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Effect of innovation on company performance with environmental performance as a mediating variable

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Abstract

The ASEAN Economic Community (AEC), which enacted in early 2016, has caused business competition in Indonesia even tighter. This encourages the company to form an ability to innovate in order to achieve unique and superior resources so that competitive superiority can be achieved. This study aims to analyze the effect of innovation on company performance with environmental performance as a mediating variable in manufacturing sector companies listed on the Indonesia Stock Exchange of 2011-2015. Results showed that innovation has a negative effect but not significant on company performance. Inversely related to the findings, innovation has a positive effect on the company's environmental performance. Environmental performance also has a positive effect on company performance.

Keywords: Innovation, Company performance, Environmental performance.

Efecto de la innovación en el desempeño de la empresa con el desempeño ambiental como una variable mediadora

Resumen

La Comunidad Económica de la ASEAN (AEC), que se promulgó a principios de 2016, ha provocado que la competencia empresarial en Indonesia sea aún más estricta. Esto alienta a la empresa a formar una capacidad de innovación para lograr recursos únicos y superiores para que se pueda lograr la superioridad competitiva. Este estudio tiene como objetivo analizar el efecto de la innovación en el desempeño de la empresa con el desempeño

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ambiental como una variable mediadora en las empresas del sector manufacturero que cotizan en la Bolsa de Indonesia de 2011-2015. Los resultados mostraron que la innovación tiene UN efecto negativo pero no significativo en el desempeño de la empresa. Inversamente relacionada con los hallazgos, la innovación tiene UN efecto positivo en el desempeño ambiental de la empresa. El desempeño ambiental también tiene UN efecto positivo en el desempeño de la compañía.

Palabras clave: Innovación, Desempeño de la compañía, Desempeño ambiental.

1. INTRODUCTION

The enactment of the ASEAN Economic Community (AEC) in the early 2016, increasingly bridging the foreign companies to conduct business activities in Indonesia. This requires domestic companies to work harder in running their business, plus because at this time competitors do not only come from within the country, but also companies that come from abroad so that makes the business environment in Indonesia become very competitive (PURWONO, MUBIN AND YASIN, 2018). To realize this, the company must be willing to continue to innovate continuously. Innovation can be considered as organizational capability, because it is an act of utilizing resources with the new capability to create value (YANG, MARLOW AND LU, 2009).

Products that do not experience development will have an impact on the boredom of consumer, so consumer will find new product alternative to fulfill their needs and fulfill their expectation. The company must always innovate to create new products that are in

accordance with the changing times to keep up with changing consumer preferences. This is one way to face competition and respond to the market challenge (TJAHJADI, 2015). The number of new product which produced from an innovation on the product, then it will has an impact on increasing sales due to increased market share of new product produced. With a high market share accompanied by determination of high prices on the new product will has an impact on increasing company's profit (SASIKIRONO, SUMIATI AND INDRAWATI, 2018: OLIVEIRA ET AL, 2018).

Various innovation activities are carried out by companies to achieve unique and superior resources so that competitive superiority can be achieved. With the achievement of competitive superiority, the opportunity to win the competition from competitors will be more wide open. In addition, innovation is carried out continuously for the creation of various products (SOEWARNO AND MARDIJUWONO, 2018).

Along with the increasing variety of products, the company's market share will also increase due to the increasing number of customers with product preferences appropriate with the products produced by the company and the company does not have many competitors for the new product that created and developed by them. All exposure to the achievement that the company wants to realize later will have an impact on company performance (WANG, 2011).

Company's responsibility to the environment is an important thing to do. Company's responsibility for the environment is also often referred to as environmental performance. Environmental performance is the company's performance in creating a good environment (green) (SOEWARNO, TJAHJADI AND FITHRIANTI, 2019). Many natural disasters, climate change and environmental problems are the important issues and become the center of attention at this time. These three problems are the effects of environmental pollution, one of which is caused by the growing development of industrial activity in each country (BURNETT, SKOUSEN AND WRIGHT, 2011).

The existence of various policies related to the management and preservation of the environment is one of the causes of the development of a concept that aims to find solution for the business objective fulfillment and solving environmental problem called the concept of eco-efficiency. The concept of eco-efficiency itself is to create more value by minimizing resources and influence on the environment (SOEWARNO, TJAHJADI AND FITHRIANTI, 2019).

