Agustia, Dian; Sawarjuwono, Tjiptohadi; Dianawati, Wiwiek

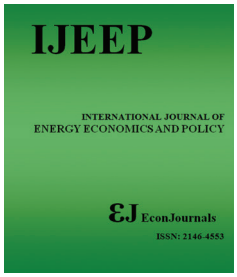
Article

The mediating effect of environmental management accounting on green innovation : firm value relationship

International Journal of Energy Economics and Policy

Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Agustia, Dian/Sawarjuwono, Tjiptohadi et. al. (2019). The mediating effect of environmental management accounting on green innovation : firm value relationship. In: International Journal of Energy Economics and Policy 9 (2), S. 299 - 306. doi:10.32479/ijeep.7438.



International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2019, 9(2), 299-306.

The Mediating Effect of Environmental Management Accounting on Green Innovation - Firm Value Relationship

Dian Agustia*, Tjiptohadi Sawarjuwono, Wiwiek Dianawati

Faculty of Economic and Busines, Universitas Airlangga, Indonesia. *Email: dian.agustia@feb.unair.ac.id

Received: 06 December 2018 **Accepted:** 09 Febrary 2019 **DOI:** https://doi.org/10.32479/ijeep.7438

ABSTRACT

This study was conducted to determine the effect of green innovation (GI) on firm value (FV) with environmental management accounting (EMA) as an intervening variable. Companies that are able to create GI will not only get the economic benefits but also the competitive advantage, therefore it will increase the value of the firm. The application of GI will be able to improve the application of EMA, thereby reducing the impact of environmental damage due to the company's business processes. With manufacturing and the main sector's companies listed on the BEI 2012-2015 as the population, using purposive sampling, this study has obtained 277 companies as a sample. The result shows that GI has an effect on EMA, while EMA has proven to affect FV, and GI has an influence on FV.

Keywords: Green Innovation, Environmental Management Accounting, Firm Value
JEL Classification: Q56

1. RESEARCH BACKGROUND

The growth of an advanced industry is proportional to the rise of pollution generated from the industrial production process such as production waste that can increase air and water pollution at dangerous levels. According to data owned by Director of The Earth Institute of Columbia University (Sahcs, 2013), global climate change is influenced by environment unawareness of industrial activity. To overcome this, the Indonesian government tighten regulations related to the environment. Some of the latest regulations such as the Environmental Law No.46 of 2017 on Environmental Economy Instruments, Government Regulations on the Environment, Presidential Decrees, to the Regulation of the Minister of Environment have been issued.

Moreover, the government, in this case the environmental minister also tried to encourage people to be more environmentally conscious by applying the relevant regulations called "ecolabel" in the Minister of Environment No. 02 of 2014. The Ecolabel is expected to encourage consumer awareness level of concern so that the decision making in the election product type is not only determined by price and quality factor, but also based on other factor which is environmental impact. Although the inclusion of ecolabel is still voluntary, it makes people's demands on the company are increasing. Therefore, in its development, the company's environmental performance becomes the most important valuation factor for investors before buying shares in a company (Christoffersen et al., 2013).

Pressure from governments, communities, and investors, as well as high business competition has prompted the company to conduct a new resource for the production process. Companies which are able to create new ways in the process of production, distribution, or can create a new product will be the winner in business competition (Dereli, 2015). Green innovation (GI) is one of the environmental strategies that can be done to develop the business without violating the government regulations (Özşahin et al., 2013).

GI is a new technology (hardware or software) related to products or production processes that will drive energy efficiency, pollution reduction, waste recycling, green product design and corporate environmental management (Chen, 1994 dalam Ar, 2012). GI strategy will encourage companies to have special capabilities that will ultimately become a source of important competitive advantage for the company (Sharma and Vredenburg, 1998; Ferreira et al., 2010). This competitive advantage will increase the value of the company in the future (Bech, 2013). This is supported by previous research that has proved that innovation has a positive effect on firm value (FV), the existence of new innovation is closely related to the increase in profit without increasing the risk of the company. (Salehi and Arbatani, 2013; Sorescu and Spanjol, 2008).

However, the creation of eco-friendly product innovation is not an easy task, it will cost a lot to make it happen, for example the cost of research and development (R and D), the cost of obtaining materials, the cost of worker safety, the cost of product safety certification for the people who consume it, depreciation costs of related equipment, and management costs which often called as hidden costs (Cahyandito, 2006). Companies need accurate, detailed, and relevant information regarding visible costs and unseen costs, in addition to the necessary limitations on the use of existing resources so that environmental sustainability will be maintained. That's why companies need to adopt environmental accounting.

