International Journal of Innovation, Creativity and Change. www.ijicc.net
Volume 15, Issue 3, 2021

Adoption of Environmental Management Accounting: Corporate Characteristics and Innovation

Novie Susanti Suseno[a], Irma Rosmayanti[b], Acep Abdul Basit[c], Rita Herawati[d], Inda Amalia Haq[e], [a]Departement of Accounting, Universitas Garut, Indonesia, [b]Departement of Accounting, Universitas Garut, Indonesia, [c]Departement of Management, Universitas Garut, Indonesia, [d]Departement of Management, Universitas Garut, Indonesia, [e]Departement of Accounting, Universitas Garut, Indonesia, Email: [a]noviesusantisuseno@uniga.ac.id, [b]irmarosmayanti71@gmail.com,[c]acep.basit@uniga.ac.id,[d]ritaherawati@gmail.com, [e]indaamaliahaq98@gmail.com

The implementation of Environmental Management Accounting is essential for companies to recognise the company's activities that have an impact on the environment, where in the end, the company is demanded to be able to create quality products and not harm the environment. This research aims to determine the effect of environmental management accounting and company characteristics on product innovation. The research is carried out on Garut Regency. The research method used is a quantitative method with an associative approach. The study population was the Centre for the leather industry in the Garut Regency, West Java, with a sample of 69 respondents. The type of data used in this study is primary data in the form of questionnaires and secondary data. Data analysis techniques used multiple linear regression analysis. The results of this research indicate that environmental management accounting and company characteristics influence product innovation. This illustrates that efforts are needed to continually increase the awareness of the company always to increase innovation to create environmentally friendly products.

Key words: *Environmental Management Accounting, Company Characteristics, Product Innovation.*

Introduction

The growing business environment affects every company. The company operates in a business environment characterised by rapid change and increased competitiveness (Saeidi et al., 2018). One form of environmental development is innovation, which is the foundation for an

organisation to be able to compete in a dynamic environment (Suseno, 2016; Torres et al., 2009). Organisations are required to innovate, and innovation is generally considered an essential aspect of most businesses because it can lead to competitive advantage (Ferreira et al., 2010).

Innovation is a definite competitive advantage that enables companies to enter new markets by becoming more proactive in manufacturing new products, building new processes, and gaining higher levels of reputation among consumers (Saeidi et al., 2018). Innovation is a core driving force that enables the creation of new opportunities and markets (Nguyen et al., 2016). However, in a company, innovation is sometimes not in line with the environmental impacts that are generated, so innovation is also needed to produce products to avoid various environmental risks (Rahayu, 2016). In this case, research is required in analysing the potential effects and practices of environmental management on the development of innovation to encourage the sustainability of a company's growth.

To achieve sustainable practices and environmental efficiency, organisations are directed to develop new products and improve existing processes to reduce resource use and environmental damage caused by their activities (Ferreira et al., 2010).

There are various problems that arise due to the process of using resources that cause environmental damage, such as the occurrence of rivers in the Sukaregang leather industry area, namely water pollution caused by the surrounding factory waste, which until now there has been no solution for the management of the liquid waste. Therefore, industries or factories that manage leather are not allowed to stand in areas other than the Sukaregang industrial area because the emergence of liquid waste can disrupt the activities of surrounding communities (Liputan 6, 2018). With the facts of the problem, the Garut Regency, which is famous for its leather processing centre, must be able to create implementing strategies in the form of product innovations that can preserve the surrounding environment.

Environmental Management Accounting (EMA) is a prime example of the latest innovations in management accounting that can help organisations deal with their environmental responsibilities and can lead to the identification of the shared environmental and economic benefits of company activities (Ferreira et al., 2010). Besides, EMA benefits organisations by providing different information for decision making (Burritt et al., 2009). Such information can reveal hidden opportunities, such as better waste management processes, reduced energy and material consumption, or opportunities for material recycling. From an environmental perspective, this information can also be used in developing processes that are more efficient and thus lead to innovation (Ferreira et al., 2010). Because if the product innovation is not appropriate or there is an error in the production process, it can be influenced by two factors, namely the use of environmental costs that must be appropriate and the characteristics of the company that is the basis for developing or not, a product innovation in a company.

