

The Role of Environmental Management and Green Innovation (case study of BUMDES (Village Business Agency))

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Abstract

Purpose: Environmental Based Management is a discussion that is being carried out, on the other hand Indonesia has a business entity that greatly contributes to the welfare of the people and has a good environmental-based management namely BUMDES (Village-Owned Enterprises). This study aims to analyze the relationship between environmental management and green innovation on firm performance for BUMDES.

Methodology: This study uses a quantitative method with PLS (Partial Least Square). Data was collected by questionnaire distribution of 110 respondents from BUMDES managers.

Results: The results of this study indicate that environmental management and green innovation have a positive and significant effect on firm performance.

Applications/Originality/Value: This research is important because of the limited literature that discusses environmental management and green innovation at Village Business Agency such as BUMDES. The results of this study are expected to help the government and managers of BUMDES to further develop environmental management and green innovation so as to improve the performance of BUMDES.

Keywords: Environmental Management, Green Innovation, BUMDES (Village-Owned Enterprises)

INTRODUCTION

In recent years, the discussion of environmental-based firm management has been widely discussed in various literature (Lin et al., 2013). Environmental-based management is also widely adopted by institutions under the auspices of the government, one of which is the Village-Owned Enterprises (BUMDES). The development of BUMDES that is quite good in Indonesia is BUMDES in Yogyakarta. Yogyakarta has dozens of BUMDES and hundreds of MSMEs under their management and supervision. BUMDES management always prioritizes the culture and utilization of the environment, gaining profits while preserving and preserving local wisdom. This is of course very interesting to study and analyze its development.

In the development of BUMDES, competition is one of the obstacles and challenges that must be conquered. Therefore, in order to be able to survive amid tight competition BUMDES must always improve its performance. Performance benchmarks can be seen from several points of view. Azlina et al. (2014) defines a firm's performance from the perspective of financial performance consisting of financial efficiency measures such as return on investment and return on equity, and size of earnings such as return on sales and net profit margins, earnings, turnover or return on investment. Whereas Bobillo et al. (2010) describe the firm's performance from three aspects, namely accounting based, market based and operational. Rahman and Ramli (2014) describe the firm's 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.

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Aspects that need to be considered in improving firm performance are direct environmental management (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; Moliner et al., 2012). Environmental management is the management of companies that save energy and natural resources, minimize environmental problems caused by firm activities and protect the natural environment (Lopez et al., 2015).

Environmental issues attract a lot of attention from the firm to the community. This situation makes its own opportunities for companies to improve their competitiveness and performance. In addition to environmental management, environmental-based management aspects that are also widely discussed in previous literature are green innovation. Green innovation is all actions taken by stakeholders who contribute to environmental impacts and achieve certain ecological goals (Ar et al., 2012). Several studies have proven that by developing green innovation companies are able to achieve better performance (Xie et al., 2019; Lin et al., 2019; Rezende et al., 2019; Zhang et al., 2019; Rodriguez et al., 2017; Tariq, 2018; Arfi et al., 2017; Chan et al., 2015; El-Kassar, 2018; Lin et al., 2013).

Therefore this study will discuss the application of environmental management and green innovation in the management of BUMDES and analyze their effects on firm performance. This research is important to do because there are still limited previous studies that discuss environmental management and green innovation, especially in the management of BUMDES (Village-Owned Enterprises).

LITERATURE REVIEW

Environmental Management and Firm Performance

Environmental management is defined as the equipment, methods and procedures used in production, product design and product distribution mechanisms that save energy and natural resources, minimize the environmental problems caused by human activities and protect the natural environment (Lopez et al., 2015). Another definition defines environmental management as an organized effort of all organizational functions with the main goal of enabling it to comply with existing environmental laws and to continue to increase their impact on the environment (Jimenez et al., 2012).

Environmental management is also defined as part of a management system that includes organizational structure, responsibilities, practices, procedures, processes and resources intended to achieve and maintain specific environmental behavior that can reduce the impact caused by the firm's operations on the natural environment (Claver et al., 2007). The discussion on environmental management is also described as voluntary implementation of practices and innovations, such as designing or changing operations, processes and products, to prevent negative environmental impacts (Huang et al., 2018).