Environmental management accounting (EMA) is a tool for achieving strategic positions by enhancing the competitiveness of enterprises. EMA can provide an overview for companies to minimize costs and improve performance (Cahyandito, 2006). Implementation of EMA will be able to bridge between environmental interests and economic interests, so that they can work together to improve company performance and environmental performance. Larojan et al. (2014) proved that environmental accounting implementation has positive influence on FV. Moreover, a burgeoning amount of operational management research has shown that implementing environmental management activities may result in improved firm performance (Klassen and McLaughlin, 1996; Melnyk et al., 2003; Montabon et al., 2007 in Hofer et al., 2012). Klassen and McLaughlin (1996) found that environmental management announcements are positively correlated with a firm's market valuation. Similarly, Montabon et al. (2007) concluded that environmental management activities are related with product innovation, process innovation, and sales growth. Hence, there is evidence that the implementation of environmental management activities is associated with competitive advantage (Hofer et al., 2012).

However, as a growing area of research, EMA has received relatively little attention from accounting researchers (Ferreira et al., 2010). Therefore, this study could fill in the research gap in the accounting literature by investigate the role of EMA in mediating the impact of GI on FV. It is interesting to prove whether the FV will increase when company implemented EMA in their GI practices.

2. LITERATURE REVIEW

2.1 GI

GI or environmental innovation is a new or modified technique, practice, system, and production process to reduce the impact of environmental damage (Rennings and Rammer, 2003). GI is also defined as new technology (hardware or software) related to products or production processes that will lead to energy efficiency, pollution reduction, waste recycling, green product design and corporate environmental management (Chen, 1994 in Ar, 2012).

The concept of GI is not really different from the concept of conventional innovation, which has the purpose of improving a product in order to increase productivity, cost efficiency, and also open new market opportunities. While GI not only aims to improve the company's performance economically, but also to reduce the negative impact on the environment and create a competitive advantage for the company. Another advantage of GI is to encourage companies to convert waste production into a viable product that can generate additional profits for the company.

GI contributes to improving the company's environmental performance through three ways (Ramus, 2002 in Küçükoğlu and Pınar, 2015):

1. GI will reduce the environmental impact caused by the company's activities by using reusable goods in the re-usage process and recycling the waste before disposing into the community.
2. GI is able to solve environmental problems by reducing the use of hazardous materials not only during the manufacturing process, but also in the final product content. By ensuring the quality of the products, company can give a positive impression to the public.
3. GI builds environmental friendliness and effective production processes by using raw materials and energy efficiently. With minimal use of raw materials and energy, the company will be able to maintain environmental sustainability for future generations.

2.2 EMA

EMA is part of the environmental accounting. EMA is not just about setting up accounting for environmental costs alone, but accounting for all costs and benefits arising from changes in operational processes that will ultimately change the impact on the environment (Boyd, 1998).

IFAC (2005) stated that the management of environmental and economic performance through the development and implementation of appropriate environment-related accounting systems and practices. While this may include reporting and auditing in some companies, EMA typically involves life-cycle costing, full-cost accounting, benefits assessment, and strategic planning for environmental management.

EMA incorporates environmental cost elements into conventional reports, as well as making it the basis for business processes and emphasizing the efficiency and effectiveness of resource usage.

There are several reasons that require companies to implement the EMA (IFAC, 2005):

1. Supplier chain pressure, as a large company, manager must ensure that their suppliers meet the established environmental management system standards.
2. Pressure from stakeholders requesting the company to publish its environmental performance into the annual financial report or issue a stand-alone environmental performance report in accordance with the Global Reporting Initiative (GRI).
3. The existences of financial pressure from investors who start invest funds for the growth of the social environment.
4. Pressure from the government to maintain the existing environment.

EMA itself has two functions:

a. Internal function: Serves as a decision-making tool. With EMA, managers can manage and analyze the costs of environmental conservation in order to obtain the expected benefits and carry out environmental conservation activities effectively and efficiently.
b. External Functions: Serves to influence stakeholders in making decisions.

It categorizes information into two types: Physical and monetary information. The physical information provides information on the flow of energy, raw materials, water and waste. While the monetary information provides information about environmental costs, future litigation costs, income, and the value that can be stored from the environment.