One of the things that can affect innovation is the company's characteristics (Rustika, 2011). The company characteristics discussed in this study are company age and company size to support the influence of Environmental Management Accounting on product innovation. The most influential variable to explain company characteristics is company size (Galani et al., 2012). The size of the company is a predictor of products; small companies, are more innovative than large companies because they have more nimble characteristics in entrepreneurship (Pitrchart et al., 2019). The age of the company is defined as the number of years since the company was founded. The period of the company is sometimes referred to as a newcomer (new company) versus an industrial worker (old company) (Chandy & Tellis, 2000). This process is needed to increase efficiency when the industry or market is more mature (Pitrchart et al., 2019). When the age of the company is passed, the company is increasingly experienced and expanding its capabilities (Balasubramanian & Lee, 2008).

The results of research on the effect of the application of environmental management accounting and business strategy on product and process innovation, show that there is a positive relationship between the implementation of environmental management accounting with process innovation (Ferreira et al., 2010). Company age and company size affect product innovation (Pitrchart et al., 2019).

This study will examine the effect of Environmental Management Accounting (EMA) and Company Characteristics on Product Innovation (Survey at the Leather Industry Centre in the Garut Regency). This research is essential to do, to give an overview for companies about Environmental Management Accounting Practices that will be useful to create sensitivity to the environment by innovating environmentally friendly products. The application of environmental management accounting and business strategy to produce and process innovation shows that there is a positive relationship between the implementation of environmental management accounting with process innovation (Balasubramanian & Lee, 2008; Ferreira et al., 2010; Galani et al., 2012; Nguyen et al., 2016; Saeidi et al., 2018; Suseno, 2016), the age of the company and the size of the company's influence on product innovation (Pitrchart et al., 2019).

Research Framework

Environmental Management Accounting / EMA is a combined approach that provides data transitions from financial accounting, cost accounting, and material flow balance to improve material efficiency, reduce environmental impacts and risks and reduce environmental protection costs (Jasch, 2003). EMA is a prime example of the latest innovations in management accounting that represent the current development of companies (Ferreira et al., 2010).

EMA provides cost accounting information based on balance sheet data (Saeidi et al., 2018). This comprehensive information provides decision-makers with a clear picture of the environmental and economic outcomes of the company's activities to make more strategic and effective decisions (Pitrchart et al., 2019). EMA has a positive and significant effect on innovation (Ferreira et al., 2010).

The size of a company is perhaps the most debated about its impact on innovation (Balasubramanian & Lee, 2008). Company size refers to the scale of the organisation's operations (Chandy & Tellis, 2000). Companies of different sizes usually have different innovation practices and different mechanisms (Christensen, 1997; Shi et al., 2018). As the organisation grows, the level of filtering and decision-making of the organisation gets higher (Chandy & Tellis, 2000).

The age of the company is defined as the number of years since the company was founded (Chandy & Tellis, 2000). Younger companies or industrial entrants are more likely to pursue innovative products because they are driven to gain profits and market share (Pitrchart et al., 2019). The creative ability of a company can increase with time (Balasubramanian & Lee, 2008); the age and size of the company affect product innovation (Pitrchart et al., 2019).

Methodology

To test the extent of the effect of EMA and company characteristics on product innovation, a survey of 69 Leather Industry Centres in the Garut Regency was conducted. The associative method was used in this study.

To measure Environmental Management Accounting refers to those raised by these indicators: Product costs, Process costs, Systems or facilities, Environmental prevention costs, Environmental detection costs, Environmental internal failure costs, Environmental domestic failure costs, Emphasis on pollution costs, Allocation of environmental costs to products and Valuation product life cycle costs (Hansen & Mowen, 2011).

Company characteristics of the company in this study refer to those raised by those consisting of company size and company age, while product innovation refers to those consisting of product style and design, product features and product quality (Rahayu, 2016). The data processing technique used in this study is multiple linear regression analysis.

