
INNOVATION, ENVIRONMENTAL MANAGEMENT ACCOUNTING,
FUTURE PERFORMANCE: EVIDENCE IN INDONESIA

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Abstract. This study aims to identify and analyze the influence of environmental management accounting on future performance with innovation as an intervening. Innovation is one strategy to produce a competitive advantage. With the competitive advantage achieved, corporate performance is expected to be increased. However, companies are expected to implement a strategy that not only emphasizes business continuity, but also can carry out its business process with the concept of sustainable development. Using 122 manufacturing companies which are listed in Indonesian Stock Exchange, this study tests the hypotheses using path analysis. The paper provides empirical insights about how environmental management accounting does not affect future performance while innovation can mediate the effect of environmental management accounting on future performance.

Keywords: environmental management accounting; innovation; future performance

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JEL Classifications: Q01, L25.

1. Introduction

Competition in the business world is something every company must face, including companies in Indonesia. The existing competition requires the company to work harder in running its business process, especially now that competitors come from within the country and from abroad. Companies should always strive to improve product quality, understand market conditions, improve production systems, distribution, and management within the company to survive in the business world.

Innovation is one strategy that can be undertaken to face business competition. Innovation undertaken by the company aims to produce a competitive advantage. With the competitive advantage achieved from the implementation of innovation, it is expected that future corporate performance will also increase. According to OECD (2005), innovation is the implementation of new or significantly developed goods or services, or processes, new marketing methods, or new organizational methods in business practices, workplace organizations or external relationships.

Innovation is an important undertaking for a company in order to develop its business processes and affects the going concern of the company. Good innovation will produce quality products or services with cost efficiency, improvisation of products and produce different products from previous ones. The application of good innovation will have an impact on the improvement of the company's future performance, for example, innovations by PT Semen Indonesia. PT Semen Indonesia made technological innovations in 2013 by providing energy

conservation technology and CO₂ Gases Emission Technology through the utilization of biomass and B3 waste as Alternative Fuels.

Technological innovations undertaken by PT Semen Indonesia can have an impact on cost efficiency and can reduce the impact of environmental damage occurring. The environmental damage that is occurring today is the result of man's own actions, both personally and in groups. The impacts most felt by humans are climate change and global warming. Some real cases of climate change and global warming have occurred in both Indonesia and other countries. For example, increased temperatures cause sea levels to rise and impact on frequent floods, forest fires, tornadoes and more. The existence of environmental problems not only affects the environment, but other areas such as the economy in a country can also be disrupted. Therefore, companies in Indonesia are expected to implement a strategy that not only emphasizes business continuity but also can carry out its business process with the concept of sustainable development.

The theory of legitimacy according to Dowling and Pfeffer (1975) states that: "Legitimacy is important to the organization, the limits emphasized by social norms and values, and reactions to those limits promote the importance of organizational behavioral analysis with regard to environmental aspects". The company seeks to create harmony between the social values inherent in its business processes with the norms of behavior existing in the social system of society. As long as the two value systems are aligned, they can be called corporate legitimacy. However, when there is a dissonance between the two value systems, there will be a threat to the legitimacy of the company or the legitimacy gap. It is also related to the going concern of the company. Strategies that are planned, selected, and performed by the company must be based on the theory of legitimacy.

Legitimacy theory can also be achieved by applying green accounting. According to Cohen and Philipson (2011), through the application of green accounting it is expected the environment will preserve sustainability, because in implementing green accounting the company will voluntarily obey government policies where the company runs its business. The purpose of green accounting is to identify the negative effects of corporate activities and systems on the environment, so that decisions can be effective and efficient in relation to environmental protection.

One strategy implementation with a green accounting objective is to implement environmental management accounting (EMA). EMA, according to International Federation of Accountants (2005), is defined as the management of environmental and economic performance through the development and application of appropriate environment related accounting systems and practices may include reporting and auditing in some enterprises. According to the UN Division for sustainability development (2003), EMA is a better and more comprehensive approach to management accounting. UNDSO states that the use of general environmental management accounting information is for internal organizational and decision-making calculations.

The environmental management accounting performed by the company brings the entity closer to improving the company's future performance, which is one benchmark of success of a company. Company performance will always be seen by the stakeholder in taking the business decision of the company. Information on company performance can be obtained from financial statements, from which indicators in assessing company performance can be seen through profitability ratios.

Financial performance, which is the main focus in this research, is one important aspect used by an entity or company as a benchmark of business success in managing the company's operations. Company performance is a description of the level of adjustment of the implementation of an activity in realizing the goals, objectives, mission, and vision of the company contained in the strategic planning of a company (Suharto et al., 2013). Given the natural phenomena that often occur, the expected performance results of entities, especially manufacturing industry companies, provide the impact of sustainable development.