2.3. FV

The company is a legal entity consisting of one or more individuals and separated from its owner (Ross et al., 2008. p. 6). The main purpose of the company is to maximize the company value for its shareholders or owners (Ross et al., 2008. p. 9). The value of the company is the investor's perception of the company's success rate (Hermuningsih, 2013). For companies that have gone public, the value of the company can be reflected through the company's stock price, while for the company that has not gone public, its value is reflected through the realizable value of the company's assets at the time the company will be sold (Margaretha, 2005. p. 1). High company value will make the market believe not only in the company's current performance but also on the future prospects of the company.

3. HYPOTHESES DEVELOPMENT

3.1. The Effect of GI on EMA

GI through green product and green process aims to enhance productivity, cost efficiency, and open new market opportunities. In addition, it also to reduce the negative impact on the environment and turn waste into a product worth selling in order to provide benefits for the company.

However, the creation of eco-friendly product innovation is not an easy task, it will cost a lot to make it happen (Cahyandito, 2006). Companies need accurate, detailed, and relevant information regarding visible costs and unseen costs, in addition to the necessary limitations on the use of existing resources so that environmental sustainability will be maintained. That's why companies need to adopt environmental accounting.

When companies must take a financial decisions making related to the environment, the conventional report does not specify the cost of any related environmental management, it just categorized into the overhead cost. EMA can be a solution to this by presenting a traceable environmental cost so that it can be used in making the right decisions. Therefore, this study proposes that,

H_1: GI has an influence on EMA

3.2. The Effect of EMA on FV

EMA is a tool for achieving strategic positions by enhancing the competitiveness of enterprises. EMA can provide an overview for companies to minimize costs and improve performance (Cahyandito, 2006). Implementation of EMA will be able to bridge between environmental interests and economic interests, so that they can work together to improve company performance and environmental performance. EMA incorporates environmental cost elements into conventional reports, as well as making it the basis for business processes and emphasizing the efficiency and effectiveness of resource usage.

Companies that implement EMA tend to have a better future than those who do not (Ikhsan, 2009). This concludes that stakeholders not only judge the company from the level of profit but also from good environmental performance, since it can be assured that the company can survive or improve the achievements obtained in the long run.

Larojan et al. (2014) proved that environmental accounting implementation has positive influence on FV. Moreover, a burgeoning amount of operational management research has shown that implementing environmental management activities may result in improved firm performance (Klassen and McLaughlin, 1996; Melnyk et al., 2003; Montabon et al., 2007 in Hofer et al., 2012). Therefore, this study proposes that,

H_2: EMA has an influence on FV.

3.3. The Effect of GI on FV

The main purpose of the company is not only to create the value of stockholder, but to create value for all stakeholders. High FV will attract investors to invest in the company. But in the process of realizing its goals, companies often experience conflict in aligning economic goals and environmental goals. Value creation for all stakeholders requires managers to improve their performance in financial performance, social performance and environmental performance and ensure that the company remains sustainable in the future. In accordance with the theory of legitimacy (O'Donovan, 2002), the company can continue to survive (sustainable) if the company is able to adjust business processes with rules or norms applicable in the community

High productivity level and the regular innovation surely can help company to achieve and retain company value. Not only economic and social performance, environmental performance becomes an

aspect that is considered by stakeholders. Green Inovation is one of the key for the company to get its goals, especially for companies in a high level of competition and unstable environment. GI can be a competitive advantage for the company if it is done regularly and applied to the whole business process.

Innovation creates value for both new and established companies (Rosenbusch et al., 2013). GI improves firm performance through increased market share or through operational cost suppression (Özşahin et al., 2013). GI improves company performance through efficient use of raw materials and energy, creation of new market share and competitive advantage products (Ar, 2012). In addition, GI can also be used as a unique tool for marketing activities to increase market share continuously (Küçükoğlu and Pınar, 2015). Hence, this study proposes that,

H_3: GI has positive influence on FV.

3.4. The Mediating Effect of EMA on GI - FV Relationship

The purpose of the company today is not to seek profit as much as possible, but to ensure the sustainability of the company in the future. Supports from all stakeholders, both internal and external stakeholders surely are needed. This is consistent with stakeholder theory that the existence of a company is influenced and influences certain groups. To be able to get the support, the company must be able to satisfy all stakeholders. Companies need a strategy that maximizes the profitability of the company, does not violate the prevailing rules, nor does it adversely affect the community and the environment.

GI is one strategy to achieve the company's goals. But to apply it required a stage of research and development. In this stage, the company invested capital, resources, and time to the maximum in order to get the best results. It takes good management to plan, organize and set up so that the R and D process is capable of producing quality innovations. This management includes R and D cost management, resource and energy usage management, and process management that is not environmentally damaging.