Result and Discussion

Validity and Reliability Test

Table 1: Validity Test

Variable	Item No.	r count	r table	Decision
Environmental Management Accounting (X_1)	1	0.363	0.361	Valid
	2	0.386	0.361	Valid
	3	0.364	0.361	Valid
	4	0.578	0.361	Valid
	5	0.399	0.361	Valid
	6	0.370	0.361	Valid
	7	0.518	0.361	Valid
	8	0.522	0.361	Valid
	9	0.648	0.361	Valid
	10	0.587	0.361	Valid
	11	0.724	0.361	Valid
	12	0.521	0.361	Valid
	13	0.515	0.361	Valid
	14	0.493	0.361	Valid
	15	0.565	0.361	Valid
	16	0.416	0.361	Valid
	17	0.515	0.361	Valid
	18	0.469	0.361	Valid
	19	0.375	0.361	Valid
Company Characteristics (X_2)	20	0.704	0.361	Valid
	21	0.744	0.361	Valid
	22	0.534	0.361	Valid
	23	0.708	0.361	Valid
Product Innovation (Y)	24	0.784	0.361	Valid
	25	0.627	0.361	Valid
	26	0.672	0.361	Valid
	27	0.681	0.361	Valid
	28	0.681	0.361	Valid
	29	0.480	0.361	Valid
	30	0.454	0.361	Valid

Based on Table 1, it can be seen that each question item for Environmental Management Accounting is more than equal to 0.3 (r count ≥ 0.3), same as the other independent variables namely Company Characteristics produce r count value greater than 0.3 (r table ≥ 0.3l), meaning that the items are valid. The dependent variable that is Product Innovation, also has a calculated r value greater than or equal to 0.3 (r table ≥ 0.3), meaning that the entire question items for both the independent and dependent variables are valid.

Table 2: Reliability Test Results

Variable	Cronbach Alpha	Standard Value	Decision
Environmental Management Accounting (X_1)	0.809	0.60	Reliable
Company Characteristics (X_2)	0.593	0.60	Reliable
Product Innovation (Y)	0.740	0.60	Reliable

Based on Table 2, it shows that all three variables have reliable data because the Cronbach Alpha value is more than the standard value set at 0.60. Therefore, each item of questions in the variable shows reliable and dependable data collection to use.

Normality Test

Following are the results of normality testing with the Kolmogorov-Smirnov test using the following software SPSS tools:

Table 3: Normality Test Results

		Unstandardized Residual
N		69
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	1.93514831
Most Extreme Differences	Absolute	.103
	Positive	.103
	Negative	.082
Test Statistic		.103
Asymp. Sig. (2-tailed)		.067[c]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

Based on Table 3, it can be seen that the value of Kolmogorov-Smirnov is 0.103 with an Asymp value. Sig. (2-tailed) of 0.067. This means that the standardised residual value normally spread, because the sig value is greater or equal to 5%.

Hypothesis Test

Effect of EMA on product innovation

The first hypothesis which states EMA affects product innovation. Hypothesis test results can be seen in Table 4:

Table 4: Effects of EMA on product innovation

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.028	3.745		5.883	.000
	EMA	.101	.047	.256	2.165	.034

Dependent Variable: Product Innovation

Based on the partial test in Table 4, it can be seen that the sig value of 0.034 compared to the probability value of 0.05, the sig value is smaller than the probability value or 0.05 ≥ sig. Therefore, Environmental Management Accounting significantly influences product innovation. This illustrates that the application of Environmental Management Accounting in companies is needed to produce the right quality products and not have a lot of negative impacts on the environment. As for what the company has done in implementing this EMA, the company is trying to separate the waste generated so that it is not disposed of to the community around the industry. This is intended by the company so as not to harm the community around the industry, especially the Sukaregang Garut Regency. As for the waste disposal process, the company has tried not to dump it into the surrounding community. However, until now, the process of managing waste, especially liquid waste, has not yet found a solution.

