The Mediating Role of Green Innovation on the Effect of Environment-Based Culture on Company Performance

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Purpose : The main purpose of this study was to prove empirically the influence of environment-based culture on financial performance, with green innovation as a mediating variable for manufacturing companies listed in the vicinity of PIER and SIER East Java. **Design/Methodology:** The population of this study are manufacturing companies located in SIER and PIER. The survey was conducted by sending questionnaires to respondents in management levels in an organisation of a manufacturing company. The survey was carried out using two methods, both online, with paper surveys for some people. **Findings:** The results of this study indicate that environmental culture has a positive effect, and was shown to significantly affect financial performance, mediated by green process innovation, but green innovation products have not succeeded in mediating the influence of environmental commitment on financial performance. **Originality/value:** The originality of this study includes: the use of green accounting as a mediator – something which has not been conducted by other researchers, especially in Indonesia; measurement using ordinal scale primary data; and analysing manufacturing companies as the study's population.

Key words: *environment-based culture, green process innovation, green product innovation, financial performance.*

Introduction

Climate change and global warming are discussed by all countries in the world. Yu-Shan Chen (2012) explained that companies must be able to lead in environmental management. Pressure

on companies to pay attention to environmental aspects of their business is a major challenge facing companies (Yu-Shan Chen, 2012). According to Yu-Shan Chen (2012), in an environment-based era, it is not easy for companies to adopt proactive strategies for environmental management, but companies need to change their business model and managerial views to benefit from environmental problems, by exploiting the opportunities available from these problems, through the creation of environment-based management.

The success of a company in the creation of environment-based management is strongly influenced by the organisational culture in the company (Tushman & O'Reilly, 2006). To answer the big challenges of environmental problems faced by companies, a company strives to create a corporate culture that is oriented towards the environment (green culture).

Environment-based corporate culture is an organisational setting, sought by companies to improve their performance. Environment-based corporate culture is beneficial for organisations to maintain innovative corporate culture, by implementing mechanisms and structures that encourage new ideas and ways of thinking, and operations based on solving possible environmental problems. New ideas and ways of thinking encourage management to streamline the resources they have throughout their production process, so that production costs can be reduced and help increase company profits. Increasing profits is an indicator of improved company performance.

This research was conducted at manufacturing companies listed on the Indonesia Stock Exchange. This is because manufacturing companies are an industrial sector capable of producing large environmental impacts, due to their large production activities in manufacturing companies, so this study is expected to be able to contribute to the company's efforts in environmental management planning, addressing contemporary problems in the industrial world.

Literature Review

Company Performance

Company performance is a measure of achievement against business goals set when a company was established, namely to maximise profit and to be able to sustain growth and development. Criteria in assessing a company's performance include operational and financial performance. In this study, company performance is measured by financial performance.

Financial performance is a display of the company's financial condition for a certain period and is a tool used by companies to measure a company's financial health. Financial performance is used by the company as a subjective measurement, which describes the efficiency and

effectiveness of asset management by a company in carrying out the its operations and increasing its income. A company's financial performance can generally be measured in two ways, namely:

Market-Based Measured

Stock returns are one of the benchmarks of the performance of shares in a company, so that investors are always looking for a maximum level of return from the company after considering risk. The advantage of market-based calculations is that stock returns are not susceptible to interference that can arise from various accounting treatments, and possible manipulations that can appear in financial statements. From market-based calculations, investors can evaluate a company's ability to generate income into the future.

Accounting Based Measured

The accounting-based measurement rationale focuses on a company's earnings towards policy changes taken by management. In other words, accounting return measurements are only based on the company's internal conditions, without taking into account external factors.

Environment-Based Corporate Culture

A corporate culture that is oriented towards environmental issues can be used by a company to minimise the pressure placed, by stakeholders, on environmental problems that arise in the production process. Creating an environment-based corporate culture is the first step to implementing environment-based management. An environment-based corporate culture encourages management to find creative solutions to solve problems related to environmental aspects. This can encourage management to create green innovation (Edwin A. Locke, 1995).

Research conducted by Uzkurt, Kumar, Semih Kimzan, & Eminoğlu (2013) provides empirical evidence that organisational culture influences company performance. This research was carried out on a hatchery company in Turkey. Its results prove that companies that have a good organisational culture will encourage managers and employees to be more creative in developing new ideas to improve company performance.