The importance of environmental management is evidenced by the efforts of companies that have limited markets and locations, especially companies operating in rural areas to provide products labeled 'quality', 'green', or 'ethical'. Thus, environmental quality attributes become prevalent and business strategies and competitiveness are important for companies (Arthur and Yamoah, 2019).

Some literature proves that environmental management can have a positive and significant influence on firm performance directly (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; Moliner et al., 2012). Salvado et al. (2012) found that the environmental management system positively moderated the relationship between environmental product innovation and the firm's market performance. Whereas Potrich et al. (2019) examines proactive environmental management at the firm level and mentions three dimensions of environmental management builders namely organizational, operational, and communicational.

The firm's performance is defined in several points of view. Azlina et al. (2014) defines a firm's performance from the point of view of financial performance consisting of financial efficiency measures such as return on investment and return on equity, and measures of return such as return on sales and net profit margins, earnings, turnover or return on investment. Whereas Bobillo et al. (2010) describe the firm's performance from three aspects, namely accounting based, market based and operational. Rahman and Ramli (2014) describe the firm's 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.

Environmental management with one big role, namely the reduction of pollution at the site has a significant impact on the financial performance of short-term construction companies and long-term on multinational companies (Chen et al., 2016). From another point of view environmental management, which focuses on the logic of prevention, has had a positive impact on 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 designed to reduce residuals and pollution (Claver et al., 2007).

As for Huang et al. (2018) states that not all types of environmental management are related to firm performance and in order to maximize environmental management a firm needs to do controlling families. Related to the application of environmental management, if the practice is stronger, it can contribute to environmental performance on economic performance that will gradually improve (Liang and Liu, 2016).

Whereas the indicators of implementing environmental management are adopting environmental management systems, implementing environmental policies, 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, certificating environmental performance by independent agencies and participating in voluntary environmental activities.

Strengthening the relationship of environmental management with firm performance, Moliner et al. (2012) found that quality management and environmental management positively influenced several dimensions of firm performance, and also that the application of quality management facilitated the development of skills for environmental management in the hotel industry.

H1: Environmental management has a positive and significant effect on firm performance.

Green Innovation and Firm Performance

Green innovation is all steps taken by relevant stakeholders in a firm to promote the development and application of processes, products, techniques, and management systems that contribute to the environment and achieve certain ecological goals. Green innovation can be classified into three main categories as green product innovation, green process innovation, and green managerial innovation (Ar, 2012). The explanation of green innovation is explained in two dimensions, namely green process innovation and green managerial innovation (Burki and Dahlstrom, 2017).

Related to the importance of green innovation, Apak and Atav (2015) added that green innovation and green technology are considered as an important stage for companies seeking to gain international competitiveness in the global market. While from different aspects, Borsato and Amui (2019) discussed the relationship between environmental regulation and green innovation and found that the relationship was positively moderated by firm size and negatively moderated by the level of internationalization. While the relationship between state competitiveness and green innovation is negatively moderated by firm size and positively moderated by the level of internationalization.

In addition to environmental management, environmental-based management aspects that are able to influence firm performance are green innovation (Xie et al., 2019; Lin et al., 2019; Rezende et al., 2019; Zhang et al., 2019; Rodriguez et al., 2017; Tariq, 2018; Arfi et al., 2017; Chan et al., 2015; El-Kassar, 2018; Lin et al., 2013). Green innovation can be translated into green process innovation and green product innovation. Green process innovation has a positive impact on green product innovation and that green process innovation and green product innovation can improve a firm's financial performance. In addition, green product innovation mediates the relationship between green process innovation and the firm's financial performance and that the green firm image moderates the relationship between green process innovation and green product innovation (Xie et al., 2019).

Lin et al. (2019) states that green strategic innovation positively influences the firm's financial performance. Interestingly, we also find that firm size moderates the negative correlation between green strategic innovation and corporate financial performance. Small companies show higher returns on green innovation investment than large companies, which shows that these small companies are more likely to seek variety and visibility, to access better resources.

Different results found by Rezende et al. (2019) that there is no significant relationship between the intensity of green innovation with the firm's financial performance in the coming year but a positive relationship, will last for the following years and become expressively higher after two years. Furthermore the degree of internationalization does not moderate this relationship. These findings provide empirical evidence that the return of green innovation depends on time but not how much multinational companies are internationalized.

