahlstrom (2017), Fankhauser et al. (2013), Papadas et al. (2018), Singjai et al. (2018), Vaccaro et al. (2009).

In addition to environmental-based management, BUMDes also needs to think about environmental-based innovation. Starting from the selection of raw materials, processing, to sell products, all must pay attention to environmental aspects. It is proven that with the implementation of green innovation, BUMDes will have a higher competitive advantage.

*"We offer products from natural and environmentally friendly materials, and it turns out that this is indeed able to outperform competing products, even though the production process is a bit more difficult."* (I3)

The informant's statement supports and justifies that the efforts of carrying out environmental-based management are able to provide competitive advantage for their business, and have a strategic advantage compared to the competitors. The result of this study also supports the third hypothesis that competitive advantage can have a positive and significant effect on firm performance. The result supports the studies carried out by Anwar et al. (2018), Gamero et al. (2009), Anwar et al. (2018), Bobillo et al. (2010), Cantele and Zardini (2018), Khan et al. (2018), Rahman and Ramli (2014), Rua et al. (2018).

BUMDes in Yogyakarta does have a strategic advantage compared to other companies in the same industry. For example, Kampung Flory, which has a business in the culinary field namely a restaurant. The strategic advantage owned by Kampung Flory is vast land and has a very dominant nature field. Kampung Flory also offers a very natural menu of traditional food products which is also processed by natural methods. Managers believe that this is what makes visitors come, and makes the benefit continues to increase from year to year.

*"Kampung Flory has a fairly high attraction for consumers; our restaurant has a strong natural nuance. We provide an outbound area, river views in the middle of the restaurant, and now we are completing it with a very natural and beautiful reservoir."* (I2)

The results of this study also support the fourth hypothesis that environmental management can have a positive and significant effect on firm performance. This positive and significant effect is also supported by the previous studies, such as from Potrich et al. (2019), Salvado et al. (2015), Jimenez et al. (2012), Chen et al. (2016), Claver et al. (2007), Ann et al. (2006), Huang et al. (2018), Liang and Liu (2016), Longoni and Cagliano (2018), Lundgren and Zhou (2017), and Moliner et al. (2012).

In addition to have a positive and significant effect on competitive advantage, environmental management also has a positive and significant effect on firm performance. This proves the magnitude of the role of environmental management in managing BUMDes. Besides environmental management, green innovation also has an equally important role. The fifth hypothesis stated that green innovation has a positive and significant effect on firm performance, which is also supported by the result of this study. The result supports the previous studies conducted by Xie et al. (2019), Lin et al. (2019), Zhang et al. (2019), Tariq (2018), Chan et al. (2016), El-Kassar & Singhb (2018), and Lin et al. (2013).

*"BUMDes is located in the village, and managed by the village people. Therefore, our superiority is the nuances of nature and environmentally friendly. We are very proud of it and because of this, our performance has always improved."* (I1)

From the results of the study and information from the informants, it is clear that environmental management and green innovation are both important aspects in the BUMDes management that are able to provide competitive advantage and better performance.

*"From several businesses developed by our BUMDes, the businesses that have advantages in the field of environment have high competitiveness. Surely, this will make our business continues to grow, but yes, sometimes there are some problem in funding and workforce."* (I2)

The management of BUMDes is sometimes hampered in less competent human resources (HR) and funding aspects. Thus, the government role is very much needed in the development of BUMDes. The application of environmental management and green innovation indeed has a big impact on the development

of the company, but it also requires a high investment. The government and related parties are expected to be able to facilitate the BUMDes management for HR training, mentoring, and funding.

## **CONCLUSION**

This study provides conclusion that environmental management and green innovation are very important for BUMDes to improve competitive advantage and the performance of the company. When the environmental management and green innovation increase, the competitive advantage will also increase. Another finding of this study is that increased competitive advantage will provide an increase in firm performance. On the other hand, this study also found that an increase in environmental management and green innovation can have a positive and significant effect on firm performance directly.

The theoretical implications of this study are that environmental management, green innovation, competitive advantage, and firm performance can be integrated into a model that is able to develop BUMDes in Yogyakarta that is also feasible to be implemented in other BUMDes in its management. This study also offers contribution for the government and BUMDes' managers, that it is important for them to develop environmental-based management, especially environmental management and green innovation aspects.

For further research, it can be developed by conducting research in other industries, such as culinary industry, folk markets, or others that need development and support. There are many other environmental aspects that also need to be examined and analyzed for how they contribute to the company.

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