EMA in a company is a sign that the company has been aware of the importance of environmental aspects for the company. The implementation of Environmenatal management accounting not only influences and encourages GI but also creates competitiveadvantage for the company (Ar, 2012). EMA is able to coordinate the problems caused by the GI process, such as the problem of environmental exploitation, energy limitations, and cost issues. With good coordination, the company will be able to get the economic benefits from the GI that has been done (Salvadó et al., 2015). Hence, this study proposes that,

H_4: EMA has mediating effect on GI – FV relationship.

4. RESEARCH METHODOLOGY

4.1. Research Designs

This study use 277 companies listed in Indonesia Stock Exchange and followed PROPER programme in the year 2012-2015 as a sample. Moreover, this study also used path analysis as the hypotheses testing. Ghozali (2013. p. 249) suggests path analysis is an extension of multiple linear regression analysis, or path analysis is the use of regression analysis analysis to estimate causal relationships among predefined causal variables based on theory. Ghozali (2013. p. 251) states that a direct relationship occurs if one variable affects other variables without any third variable that mediates the relationship between the two variables. The indirect relationship is if there is a third variable mediating the relationship between these two variables.

The path coefficient is calculated by making two structural equations i.e., the regression equation showing the hypothesized relationship. In this case there are two similarities:

$$EMA=\alpha+\beta1GI+e \quad (1)$$

$$FV=\alpha+\beta2GI+\beta3EMA+e \quad (2)$$

Total effect from GI to FV equals with direct effect GI on FV plus the indirect effect which is path coefficient from GI on EMA, which is β1 multiplied by path coefficient from EMA on FV (β3).

$$\text{Direct effect GI on FV}=\beta2$$

$$\text{Indirect effect GI on FV}=\beta1 \times \beta3$$

$$\text{Total effect GI on FV}=\beta2 + (\beta1 \times \beta3)$$

GI=Green innovation
EMA=Environmental management accounting
FV=Firm value
α=Constanta
e=Residual

4.2. Operational Definitions of Variables

4.2.1. GI

GI is a new or modified technique and production process to reduce the impact of environmental damage, that will lead to energy efficiency, pollution reduction, waste recycling and green product design. GI (X) obtained through content analysis in company annual report. Several indicators will be used to determine whether the company has applied GI. This indicator is derived from Ar (2012). The results of this content analysis will be quantified in terms of ratios. The indicators to be used in content analysis are as follows: (1). The production process uses new technologies to reduce energy, water, and waste, (2). the product uses less non-polluting or hazardous substances (environmentally friendly materials), (3). using an eco-friendly product package (e.g., paper and plastic), and (4). components or materials in the production process can be recycled or reconditioned.

4.2.2. FV

FV is the perception of stakeholders, especially investors on the firm's accomplishment rate associated with stock market prices and measured by percentage. FV in this research is measured by using Tobins'Q ratio. Tobin's Q ratio is calculated by the following formula (Chang and Wang, 2007):

$$Q = \frac{(OS \times P) + (D+1) - CA}{(TA)}$$

OS=Outstanding share
P=Stock price
D=Total debt
I=Inventory
CA=Current asset
TA=Total asset

4.2.3. EMA

EMA variable in this study is measured by using the level of eco-efficiency in the company. Eco-efficiency is calculated by using the formula (Schaltegger et al., 2008):

$$\text{Eco-efficiency} = \frac{\text{Value of product}}{\text{Environmental influence}}$$

5. RESULTS AND DISCUSSIONS

5.1. Results

5.1.1. Model 1

Model 1 of this research was using simple linear regression to test the effect of independent variable of GI to EMA dependent variable showed in Tables 1 and 2.

Based on the result of t-test, it is known that t value for GI variable to EMA of 3.564 with a significance value of 0.000. The value is <0.05 so it can be concluded that the GI significantly influence the EMA on the sample company. Hence, hypothesis 1 is accepted.

5.1.2. Model 2

Multiple linear regression analysis of Model 2 was conducted to examine the effect of independent variables of GI and EMA on dependent variable of FV. The result is show on the Table 3.

Based on t-test result, it is known that t-value for EMA variable on FV of 8.50 with a significance value of 0.00. The value is <0.05 so it can be concluded that the EMA has a significant effect on FV in the sample company. Hence, hypothesis 2 is accepted. Moreover, t-value for GI variable on FV is 2.381 with significance value 0.019. The value is <0.05 so it can be concluded that GI has significant effect on FV. Hence, hypothesis 3 is accepted.