Aulia (2010) conducted research on market reaction to measurement of accounting performance of prospector and defender companies with a product life cycle approach. The results of his research prove that the aver-

age growth in profit and sales growth of prospective companies and companies significant defender. Aulia's research results show that the average dividend payout ratio of the defender company is bigger than the company's prospector, while the average return on investment of the prospective company does not differ significantly from the defender company.

Application of environmental management accounting (EMA) is widely discussed in scientific literature (Senan 2018; Arbidane, Mietule, 2018; Pechancová et al., 2019; Vegeera et al, 2019; Rezk et al., 2019; El Iysaouy et al., 2019; El Idrissi et al., 2020).

EMA can be one way to improve the company's future performance. According to research conducted by Molina-Azorin et al. (2009), there is a significant positive relationship between environmental management accounting and financial performance that is dominant. Environmental Management Accounting and financial performance can influence each other.

Due to the inconsistency in the results of research relating environmental management accounting (EMA) to future performance, it is necessary to examine the variables that can bridge the influence of EMA on future performance. This research uses innovation variable as a bridging variable.

EMA that has been applied and formed by the company has an effect on the innovations produced by the company. This is supported by research conducted by Rustika (2011), which states that the application of EMA has a positive impact on innovation. The application of EMA is one of the important components of accounting innovation that is useful for the purpose of efficiency and effectiveness to be achieved. On the other side, Ferreira and Carly (2009) state that the application of environmental management accounting has no effect on company innovation. Innovation is significantly influenced by R & D effort and firm size.

The company's innovation is one of the key improvements to the company's future performance. Saunila et al. (2013) state that the higher the company's ability to create innovation, the better the company's financial performance. Companies that measure the determinants of innovation ability, primarily through the exploitation of active external knowledge, tend to have higher levels of innovation, and have positive values that impact business performance. Performance measurement can be used as a tool to improve SMEs performance through innovation capability.

However, Santos et al. [24] state that although innovation has a positive effect on firm performance the effect is not significant. This research sample found little evidence that innovation in one period has a positive influence on the company's performance in the future. Possible explanations for this result are the effects of long-term innovation, as well as the use of a one-year analysis between innovation and financial performance. The effect may not have materialized in the sample measurement.

2. Literature Review

2.1. Legitimacy Theory

The theory of legitimacy states that companies must ensure that their operations are aligned in accordance with social norms and values in society. If the legitimacy of the company is not in accordance with the social values or norms of society, the legitimacy of the company will be threatened. Differences between corporate value and community value are often called legitimacy gaps. O'Donovan (2002) argues that the causes of legitimacy gaps are a change in company performance, but public expectations of company performance have not changed. Secondly, the company's performance has not changed but the public's expectation on the company's performance has changed. Thirdly, the company's performance and people's expectations change in different directions or in the same direction at different times.

2.2. Stakeholders Theory

This theory states that the company is not an entity that only operates for its own interests, but also must pay attention to the interests of stakeholders (Ghozali & Chariri, 2007). Freeman (1984) defines stakeholders as individuals or groups that can influence and/or be influenced by organizations to achieve certain goals as the impact of organizational activity. Stakeholders divided into two types, namely internal stakeholders and external stakeholders. The company's efforts to establish a strategy typology and to implement environmental management accounting are expected to keep the stakeholders in the best interest, so that stakeholders will provide feedback to companies such as supporting the company's operations to improve future performance.

2.3. The Effect of Environmental Management Accounting On Innovation

The International Federation of Accountants (2005) defines EMA as the management of environmental and economic performance through the development and application of appropriate environment related accounting systems and practices. The concept of environmental management accounting is used to perform monitoring and evaluation of measurable information from financial and management as well as data flows on reciprocal materials and energy, in order to improve the efficiency of the use of materials and energy, reduce the environmental impact of the company's operations, products and services, reducing environmental risks and improving the results of corporate management (Ikhsan, 2009). Berry and Rondinelli (1998) argue that there are several forces that encourage companies to take environmental management actions, namely, regulatory demand, cost factors, stakeholders forces and competitive requirements.

The cost efficiency strategy can be achieved with the concept of environmentally friendly innovation. EMA as a prime example of innovation has an influence on the application of innovation. The application of innovation is said to increase by combining significant changes to existing products or creating new products.