Eco-efficiency studies how a company can produce goods or services that are more useful and also reduce negative environmental impact, resource consumption, and stimulatory cost (VERFAILLIE, 2000). The concept of eco-efficiency contains three important messages. First, improving ecological and economic performance must go hand in hand and complement each other. Second, improving environmental performance should no longer be seen as charity, but

also as competition (competitiveness). Third, eco-efficiency is a complement and support of sustainable development (SALEM, HASNAN AND OSMAN, 2011).

Efficiency can be achieved when the company continues innovating the process. Part that is included in the innovation of the process is a significant change in the production technique, equipment and/ or software used. Process innovation can be aimed at reducing unit production or shipping cost, to improve the quality, or to significantly increase production or produce new product (SARI AND KUSUMASTUTI, 2018).

Innovation that is carried out continuously causes the company to keep abreast of increasingly sophisticated and efficient technology development. The achievement of efficiency in the production process has an impact on the management of raw material that is also more efficient so that the side effect or waste produced will also be reduced. This will certainly affect the company's environmental performance. Technique, process or product can eliminate or reduce the emission from pollutant and also the use of raw material, natural resource, and energy (KEMP, 1994).

Based on the background described above, the purpose of this study is to obtain information and empirical evidence of a positive effect between innovation on company performance and the environment. The result of this study is expected to provide an

overview of innovation activity and their effect on environmental performance and company performance, as well as how environmental performance can also affect company performance, so that it can become a consideration in carrying out innovation activity and the impact that may be caused, both on the environment and the company performance. This study can also be used as one of the media consideration so that stakeholders provide support to the right company.

This theory is the development of Porter's five force model concept. Porter states that there are five forces that determine the intensity of competition in an industry, namely the threat of substitute product, the threat of competitor, the threat of new entrant, the bargaining power of supplier, and the bargaining power of consumer (MADURA, 2001: 42). Since the 1960s, the framework used to achieve the sustainable competitive superiority has been to carry out strategies that maximize internal strength through the exploitation opportunities in the external environment, neutralize threat from the external environment and minimize the company's internal weakness.

2. METHODOLOGY

The approach used in this study was associative research and explanatory research. Associative research aimed to find out the relationship between two or more variables. The result of this study

will be used to build a theory that can serve to explain, predict, and control a symptom (PURWONO, MUBIN AND YASIN, 2018).

The dependent or bound variable in this study was company performance. The independent or free variable in this study was innovation. The mediating variable in this study was environmental performance. The control variable in this study was company measure and company age.

The population in this study was all manufacturing companies listed on the Indonesia Stock Exchange in the period of 2011-2015. Sampling in this study was conducted using purposive sampling method. The consideration determined by researchers for the sample criteria was manufacturing companies published their annual report during the period of 2011-2015, manufacturing companies disclose the burden of Research and Development periodically during the period of 2011-2015, manufacturing companies present the data completely related to the variable of this study. This was carried out to minimize the bias generated in the study due to the unavailability of data.

Table 1: Sample criteria

	Total Company				
	2011	2012	2013	2014	2015
Manufacturing companies listed on Indonesia Stock Exchange in the period of	133	135	137	Sample Criteria	143

2011-2015					
Company which not disclose the burden of *Research and Development* (R&D) in the period of 2011-2015	(113)	(115)	(117)	(121)	(123)
Manufacturing companies which not present the data completely related to the variable of the study	(0)	(0)	(0)	(0)	(0)
Population target	20	20	20	20	20

The data analysis technique that used in this study was descriptive statistics, which describe the data that has been collected as it was without intending to make conclusion that apply to the public or generalization (AROCHE-REYES, 2003). The model that used in this study was a model of causality or relationship or effect and to test the proposed hypothesis, then, the analysis technique used was the Structural Equation Method. The data obtained will be processed by SPSS 20 (Structural program for social science) software and SPSS AMOS 20.0 (Analysis of Moment Structure). The use of SEM analysis method was because SEM can identify the dimensions of a construct and at the same time be able to measure the effect or degree of relationship between the factors that have been identified by its

dimensions (OLARENWAJU AND OLABISI, 2012). The Structural Equation Model method was used because in this study there was a tiered causality relationship which was characterized by the mediating variable between the effects of each variables, the relationship was a direct relationship. The relatively large amount of the data caused Analysis of Moment Structure (AMOS) to be the right method to be used in this study.