5.1.3. Mediating Effect

The path analysis test results in Figure 1 state that there is no indirect effect between capital structure on company performance. That is, innovation cannot mediate the relationship between the independent variables, namely the capital structure of the dependent variable of company performance. Based on the results of H2 testing (Sig=0.008, Beta=−0.009) and H3 (Sig=0.025, Beta=0.356), there is a difference in the direction of the regression results. The presence of different directions shows that innovation cannot mediate the influence of capital structure and company performance.

The influence of innovation as a mediating variable can also be tested using the sobel test via the sobel test calculator available at www.quantpsy.org. The sobel test calculation is presented in Table 4.

5.2. Discussions

5.2.1. The effect of GI on EMA

Based on the statistical result, the significance value equals to 0.00 means that GI has an effect on EMA. GI through green product and green process aims to increase productivity, cost efficiency, open new market opportunities. Moreover, it can also reduce the negative impact on the environment and turn waste into a product worth selling in order to provide benefits for the company.

When companies must take a financial decisions making related to the environment, the conventional report does not specify the cost of any related environmental management, it just categorized into the overhead cost. Environmental innovation costs associated with GI consist of waste management costs, research costs for technologies that support green processes, material costs purchased, technological depreciation, and management costs which in the financial statements can not be traced to the special costs for the environment because they are categorized together with other costs as an overhead cost.

EMA can be a solution to this because EMA focuses on the calculation of environmental costs, the flow of energy and materials and its changes, can be used in decision making and so will be very useful for companies that pro-actively run GI.

5.2.2. The effect of EMA on FV

Based on the statistical result, the significance value equals to 0.00 means that EMA has significant effect on FV. EMA in this research is measured using eco-efficiency. This is consistent with eco-eficiency theory which argues that firms can achieve high levels of corporate performance through the efficiense of environmental resources by reducing the toxic waste generated from existing production processes (Porter and van der Linde 1995a, 1995b in Burnett et al., 2011). Porter (1991) in Burnett et al. (2011) confirmed that through eco-eficiency, companies are able to achieve competitive advantage. It can be concluded

Table 1: Simple linear regression result

Model B	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	Standard error	Beta			
1					
(Constant)	0.749	0.170		4.410	0.000
GI	0.312	0.088	0.210	3.564	0.000
R^2			0.044		

GI: Green innovation

that competitive advantage is created by possessing the unique resources and capabilities to efficiently exert existing resources so that firms in industrial competition can be superior to others in terms of increasing levels of competitiveness and in enhancing corporate value.

Enviromental management accounting facilitates investors in assessing the level of sustainable development of the company. Strategy based on environmental friendly effort, is no longer a category of strategy that is only used to fulfill corporate social responsibility because it is related to the existence and strategic position of the company. It is certain that any company implementing enviromental management accounting in any program will have advantages over non-implementing companies (Azizah et al., 2013). The company experienced an increase in profit and production due to the quality of production and the maximum environmental quality (enviromental management accounting).

One of the reasons companies should implement EMA is the pressure from stakeholders to enable companies to publish environmental performance into annual financial statements or issue stand-alone environmental performance reports in accordance with GRI standards (IFAC, 2005). It can be concluded that companies that implement EMA will have a higher value in the investors and stakeholders' point of view than those who do not. Companies that implement enviromental management accounting tend to have a better future than those who do not.

In line with the research of Burnett et al. (2011) that the implementation of eco-effective management will increase the value of the company. Other research supporting this outcome is the study of Larojan et al. (2014) who disclose that environmental costs are no longer a minority commonly combined with other costs, the use of EMA can save expenses and improve corporate control. This concludes that stakeholders not only judge the company from the level of profit but also from good environmental performance as well as it can be assured that the company can survive or improve the achievements obtained in the long run.