Effect of Company Characteristics on Innovation

The results of the second hypothesis test, which states that there is an influence between company characteristics on product innovation, can be seen in Table 5 below.

Table 5: Effect of Company Characteristics on Innovation

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	16.956	2.566		6.608	.000
	Karakteristik	.788	.153	.533	5.151	.000

a. Dependent Variable: Product_Innovation

Based on the partial test in Table 5, it can be seen that the sig value of 0.000 compared to the probability value of 0.05, the sig value is smaller than the probability value or (0.05 ≥ sig). Ho is rejected, and Ha is accepted, which means significant. Therefore, company characteristics significantly influence product innovation. This illustrates that the leather industry centre in the Garut Regency, during its founding, always tried to produce the right quality products and firm competitiveness. Furthermore, the size of the company and the length of the company's standing will increase product innovation that is getting more quality, both in terms of features, size, and types of new products produced. In this case, the company can continue to maintain the viability of the company to produce products that are needed by consumers and, of course, are environmentally friendly.

Effect of EMA and company characteristics on product innovation

The third hypothesis, which states that EMA and Company Characteristics have an effect on Product Innovation, can be seen in the following Table 6.

Table 6: Effects of EMA and Characteristics of Companies on Product Innovation

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	104.426	2	52.213	13.533	.000[b]
	Residual	254.646	66	3.858		
	Total	359.072	68			

a. Dependent Variable: Product_Innovation
b. Predictors: (Constant), Characteristics, EMA

Based on the simultaneous test in Table 6, it can be seen that the sig value is 0,000 compared to the probability value of 0.05, the sig value is smaller than the probability value or (0.05 ≥ sig). Therefore, Environmental Management Accounting and company characteristics significantly influence product innovation.

Table 7: Determination Coefficient Test Results (R^2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.539	.291	.269	1.964	.291	13.533	2	66	.000

a. Predictors: (Constant), Characteristics, EMA
b. Dependent Variable: Product_Innovation

Based on Table 7, it can be said that the effect of EMA and company characteristics on product innovation in the leather industry centre in the Garut Regency is 26.9%, while the rest is caused by other variables not examined in this study.

This illustrates that if Environmental Management Accounting is implemented appropriately, it can affect the company's ability to innovate in order to produce the right quality products and can minimise adverse impacts on the environment. The company has identified environmental costs where these results indicate that the leather industry centre in the Garut Regency in the decision-making process of production costs is always based on the planned product costs even though it has a negative impact on the environment, and even though it has not been fully overcome by the company. The company requires efforts to manage the remaining production results properly and to minimise waste that will be disposed of by the company.

The results of this study support previous research, which states that Environmental Management Accounting has a positive and significant effect on innovation (Ferreira et al., 2010). Environmental Management Accounting has a positive influence on product and innovation processes on the one hand and the positive influence that innovation has on financial performance on the other hand (Saeidi et al., 2018).

Furthermore, the results of the study show that EMA and company characteristics influence product innovation. This illustrates that companies that have the ability in the form of resources, both human resources and technology and have the opportunity to develop EMA, which ultimately has the capacity to innovate by developing products which are environmentally friendly. This research is in line with previous research, which states that company size is a predictor of product innovation (J. A. Schumpeter, 1934; Ribeiro & Guzman, 2010); older companies tend to produce innovation (Davis, 1989). The results of this study also support previous research, which states that company characteristics (size and age of the company) significantly influence product innovation (Pitrchart et al., 2019).

Conclusion

The results show that Environmental Management Accounting significantly influences product innovation, as well as company characteristics, and affects product innovation. In general, it can be concluded that Environmental Management Accounting is a prime example of innovation in management accounting that represents current developments. Innovations in the field of environmental management are mainly conceptualised as product innovation and process innovation. Besides that, the characteristics of the company will increase the company's ability to continue to innovate by producing products that are increasingly high quality and environmentally friendly, both in terms of design, features, and product value. This further shows that it is necessary to balance the company's goals, which focus on improving financial performance without ignoring concern for the surrounding environment.

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