Research conducted by Laforet (2016) provides empirical evidence that organisational culture influences company innovation. This research was conducted on 700 Small and Medium Enterprises (MSMEs) in the UK. Laforet's research proves that companies that have flexibility and openness in their organisational culture will find it easier to increase innovation. Companies that seek to absorb information and consumer needs will have a strong drive to innovate.

Research conducted by Ar (2012) provides empirical evidence that green innovation affects company performance. This research was conducted on 1000 exporters gathered at the Turkish Exporters Assembly (TEA), during the period of 2010. The study's results prove that companies that increase green innovation, through the creation of environment-based products, will benefit with an increase in market share, which inevitably increases sales. An increase in sales will increase the company's profits.

Research Hypothesis

The Effect of Environment-Based Corporate Culture on Company Performance

H1: Environment-based corporate culture has a positive effect on company performance.

The Effect of Environment-Based Corporate Culture on Environment-Based Innovations

H2: Environment-based corporate culture has a positive effect on environment-based innovation.

Effect of Environment-Based Innovations on Company Performance

Effect of Green Process Innovation on Financial Performance

Green process innovation has an important role in improving a company's financial performance. Green process innovation is the process of companies giving more attention to the environmental issues in production. The production process is redesigned to reduce energy and water use, replace more conventional energy sources with the latest energy, and prevent water, soil and air pollution (Grekova, Bremmers, Trienekens, Kemp, & Omta, 2013).

H3a: Green process innovation influences financial performance.

Effect of Green Product Innovation on Financial Performance

Green product innovation has an important role in improving a company's financial performance. Green product innovation focuses on product redesign and improvement, which leads to a reduction of environmental impacts, enabling increased product quality, product price premiums and higher market share (Grekova et al., 2013).

H3b: Green product innovation influences financial performance.

Mediation of Environment-Based Innovations on the Effect of Environment-Based Corporate Culture on Company Performance

Environment-based corporate culture is an organisational setting that is sought by companies to improve their performance. Environment-based corporate culture is beneficial for organisations, maintaining innovative corporate culture by implementing mechanisms and structures that encourage new ideas, new ways of thinking and operations based on solving environmental problems.

H4: Environment-based innovation mediates the influence of environment-based corporate culture on company performance.

Research Design

This research was conducted using a quantitative approach, namely by using a survey method on manufacturing companies located in SIER and PIER. Through this survey approach, the effect of environment-based corporate culture, environment-based innovation on company performance, and the mediating role of environment-based innovation on the influence of environment-based corporate culture on corporate performance were examined.

The results of the findings of this study are expected to help develop of management accounting theory, especially theory related to management decisions in creating an environment-based corporate culture to improve environment-based innovation (green accounting), to finally improve company performance in developing countries. On a practical level, the results of the study are expected to be able to provide discretionary advice for decision-makers in companies, and for investors and central and local governments.

Population, Samples, and Sampling Techniques

The population in this study are manufacturing companies located in SIER and PIER. The survey was conducted by sending questionnaires to respondents in management levels in these manufacturing companies. The survey was carried out using two methods, both online, with paper surveys for some people. The survey was applied from June to August 2018.

Analysis Techniques

The appropriate analysis technique in this study was the Structural Equation Model (SEM) technique, with the Partial Least Square (PLS) approach, using WarpPLS Version 5.0 software. The main tests in this analysis technique were: (1) testing the measurement model, (2) testing

the structural model, (3) testing the direct influence model, (4) testing the indirect influence model.

Results and Discussions

The distribution of questionnaires, distributed to sample companies both online and via door-to-door delivery, was conducted from June to August. The research targeted manufacturing companies located in SIER Surabaya and Pasuruan PIER, although the questionnaires were not fully collected until the end of September 2018. In total, 128 questionnaires were received back and 99 of those were fully filled in, which were then processed for analysis. In addition to the main survey questions, some demographic questions were not mandatory. These questions asked about organisational sector, company size, age, gender, and the level of management of the respondent. The sample included four directors, 18 senior managers, 36 middle managers, 34 junior managers, and 7 non-management staff. 46% of respondents were female and 54% were male. Most respondents aged between 40-49, with a ratio of 54%, and 27% of the total being aged 30-39, with no respondents aged over 60 years. Demographic and organisational characteristics are shown in Table 1.