In this study, confirmatory factor analysis was used with the loading factor value of each indicator. The reflective measure was said to be high if it correlated more than 0.7 with the construct that was to be measured. According to CHIN (1998) IN YAMIN AND KURNIAWAN (2011: 18) for the early stages of the study on the developing an outer loading value measurement scale of 0.5 to 0.60 was considered enough. In this study the outer loading value of 0.5 was used. Validity test was carried out to determine the ability of research instrument to measure what should be measured, according to what was stated (COOPER AND SCHINDLER, 2006).

Hypothesis testing in this study was carried out using the Structural Equation Model (SEM) approach with AMOS tools to partially test the effect of variable on the dependent variable. Based on the study objectives, then, the hypothesis test design that made was a hypothesis test design which presented based on the study objectives, namely the hypothesis t test to assess the effect of independent variable separately. The confidence level used was 90%, 95% or 99%, so the

level of precision or inaccuracy limit (α) was 10%, 5%, or 1%. It can be concluded that if the p-value was greater than α, then Ho was accepted and Ha was rejected. If the p-value was smaller than α, then Ho was rejected and Ha was accepted.

In this study there were mediating variables, namely environmental performance which was proxied by the eco-efficiency ratio. Testing mediation hypothesis can be carried out by a procedure developed by Sobel (1982) and it was known as the Sobel test. Sobel test was carried out by testing the strength of the indirect effect of the independent variable (X) to the dependent variable (Y) through the mediating variable (Z).

The indirect effect of X to Y through Z was calculated by multiplying path X-Z (a) with path Z-Y (b) or ab. So the coefficient of ab = (c - c '), where c was the effect of X on Y without controlling Z, while c' was the coefficient of the effect of X on the Y after controlling Z. The value of t-arithmetic was compared with the value of t-table. If the calculated t-value was greater than the t-table value, it can be concluded that there was a mediating effect (GHOZALI, 2009).

EZZI AND JARBOUI (2016) and C.-H. WANG (2011) stated that innovation has a positive effect on company performance. HARIYATI AND TJAHJADI (2015), also stated that innovation carried out sustainably has a positive and significant effect on company performance.

Under eco-efficiency, pollution and waste that represent inefficiency in the production process and were non-value-added cost, can be reduced or eliminated through the process of technological improvement and innovation (SINKIN, WRIGHT, AND BURNETT, 2008). HARIYATI AND TJAHJADI (2015) conveyed that innovation carried out sustainably had a positive and significant effect on the company's environmental performance.

The study related to the environmental performance by TITISARI AND ALVIANA (2012) and SURATNO ET AL. (2006) which stated that environmental performance has a significant positive effect on economic performance or company performance. In line with the study, HARIYATI AND TJAHJADI (2015) also conveyed that environmental performance has a positive and significant effect on company performance. HARIYATI AND TJAHJADI (2015) conveyed that, continuous innovation has an indirect effect to the company's financial performance, environmental performance became a partial mediating variable on the effect of sustainable innovation to the company's financial performance.

3. RESULTS AND DISCUSSION

The effect of innovation on company performance in this study was calculated using estimation model that were analyzed using SEM model with AMOS tools.

Table 2: Model Estimation Result

			Estimate	S.E.	C.R.	P	Label
ENVIRONMENT	<---	IRD	1.026	.446	2.299	.022	par_5
ENVIRONMENT	<---	AGE	-.039	.025	-1.572	.116	par_6
ENVIRONMENT	<---	SIZE	.550	.233	2.358	.018	par_7
PERFORMANCE	<---	IRD	-.009	.011	-.853	.394	par_2
PERFORMANCE	<---	AGE	.005	.001	8.797	***	par_3
PERFORMANCE	<---	SIZE	.013	.006	2.247	.025	par_4
PERFORMANCE	<---	ENVIRONMENT	.006	.002	2.357	.018	par_8
ROA	<---	PERFORMANCE	1.000				
TATO	<---	PERFORMANCE	3.146	.558	5.634	***	par_1

Based on the estimated value of the resulting regression coefficient of -0.009, it can be concluded that innovation has a negative effect on company performance. The negative sign on the regression coefficient showed the unidirectional relationship between innovation and company performance, where if innovation increases once, the company's performance will decrease by 0.009 times. Based on the P value and the estimated value of the regression coefficient, to see the effect of innovation to the company performance, it can be concluded that innovation has a negative effect on company performance but has not been proven significant.