H1: Environmental management accounting has an effect on innovation

2.4. The Effect of Innovation On Future Performance

According to OECD (2005) innovation is the implementation of new or developed products (goods or services) or new processes, marketing methods, or new organizational methods on business practices, organizations at work or external relationships. Innovation is divided into four dimensions, namely, product innovation, process innovation, marketing innovation and organizational innovation (2005). To face competition and to respond to market challenges, every company is required to innovate. A product resulting from an innovation will have an impact on increased sales due to increased market share of new products produced. Increased sales result in the company's future performance increase as well.

Future performance is a measure that can be used to evaluate the success of a company in generating profits in the future. The company's financial performance can generally be seen from two viewpoints (Al-Tuwaijri et al., 2003) ie, market based measured and accounting based measured. Market based measured is one of the benchmarks of stock performance in the company so that investors always seek the maximum return from the company after considering the possible risks. The rationale of accounting based measured is the focus of corporate earnings on policy changes from management. In this study, company performance is measured by using accounting based measured which is return on assets (ROA).

H2: Innovation has an effect on future performance

2.5. The Effect of Environmental Management Accounting On Future Performance

Stakeholders nowadays not only look at the financial sector but also look at the company's responsibilities in the social and environmental fields. Environmental costs are costs incurred due to low environmental quality due to production activities carried out by the company. The implementation of EMA provides mutually ben-

official solutions for companies and stakeholders. If stakeholders feel interested in the company's products and use them, it will increase company profits. The increase in corporate profits is expected to result in an increase in the company's performance both in the environmental and financial fields.

EMA focuses on physical material inputs and outputs that allow managers to assess material related aspects of the company's environmental performance as an effort to get legitimacy from the community. The application of EMA is a proof to the public that in operational activities, the company continues to pay attention to the environment, and pay attention to the prevailing norms in society. These efforts will give more value to the community towards the company, so that the company gain legitimacy from the community and can help stakeholders to manage future performance improvements in both environmental and economic perspectives.

The concept of environmental management accounting can be used to monitor and evaluate financial and management information to improve the efficiency of the use of materials and energy, reduce the environmental impact of the company's operations, products and services, reduce environmental risks and improve the results of the company's management. In other words, if the application of EMA increases then it is expected that future performance will increase.

H3: Environmental management accounting has an effect on future performance

2.6. The Effect of Innovation on Environmental Management Accounting - Future Performance Relationship

The implementation of Environmental Management Accounting is a form of competitive advantage in cost focus strategies, especially efficiency in environmental costs. The concept of environmentally friendly innovation is one example of a cost efficiency strategy that can be undertaken by a company. The application of innovation is said to increase by combining significant changes to existing products or creating new products. In addition, the use of EMA has led to faster growth in operating margins for product formation and higher product sales growth [9]. The company applies EMA as evidence to the public that the company has created innovations while still paying attention to the environment and the prevailing norms in society. These efforts will provide positive value from the community towards the company, so that the company gains legitimacy from the community and enhances the company's future performance.

Based on stakeholder theory, the innovation carried out by the company is an effort to fulfill the expectations of stakeholders to improve their welfare. This is evident from the products created which fulfill customer expectations on the basis of customer needs. In addition, innovations made by the company will have an impact on future performance due to the absence of competitors from new products created.

Improving company performance from new products will provide benefits to stakeholders due to an increase in profits received by the company from new products created. Karlsson and Tavassoli (2015) show that innovation mediates the influence of environmental accounting management on future performance.

H4: Innovation has a mediating effect on Environmental Management Accounting - future performance relationship

3. Research Methodology

3.1. Operational Definition of Variable

3.1.1. Environmental Management Accounting (EMA)

Environmental Management Accounting is the management of environmental and economic performance through the development and application of appropriate environment related accounting systems and practices. In this study, EMA was measured using production cost indicator with the following formula (Peters, 2005):

$$EMA = \frac{\text{Production Cost last year} - \text{Production Cost this year}}{\text{Total Sales}}$$

3.1.2. Future Performance

Future performance is a measure of the success of a company in generating profits in the future. In this study, the measurement of future performance uses Return on Assets (ROA) by dividing net income next year by total assets next year. Mathematically, ROA is formulated as follows (Demerjian et al., 2013; Ong & Poyen, 2013; Tabassum et al., 2014):

$$ROA_{t+1} = \frac{\text{Earnings before extraordinary items}_{t+1}}{\text{Total asset}_{t+1}}$$

3.13. Innovation

According to OECD [21] innovation is the implementation of new or developed products (goods or services) or new processes, marketing methods, or new organizational methods on business practices, organizations at work or external relationships. Innovation is measured by the following formula (Peters, 2005):

$$\text{Innovation} = \frac{\text{R\&D Cost}}{\text{Total Asset}}$$

3.2. Data Source

Using 122 manufacturing sector companies listed on the Indonesia Stock Exchange (BEI) in 2011 - 2015 as a sample, this study uses analytical techniques in the form of path analysis techniques; researchers used the influence of intervening variables as a link between the dependent and independent variables in testing the hypothesis. Researchers tested the hypothesis with the help of statistical tools which is SPSS version 20.