5.2.3. The effect of GI on FV

Based on the statistical result, the significance value equals to 0.019 means that H3 stated that GI has significant effect on FV is accepted. This is in line with the stakeholder theory proposed by Freeman (2010) that the company's goal is not only to create value for its stockholder, but to create value for all its stakeholders. Value creation for all stakeholders requires managers to improve their performance in financial performance, social performance, and environmental performance, and ensure that the company remains sustainable in the future. Companies can continue to survive (sustainable) if the company is able to adjust business processes with rules or norms applicable in the community (O'Donovan, 2002). This also corresponds to the theory of competitive advantage proposed by Porter (1985. p. 1) that

Tabel 2: T-test value result

Hypothesis	Significance	Result
Hypothesis 1	0.000	Significant influence
Hypothesis 2	0.000	Significant influence
Hypothesis 3	0.019	Significant influence

Table 3: Multiple regression analysis result

Model	Unstandardized coefficients		Standardized coefficients	t	Significance	Collinearity statistics	
	B	Standard error	Beta			Tolerance	VIF
1							
(Constant)	0.619	0.050		12.421	0.000		
GI	0.060	0.025	0.141	2.361	0.019	0.939	1.064
EMA	0.138	0.016	0.508	8.507	0.000	0.939	1.064
R^2			0.313				

a. Dependent variable: TOBINS

Figure 1: Path analysis

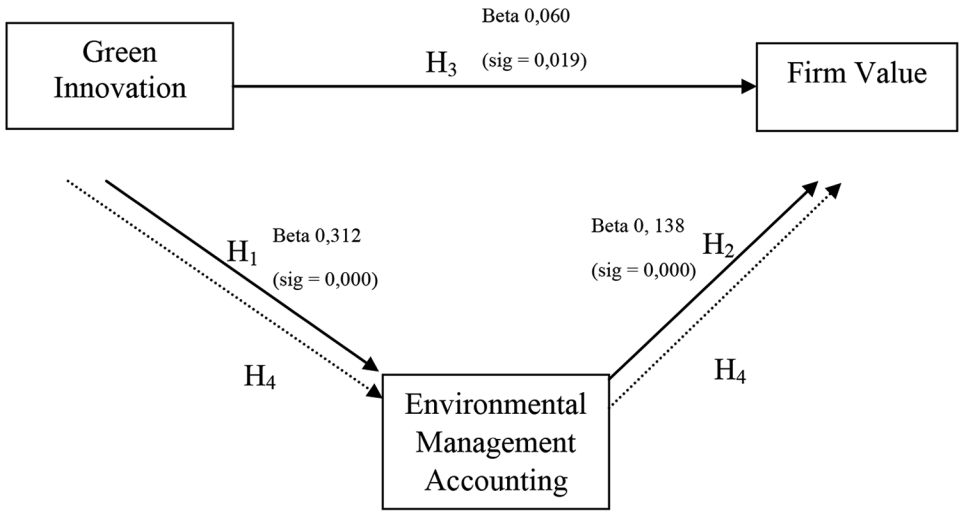


Table 4: The mediating result

	Input	Test statistisc	Standarderrror	P-value
a	−0.009	−1.80893053	0.00177121	0.0704618
b	0.356			
Sa	0.003			
Sb	0.157			

competitive advantage aims to form a sustainable and advantage position in order to survive in industrial competition. Strategy is a very important tool for achieving competitive advantage.

One strategy that can be used to achieve company goals is to implement GI. According to Renning and Rammer (2009), GI is divided into two types namely, green product and green process. Green product is a durable, non-toxic product made from recyclable or packed in minimalist packaging (Durif et al., 2010). While the green process, is the use of technology, machinery, and software that is new or has been modified in the production process and distribution companies to reduce the adverse impact on the environment.

GI encourages companies to convert waste production into a viable product that increases the company value. In addition, GI is able to produce products that are superior to conventional products. GI has positive impacts. For the environment, GI can reduce CO_2, increase biodiversity, and reduce pollution. For the company, GI is able to increase productivity, expand market share, create image of environmental awareness, and improve efficiency. Low production cost and high competitive advantage will lead the company to gain high profitability.

The number of positive impacts in the implementation of GI will attract investors. In addition to high profitability, the environmental aspects applied to the company's business strategy will make the investor believe that the company will remain and continue into the future. The better the environmental performance of a company, the higher the investor interest in the company, hence the higher the value of the company.

Based on previous studies, the results of this study support the results of research conducted by Salvadó et al. (2015), which concludes that GI positively affects the market value of the company. GI increases the market value through the efficiency of the production process. Küçükoğlu and Pınar (2015) and Ar (2012) concluded that by doing GI the company will be able to improve the company performance and competitiveness ability (competitive advantage). GI not only reduces the adverse environmental impact but brings the company to a superior position than its competitors through the creation of environmentally friendly products. The results of this study also support the results of research conducted by Rosenbusch et al. (2013) which concluded that innovation can create value for the company, both new and old. Innovation requires high initial investment and is a high risk activity. There is no guarantee of certainty over the results obtained. However, the many benefits of innovation such as product differentiation that will create competitive advantage for the company, high customer loyalty, and sales at a premium price for innovative products are worth much more than the cost incurred.