Other findings reveal that green innovation has a significant influence on a firm's financial performance, namely the higher the green innovation, the higher the firm's profitability, and reduce the firm's financial risk. In addition, the findings support the theoretical statement that the higher the intensity of market resources, market turmoil, and technological turmoil the more strengthened green innovation and the relationship of corporate financial performance (Tariq, 2018).

H2: Green innovation has a positive and significant influence on firm performance.

RESEARCH METHODS

The population of this study is the Village-Owned Enterprises (BUMDES) in Yogyakarta. Of the various BUMDES in Yogyakarta, three BUMDES have the most SMEs and good development, namely BUMDES Srimartani, Kampung Flory and Harjo Stage. This research uses quantitative methods. Quantitative data sourced from primary data obtained through the distribution of questionnaires provided to 110 SMEs under the management of BUMDES. The results of the questionnaire will be analyzed by the Structural Equation Model method using Smart-PLS (Partial Least Square) software.

This study uses 4 variables with 2 exogenous variables namely environmental management and green innovation and 1 endogenous variable, namely firm performance.

The operational definitions of each variable are as follows:

1. Environmental management is defined as an organized effort of all organizational functions with the main goal of enabling it to comply with existing environmental laws and to continue to increase their impact on the environment (Jimenez et al., 2012). Environmental management is explained in 2 dimensions namely organizational aspect and technical aspect with the following indicators (Lopez et al. 2015):

Organizational Aspects

- The firm formally communicates its environmental policies and strategies to all its employees.
- The management team participates and encourages environmental management initiatives.
- Employees have the environmental competencies needed to develop their professional activities.
- When there is a desire to improve in some aspects of the environment, the firm builds collaboration with other companies so they can help to achieve improvement.
- The firm supports experiments with new methods, with the aim of identifying areas of environmental improvement.
- The firm establishes emergency procedures to respond to environmental problems and accidents.
- The firm prioritizes purchasing harmless components and / or products.

Technical Aspects

- Alternative production techniques
 - Lower energy consumption
 - Lower resource consumption
 - Simplified / cleaner / reusable packaging
 - Material selection is low impact
 - Supports recycling
 - Convenient waste removal / care / storage
2. Green Innovation is defined as all steps taken by relevant stakeholders in a firm to promote the development and application of processes, products, techniques and management systems that contribute to the environment and achieve certain ecological goals (Ar, 2012). The green innovation indicators are as follows (Rodriguez et al. 2017):
 - Companies choose product ingredients that produce the least amount of pollution to develop or design products.
 - Companies choose the ingredients of their products that consume the least energy and resources to develop or design products.
 - Companies use the least amount of materials to arrange their products to develop or design products.
 - Companies will carefully evaluate whether their products are easily recycled, reused, and described for product development or design.
 - The firm's manufacturing process effectively reduces emissions of hazardous substances or waste.

- The firm’s manufacturing process effectively recycles waste and emissions that can be treated and reused.
 - The firm’s manufacturing process effectively reduces the consumption of water, electricity, coal and oil.
 - The process of making a firm effectively reduces the use of raw materials.
3. Firm Performance is a display of firm performance in a certain time period. The firm performance measurement indicators are as follows (Anwar et al. 2018):
- Return on investment
 - Return on equity
 - Return on assets
 - Sale growth
 - Customer satisfaction
 - Employees satisfaction
 - Product / service quality
 - Employee loyalty

RESULT

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 is as follows:

Table 1. Respondents’ Characteristic

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%

Structural Equation Model

Outer Model Evaluation

From the analysis results it is known that there are 6 indicators that are invalid, namely EMT2, GI2, GI6, GI4, GI7 and FP3 and must be removed from the analysis. Table 4 is the result of loading factors after invalid indicators are removed and describes that all items have an outer loading value greater than 0.5 with a significant level <0.05. so the questionnaire items studied have a good outer model.