4. Result and Discussion

4.1. Results

Table 1. Results of Multiple Linear Regression Analysis Model 1

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0,000	0,000		9,617	0,000
EMA	-0,00002779	0,000	-0,016	-0,177	0,860

Table 2. Results of Multiple Linear Regression Analysis Model 2

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0,107	0,014		7,455	0,000
EMA	0,055	0,045	0,099	1,218	0,226
Innovation	54,145	26,178	0,170	2,068	0,041

Testing the effect of independent variables on the dependent variables in the presence of intervening variables can be done with the Sobel Test.

Table 3. Results of Sobel Test

	Path Coefficients	Standard Error (Sa)	Standard Error (Sb)	Standard Error (Sab)	Hasil Uji Sobel
<i>Environmental Management Accounting</i> ->Innovation	0,000	-0,00002779	-	0,00167	2,361402
Innovation -> <i>Future Performance</i>	26,178	-	54,145		

Based on the table above, the t-count value of 2.361402 > t-table value 1.98 (sig.5%), indicating that innovation can be the link between environmental management accounting and future performance.

4.2. Discussions

4.2.1. The Effect of Environmental Management Accounting On Innovation

Based on statistical analysis environmental management accounting has a negative and insignificant effect on innovation. This is indicated from the significance value of 0.685 (> 0.05). The development of the times makes the company not only create strategies that can be used to achieve its goals, but also to achieve the legitimacy of society. One method that companies can apply to the goal of achieving community legitimacy is environmental management accounting. The implementation of Environmental Management Accounting is a form of competitive advantage in cost focus strategies, especially efficiency at environmental costs. The cost efficiency strategy can be achieved with the concept of environmentally friendly innovation. EMA has a negative effect on the application of innovation.

According to Berry and Rondinelli (1998), there are several reasons that encourage companies towards environmental management, such as regulatory demand, stakeholders forces, cost factors and competitive requirements. The measurement of environmental management accounting in this study uses the amount of production cost of the company in the previous year minus the production cost in the current year. According to the sample data, the production cost of the current year is greater than the cost of the previous year. This can be the cause of EMA having no effect on innovation.

Insignificant results occur due to the minimization of production costs that cannot be applied in the company, resulting in technology from the company also cannot be improved. As a result of technology that cannot be developed, the production run by the company also decreased. EMA implementation does not encourage significant innovation.

This is in accordance with the theory of legitimacy, where environmental management accounting (EMA) run by the company is expected to be an attempt to gain legitimacy from the community. The company implements EMA as a proof to the public that the company has created an environmentally friendly innovation, and in accordance with the norms prevailing in society. These efforts will provide a positive value of society to the company, so the company obtains the legitimacy of the community.

The use of EMA can be an opportunity to develop innovations both in products and processes and in reducing production costs. The existence of environmental regulations applied by the government could be one reason that the results of the analysis are not significant. Another possible explanation is that despite the similar characteristics possessed by EMA and other accounting innovations, there is a difference in the perceptions of costs and benefits between these innovations that contribute to various research findings. This difference can occur due to lack of awareness of the company in applying EMA or the way companies interpret the EMA. The results of this study are in line with the research of Ferreira and Carly (2009).

4.2.2. The Effect of Innovation on Future Performance

Based on statistical analysis, innovation has a significant impact on future performance. This is shown from the significance value of 0.031 (<0.05).

Resource-based view theory explains that firms will gain a competitive advantage when they have valuable resources, are difficult to replicate and have no substitution. To gain a competitive advantage, the company makes various efforts, one of which is innovation. The result of innovation is expected to be a tool to gain a competitive advantage. As companies achieve competitive advantage, corporate sales will increase, leading to an increase in the company's future performance.

Based on the theory of stakeholders, the company is not only responsible for the internal party of the company, but also for the company's external party. The company's innovation activity is one way to improve the company's future performance and also to improve the welfare of stakeholders. Profits gained by stakeholders will increase along with the improvement of company performance, so that the support given to the company will also be higher. Continuous innovation aims to create new products that fit with the times to follow different consumer preferences. The increasing variety of products, the market share of the company will also increase due to the increasing number of consumers with the fulfillment of consumer satisfaction on products produced by the company. Companies that do not produce many innovations to competitors for new products that they create and develop so that the impact on corporate profits and increased corporate performance in the future.