However, this study does not support research conducted by Özşahin et al. (2013) which concludes that green product innovation has no effect on company performance. This is due to the company's low ability to innovate. The low ability to innovate will undermine the company's competitiveness. Companies that have low competitiveness will not be able to compete with their competitors, the company's performance results will decrease, the company can not create value for its stakeholders and eventually the company will be vanished.

5.2.4. The mediating effect of EMA

Eventhough GI is one strategy to achieve the company's goals. But to apply it required a stage of research and development. In this stage, the company invested capital, resources, and time to the maximum in order to get the best results. It takes good management to plan, organize and set up so that the R and D process is capable of producing quality innovations. This management includes R and D cost management, resource and energy usage management, and process management that is not environmentally damaging.

EMA in a company is a sign that the company has been aware of the importance of environmental aspects for the company. The implementation of Environmenatal management accounting not only influences and encourages GI but also creates competitive advantage for the company (Ar, 2012). EMA is able to coordinate the problems caused by the GI process, such as the problem of environmental exploitation, energy limitations, and cost issues. With good coordination, the company will be able to get the economic benefits from the GI that has been done (Salvadó et al., 2015).

6. CONCLUSIONS

Based on the results of the research discussed in the previous chapter, it can be concluded as follows:

a) Green innvoation has an effect on EMA. This is because EMA focuses on the calculation of environmental costs, the flow of energy and materials and its changes, therefore EMA can be used in decision making and will be very useful for companies that pro-actively run GI. The environmental management referred to in this study is GI.
b) EMA has a significant effect on FV. This is consistent with eco-eficiency theory which argues that firms can achieve high levels of corporate performance through the efficient use of environmental resources by reducing the toxic waste generated from existing production processes (Porter, 1991; Porter and van der Linde, 1995a, 1995b in Burnett et al., 2011).
c) GI has a significant effect on FV. In accordance with the stakeholder theory proposed by Freeman (2010) that the company's goal is not only to create value for its stockholder, but to create value for all its stakeholders. The results of this study are in accordance with research conducted by Salvadó, et al. (2015), which concludes that GI positively affects the market value of the company. GI increases the market value through the efficiency of the production process. Küçükoğlu and Pınar (2015) and Ar (2012) which concluded that by doing GI the company will be able to improve company performance and competitiveness ability (competitive advantage). Good

environmental performance, high efficiency, and competitive advantage will attract investors to invest. Investor interest in the company will increases the value of the company.

REFERENCES

Ar, I.M. (2012), The impact of green product innovation on firm performance and competitive capability: The moderating role of managerial environmental concern. Procedia-Social and Behavioral Sciences, 62, 854-864.

Azizah, N.M., Dzulkirom, A.R., dan Maria, G.W.E. (2013), Analisis Penerapan Environmental Management Accounting Sebagai Bentuk Eco-Efficiency Dalam Meningkatkan Keunggulan Kompetitif Perusahaan. Skripsi. Malang: Fakultas Ilmu Administrasi Universitas Brawijaya.

Bech. (2013), Quadruple Bottom Line for Sustainable Prosperity. Available from: http://www.cambridgeleadershipdevelopment.com/quadruple-bottom-line-for-sustainable-prosperity. [Last retrieved on 2016 Feb 17].

Boyd, J. (1998), The Benefits of Improved Environmental Accounting: An Economic Framework to Identify Priorities. Discussion Paper 98-49.

Burnett, R.D., Skousen, C.J., Wright, C.J. (2011), Eco-effective management: An empirical link between firm value and corporate sustainability. Accounting and the Public Interest, 11(1), 1-15.

Chang, S.C., Wang, C.F. (2007), The effect of product diversification strategies on the relationship between international diversification and firm performance. Journal of World Business, 42(1), 61-79.

Cahyandito, F.M. (2006), Environmental Management Accounting. Bangkok, Thailand: In Went (Capacity Building International).

Chen, J.Y. (1994), The Economic Impacts of Green Product. Massachusetts: Civil Engineering, Massachusetts Institute of Technology.

Christoffersen, S., Frampton, G.C., Granitz, E. (2013), Environmental sustainability's impact on earnings. Journal of Business and Economics Research, 11(7), 325-335.

Dereli, D.D. (2015), Innovation management in global competition and competitive advantage. Procedia-Social and Behavioral Sciences, 195, 1365-1370.