Tabel 4. Conclusion of Loading Factor Value

Latent Variable	Item Code	Loading Factor	Ket
Environmental Management	EMO1	0.770	Valid
	EMO2	0.754	Valid
	EMO3	0.729	Valid
	EMO4	0.771	Valid
	EMO5	0.849	Valid
	EMO6	0.843	Valid
	EMO7	0.784	Valid
	EMT1	0.796	Valid
	EMT3	0.866	Valid
	EMT4	0.710	Valid
	EMT5	0.752	Valid
	EMT6	0.867	Valid
EMT7	0.769	Valid	
Green Innovation	GI1	0.782	Valid
	GI3	0.888	Valid
	GI5	0.888	Valid
	GI8	0.883	Valid
Firm Performance	FP1	0.814	Valid
	FP2	0.702	Valid
	FP4	0.809	Valid
	FP5	0.814	Valid
	FP6	0.820	Valid
	FP7	0.826	Valid
	FP8	0.836	Valid

Source: Processed Data, 2019

Convergent Validity and Composite Reliability

Table 2. AVE and Composite Reliability (CR)

Variable	Cronbach's Alpha	Composite Reliability	AVE (Average Variance Extracted)
EM	0.945	0.949	0.951
EMO	0.897	0.901	0.919
EMT	0.888	0.892	0.915
FP	0.911	0.915	0.930
GO	0.916	0.924	0.941

Source: *Processed Data, 2019*

Table 2 describes that there are no measurement errors in the outer model and all latent variables can be used to predict structural functions in the inner model because all research variables have AVE values > 0.5 and CR > 0.7. Likewise in Table 3 explains that all research variables are declared valid because the value of \sqrt{AVE} is higher than the correlation between the variables.

Table 3. Discriminant Validity

	EM	EMO	EMT	FP	GO
EM	0.980				
EMO	0.765	0.976			
EMT	0.979	0.923	0.943		
FP	0.978	0.787	0.801	0.810	
GO	0.795	0.758	0.794	0.843	0.894

Furthermore, in Table 4 explains the calculation of R Square and found that the firm performance variable can be explained by other variables in this research model of 96.8%.

Table 4. R-Square

Variable	R Square	R Square Adjusted
FP	0.968	0.967

Source: *Processed Data, 2019*

In order to evaluate the research model the researcher also performs the predictive relevance Q² calculation which can be seen in Table 5

Table 5. Q² Predictive Relevance

Variable	Q ² (=1-SSE/SSO)
FP	0.591

Source: *Processed Data, 2019*

Based on Table 5 it can be seen that the research variable Q2 has a value greater than 0 so that the model can be said to have a good predictive relevance.

Interpretation of Structural Equation Models

This study examines 5 hypotheses in the inner model. Two exogenous variables, namely environmental management and green innovation and two endogenous variables, namely competitive advantage and firm performance. The results of the hypothesis test are as follows.