This is in line with Karlsson and Tavassoli (2015) research. According to Karlsson and Tavassoli (2015), innovation is introducing new products that are new combinations of characteristics that align with the preferences of potential customers or change the characteristics of current products by increasing the willingness of customers to pay for the overall characteristics created. Innovation is said to work if the resulting product can contribute to an increase in company sales. Innovation also contributes to reducing operational costs due to cheaper materials, components and systems.

4.2.3. The Effect of Environmental Management Accounting On Future Performance

Based on statistical analysis, environmental management accounting has a positive and insignificant effect on future performance. This is indicated from the significance value of 0.685 (> 0.05).

The application of environmental management accounting is one of the ways to achieve competitive advantage through cost-focused strategy, especially efficiency at environmental cost. Environmental management accounting encourages the reduction of costs and environmental impacts of business processes simultaneously. EMA also encourages the implementation of costs efficient innovation so as to ensure the sustainability of the company in the future (sustainability development).

According to Berry and Rondinelli (1998), there are several forces that encourage companies to participate in environmental management, one of which is cost factors. The measurement of environmental management accounting in this study uses the amount of production cost of the company in the previous year minus the production cost in the current year. According to the sample data, the production cost for the current year is greater than the previous year's cost, which results in negative EMA measurement results. The results are not significant because the minimization of production costs that cannot be applied in the company result in technology from the company which also cannot be improved. As a result of this, the company's production also decreased. EMA implementation does not encourage significant innovation. Declining production of new products causes sales to decline so that the company's profits also decline. Future company performance also decreased, so it can be concluded EMA has not significantly affected where the future performance.

This is in accordance with the theory of legitimacy, environmental management accounting (EMA) run by the company is expected to be an attempt to gain legitimacy from the community. The company implements EMA

as a proof to the public that the company has created innovation by keeping an eye on the environment and in accordance with prevailing norms in society. These efforts will provide a positive value of society to the company, so the company acquires the legitimacy of the community. Implementation of environmental management accounting in the company will also increase the satisfaction of its stakeholders.

Environmental management practices are driven by the moral obligation to reduce the impacts of climate change and on the desire to meet the current emerging environmental regulations. The application of environmental management accounting is not only driven by financial motives. Moral and ethical obligations to mitigate negative climate impacts and respect for environmental regulations are reasons for implementing environmental management accounting. This is in line with Nyirenda et al. research (2013).

4.2.4. The Mediating Effect of Innovation on Environmental Management Accounting - Future Performance Relationship

The results of the sobel test with the t-count value of 2.361402 which is greater than the t-table value of 1.98 (sig. 5%), proves that innovation can mediate the influence of environmental management accounting on future performance.

In accordance with the theory of legitimacy, environmental management accounting (EMA) run by a company is expected to be an effort to gain legitimacy from the community. The company applies EMA as evidence to the public that the company has created environmentally friendly innovations, and in accordance with the norms prevailing in society.

These efforts will provide positive values from the community to the company, so that the company obtains legitimacy from the community. The use of EMA can be an opportunity to be able to develop innovations in both products and processes and in reducing production costs in order to increase the company's future performance.

According to the results of the sobel test, innovation has linked environmental management accounting with future performance. This happens because the innovations implemented by the company can be used to develop ideas and products. These innovations are very likely to lead to future performance of companies. Eco-friendly innovations contribute to the reduction of the environmental burden or the company's going concern target in producing environmentally friendly products with the goal of community legitimacy. The results of this study are in line with research Karlsson and Tavassoli (2015).

5. Conclusions

Based on hypothesis testing, the result of research is as follows: (1) Environmental Management Accounting (EMA) has a negative and insignificant effect on innovation. According to the sample data, the production cost of the current year is greater than the cost of the previous year. This can be the cause of EMA having no effect on innovation; (2) Innovation has a positive and significant influence on future performance. With an increasing variety of products, the market share of the company will also increase due to the increasing number of consumers. Companies that innovate for new products they create and develop impact on increased corporate profits and increased future performance; (3) Environmental Management Accounting (EMA) has a positive and insignificant effect on future performance. According to the sample data, the production cost of the current year is greater than the previous year's cost, which results in negative EMA measurement results. Cost factors can be the cause of EMA not encouraging the production of new products, resulting in the decline of sales, profits and also the future performance. And finally, (4) Innovation has proven to be able to bridge the environmental management accounting variables towards future performance. This happens because the innovations implemented by the company can be used to develop ideas and products. Eco-friendly innovations contribute to the reduction of the environmental burden or the company's going concern target in producing environmentally friendly products with the goal of community legitimacy. This innovation leads to the company's future performance.

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