Durif, F., Boivin, C., Julien, C. (2010), In search of a green product definition. Journal of Interactive, 6(1), 25-33.

Ferreira, A., Carly, M. (2009), Environmental Management Accounting and Innovation: An Exploratory Analysis. Melbourne, Australia: Department of Accounting and Finance, Monash University.

Freeman, R.E. (2010), Strategic Management. 2nd ed. New York: Cambridge University Press.

Ghozali, I. (2013), Aplikasi Analisis Multivariate Dengan Program IBM SPSS 21. Edisi Ketujuh. Semarang: Badan Penerbit Universitas Diponegoro.

Hofer, C., Cantor, D.E., Dai, J. (2012), The competitive determinants of a firm's environmental management activities: Evidence from US manufacturing industries. Journal of Operations Management, 30(1-2), 69-84.

Hermuningsih, S. (2013), Pengaruh profitabilitas, growth opportunity, sruktur modal terhadap nilai perusahaan pada perusahaan publik di Indonesia. Buletin Ekonomi Moneter Dan Perbankan, 16, 127-148.

IFAC. (2005), Environmental Management Accounting. London: Association of Chartered Accountants.

Ikhsan, A. (2009), Akuntansi Manajemen Lingkungan (pertama). Jogjakarta: Graha Ilmu.

Küçükoğlu, M.T., Pınar, R.İ. (2015), Positive influences of green innovation on company performance. Procedia-Social and Behavioral Sciences, 195, 1232-1237.

Larojan, C., Thevaruban, J.S., Larojan, C., Thevaruban, J.S. (2014), Impact of Environmental Management Accounting Practices on Financial Performance of Listed Manufacturing Companies in Sri Lanka. Proceedings of the 3rd International Conference on Management and Economics. p239-246.

Margaretha, F. (2005), Teori dan Aplikasi Manajemen Keuangan Investasi dan Sumber dana Jangka Pendek. Harga: Grasindo.

Melnyk, S.A., Sroufe, R.P., Calantone, R. (2003), Assessing the impact of environmental management systems on corporate and environmental performance. Journal of Operations Management, 21(3), 329-351.

O'Donovan, G. (2002), Environmental disclosures in the annual report: Extending the applicability and predictive power of legitimacy theory. Accounting, Auditing and Accountability Journal, 15(3), 344-371.

Özşahin, D.M., Sezen, B., Çankaya, S.Y. (2013), Effects of green manufacturing and eco-innovation on sustainability performance. Procedia-Social and Behavioral Sciences, 99, 154-163.

Porter, M.E. (1991), America's green strategy. Scientific American, 264(4), 1-68.

Rennings, K., Rammer, C. (2009), Increasing energy and resource efficiency through innovation-an explorative analysis using innovation survey data. SSRN Electronic Journal, 59(5), 442-459.

Ross, S.A., Westerfield, R.W., Jordan, B.D. (2008), Corporate Finance Fundamentals. New York: McGraw-Hill Education.

Rosenbusch, N., Rauch, A., Bausch, A. (2013), The mediating role of entrepreneurial orientation in the task environment–performance relationship: A meta-analysis. Journal of Management, 39(3), 633-659.

Sachs, J. (2008), The end of poverty: Economic possibilities for our time. European Journal of Dental Education, 12, 17-21.

Salehi, A., Arbatani, T.R. (2013), Is innovation always beneficial? A meta-analysis of the relationship between branding and performance in SMEs. Advances in Environmental Biology, 7(14), 4682-4688.

Salvadó, J.A., de Castro, G.M., López, J.E.N. (2015), The importance of the complementarity between environmental management systems and environmental innovation capabilities: A firm level approach to environmental and business performance benefits. Technological Forecasting and Social Change, 96, 288-297.

Schaltegger, S., Martin, B., Burritt, R.L., Jasch, C. (2008), Environmental Management Accounting for Cleaner Production. Dordrecht: Springer.

Sharma, S., Durand, R.M., Gur-Arie, O. (1981), Identification and analysis of moderator variables. Journal of Marketing Research, 18(3), 291-300.

Sharma, S., Vredenburg, H. (1998), Proactive corporate environmental strategy and the development of competitively valuable organisational capabilities. Strategic Management Journal, 19(8), 729-753.

Sorescu, A., Spanjol, J. (2008), Innovation's effect on firm value and risk: Insights from consumer packaged goods. Journal of Marketing, 72, 114-132.