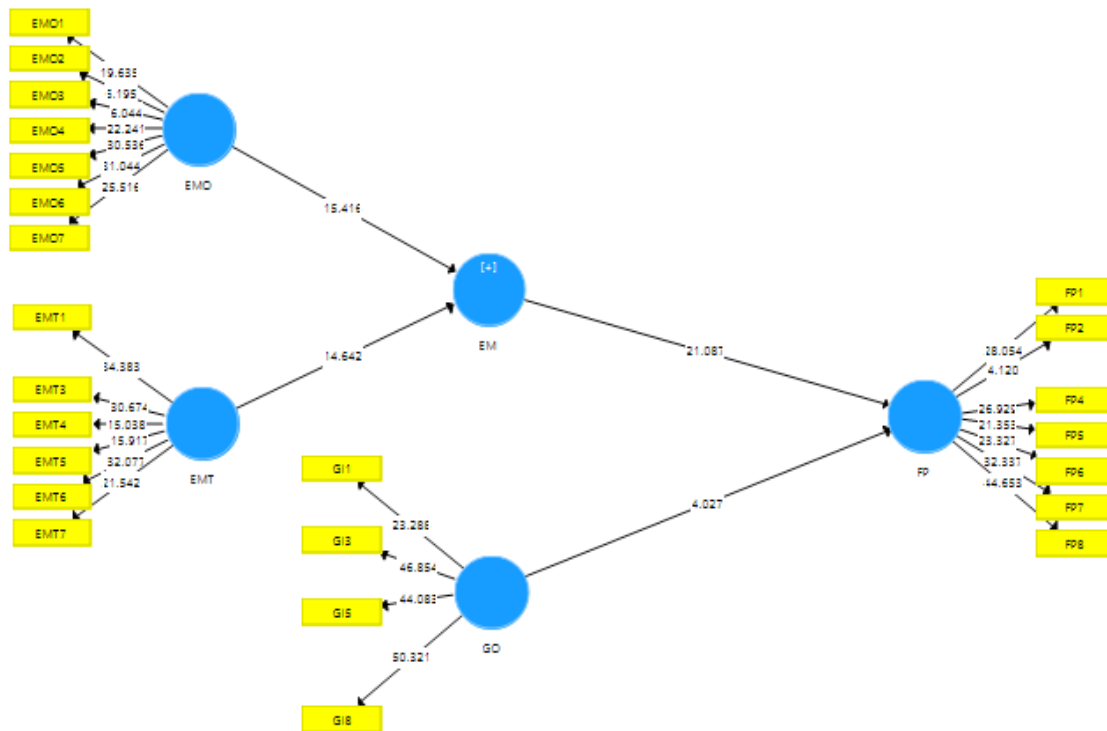


Figure 1. Structural Model (Inner Model)

Table 7. Path Coefficient

Construct	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
EM -> FP	0.835	0.831	0.040	21.087	0.000
GO -> FP	0.180	0.184	0.045	4.027	0.000

Source: Processed Data, 2019

The inner model test results as listed in Table 7 show that the two paths of relationship show that the entire pathway is significant at $\alpha = 0.05$ so that the five research hypotheses can be accepted. The conclusions from table 7 are:

1. Environmental management has a positive and significant effect on firm performance. This is evidenced by the T-Statistic value of more than 1.96 which is 21.087 and the P-Value value of less than 0.05 which is 0.000.
2. Green innovation has a positive and significant effect on firm performance. This is evidenced by the T-Statistics value of more than 1.96 which is 4.027 and the P-Value value of less than 0.05 which is 0.000.

DISCUSSION

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

The results of this study support the first hypothesis that environmental management can have a positive and significant effect on firm performance. A positive and significant relationship is also supported by previous studies such as 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; Moliner et al., 2012).

Environmental management has a positive and significant effect on firm performance. This proves the role of environmental management in the management of BUMDES. In addition to environmental management, green innovation also has an equally important role.

Good management is management that always pays attention to 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 also support the second hypothesis that green innovation has a positive and significant effect on firm performance also supported by the results of this study. These results support previous research conducted by Xie et al. (2019; Lin et al., 2019; Rezende et al., 2019; Zhang et al., 2019; Rodriguez et al., 2017; Tariq, 2018; Arfi et al., 2017; Chan et al., 2015; El -Kassar, 2018; Lin et al., 2013). In addition to environmental-based management BUMDES also needs to think about environment-based innovation. Starting from the selection of raw materials, processing to sales must pay attention to environmental aspects. And it is proven that by implementing green innovation, BUMDES will have a higher competitive advantage.

BUMDES in Yogyakarta does have a strategic advantage compared to other companies in one industry. Village of Flory for example, Village of Flory has a business in the culinary field of restaurants. The strategic advantage possessed by Flory Village is vast land and has a very dominant natural feel. Then Kampong Flory also offers traditional food menu products that are very natural and are processed by natural methods. The manager believes that this is what makes visitors more and of course the benefits obtained continue to increase from year to year.

From the results of the study and added with information from informants it is clear that environmental management and green innovation are important aspects of BUMDES management that are able to provide competitive advantages and better performance. BUMDES management is sometimes hampered in the aspect of HR (Human Resources) which is less competent and funding. Therefore, the role of government is needed in the development of BUMDES. The implementation of environmental management and green innovation does have a big impact on the development of the firm but also requires a fairly high investment. The government and related parties are expected to be able to facilitate BUMDES managers in HR training, assistance and funding.

THEORY AND MANAGERIAL IMPLICATION

This study concludes that environmental management and green innovation are very important for BUMDES to increase competitive advantage and firm performance. When environmental

management and green innovation increase, competitive advantage will also increase. Another finding from this study is that increased competitive advantage will also provide an increase in the firm's performance. On the other hand this research also found that increasing environmental management and green innovation can also have a positive and significant impact directly on firm performance.

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

This research can be developed in the future with research in other industries such as the culinary industry, people's markets or other industries that need development and support. On the other hand there are many other environmental aspects that also need to be examined and analysed how they contribute to the firm.

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