Environmental performance which was used as a mediating variable in the effect of innovation on company performance was calculated using the Sobel test. Sobel Test was a test that calculated the correlation of the value of the regression coefficient with its standard deviation. Sobel test result can be seen in table 3 below.

Table 3: Sobel Test Result

The Relationship among Variables	Original Sample	Standard Error (Sa)	Standard Error (Sb)	Standard Error (Sab)	Sobel Test Result
INNOVATION -> ENVIRONMENTAL PERFORMANCE	1,026	0,446	-	-	-
ENVIRONMENTAL PERFORMANCE -> COMPANY PERFORMANCE	0,006	-	0,002		
INNOVATION -> ENVIRONMENTAL PERFORMANCE -> COMPANY PERFORMANCE	0,0062	-	-	0,0035	1,7714

Based on the result in table 3, it can be concluded that environmental performance was a variable that can mediate the effect of innovation to the company performance. This can be seen based on the value of the sobel test result of 1.7648 greater than the t-table value which determined of 1.67. Based on the estimated value of the regression coefficient (original sample) generated from each

relationship, then, the estimated regression coefficient for environmental performance as a mediating variable was 0.0062. It can be concluded that environmental performance has a positive effect in mediating the effect of innovation to the company performance.

A positive sign on the regression coefficient indicated a direct relationship between environmental performance and company performance, where if environmental performance increased once and innovation remained, then the company's performance will increase by 0.0062 times. Based on the Sobel Test value and the regression coefficient, to see the environmental performance as a mediating variable the effect of innovation to the company performance, it can be concluded that environmental performance has a positive effect in mediating the effect of innovation to the company performance.

The result of this study stated that innovation has a negative effect, but it was not significant to the company performance, so the first hypothesis was not proven. This can show that the innovation carried out by a company cannot have a direct effect on improving company performance. Innovation carried out by the company will require research and development process in order to produce better internal resources (SOEWARNO AND MARDIJUWONO, 2018). Additional cost to support the research and development process will continue to be spent to support the process of both processes.

The increase in operational expenses that occurred will certainly have an impact on the reduced profit generated by the company (SARI AND KUSUMASTUTI, 2018). But on the other hand, innovation will produce a variety of new products or the number of products for the company. Innovation was an activity that required a relatively long and continuous time. This was commonly referred to as time gap, innovation activity carried out by the company today will produce benefit in the future or in other words the benefit obtained will not be immediately seen and enjoyed (SOEWARNO, TJAHJADI AND FITHRIANTI, 2019).

The result of this study was in line with the study of LIN ET AL. (2006) which provided empirical evidence that innovation has no effect on company performance. The result of this study was also in line with the study of WANG AND CHANG (2005) which stated that innovation made by the company cannot be felt directly by the company, or in other words the benefit provided by innovation require a relatively long time.

Based on the result in table 2, it can be concluded that innovation influenced to the environmental performance. This can be seen based on the P value of 0.022, with a significant value below 0.05. Based on the estimated value of the resulting regression coefficient of 1,026, it can be concluded that innovation has a positive effect on environmental performance. A positive sign on the regression coefficient indicated a direct relationship between innovation and

environmental performance, where if innovation increases once, then environmental performance will increase by 1,026 times. Based on the P value and the estimated value of the regression coefficient, to see the effect of innovation to the environmental performance, it can be concluded that innovation has a significant positive effect on environmental performance.

4. CONCLUSION

Based on the analysis and study result, it can be concluded that innovation has a positive effect on the company's environmental performance and was proven significant. Innovation has an impact on production efficiency and minimized the use of company raw materials, so that the secondary product or waste and pollution produced will be increasingly reduced and have an impact on improving the company's environmental performance. Innovation initially had a negative effect to the company performance, but it was not significant, because innovation did required time and also the sustainability additional cost that will be charged to the company's operational expenses.

The test result showed that the environmental performance has a positive effect to the company performance and was proven significant. Environmental performance has a positive effect in mediating the effect of innovation to the company performance and

was proven significant. Innovation can improve environmental performance. The innovations made by the company will bring the changes to the production process that was more efficient so that the operational expenses decline.

5. RESEARCH LIMITATION

Innovation in this study was measured using the value of research and development (R&D) expenses which was in the company's annual report. This was provided an impact to the number of companies' sample that used relatively small due to the number of companies in Indonesia that disclose or include the value of their R&D expenses were relatively small.

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