Table 1: Respondent Demographic Data

Number	Information	Amount	Percentage
I	**Gender**		
	Male	57	58%
	Female	42	42%
II	**Age**		
	20-30	8	8 %
	30-39	21	21 %
	40-49	42	42 %
	50-59	28	28 %
	>= 60	0	0 %
III	**Managerial Level**		
	Director	4	4 %
	Senior Manager	18	18 %
	Middle Manager	36	36 %
	Junior Manager	34	36 %
	Non-Managerial	5	6 %
IV	**Number of Employees**		
	1-100	22	22 %
	100-500	44	44 %
	500-1000	28	28 %
	>1000	5	5 %

Analysis Model

Outer Model Test

To answer the hypothesis, a two-stage test was required, using Smart-PLS software. The first step was to analyse the measurement of the outer model with a reflective indicator. This outer model measurement is completed via two types of validity tests, namely convergent validity, and discriminant validity. Convergent validity is a form of testing research variables through an assessment of indicators, said to be valid if they have a value of loading factor greater than, or equal to, 0.70 and have a T-statistics value of more than 1.96.

The results of the first iteration of the convergent validity test showed some indicators in red, as the correlation value was below 0.7, so it was removed from the construct. The results of the second iteration test showed that the remaining indicators were suitable, meaning they were statistically significant in measuring variables, as the value of the loading factor produced was more than 0.70 and the value of the T-statistic was more than 1.96.

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The next step was determining discriminant validity. Measuring discriminant validity was achieved using cross-loading values. An indicator is said to fulfil discriminant validity if the value of a cross-loading indicator for a variable is the largest when compared to other variables.

Based on the cross-loading value, it can be seen that several indicators that make up each variable in this study have met discriminant validity, as they have the largest cross-loading values when compared to other variables. Thus, all indicators in each variable in this study have met discriminant validity, with the following results:

Table 2: Discriminant Validity Test

	Culture	Product Innovation	Process Innovation	Performance
b10	0.829	-0.019	0.079	0.425
b11	0.863	0.011	0.063	0.451
b12	0.821	-0.012	-0.014	0.438
b15	0.820	0.035	0.182	0.718
b16	0.714	0.034	-0.079	0.358
b17	0.929	0.014	0.077	0.619
b18	0.782	0.015	0.154	0.563
k4	0.613	0.048	0.229	0.887
k5	0.536	0.064	0.262	0.890
k6	0.434	0.053	0.236	0.861
k7	0.646	0.032	0.193	0.844
k8	0.543	0.037	0.221	0.841
z1	0.101	0.145	1.000	0.263
z2	0.016	1.000	0.145	0.053

Next is the discriminant validity Fornell-Larcker criterion test, which explains the correlation between variables and other variables.

Table 3: Fornell-Larcker Criterion Test

	Culture	Product Innovation	Process Innovation	Performance
Culture	0.825			
Product Innovation	0.016	1.000		
Process Innovation	0.101	0.145	1.000	
Performance	0.650	0.053	0.263	0.865

The results of the discriminant validity for the Fornell-Larcker criterion test show that the relationship between variables is valid and can be tested. Another method for looking at discriminant validity is to look at the value of the square root of the average variance extracted (AVE). The recommended value is above 0.5 and, from the following table, an AVE above 0.5 was obtained for all constructs contained in the research model, so that all constructs can be tested.

The reliability test was completed by looking at the composite reliability value of the indicator block that measures the construct. The composite reliability result shows a satisfactory value above 0.70.

Inner Model Test

The next step is to test the inner model, measuring the overall relationship between the variables in this study. Testing of the structural model is done by looking at R-square, which is a model of goodness of fit. After the estimated model meets the outer model criteria, then the structural model (the inner model) is tested. The following are the R-square and the R-square adjusted values in the construct:

Table 4: R-Square and R-Square Adjusted

	R-Square	R-Square Adjusted
Product Innovation	0.000	-0.010
Process Innovation	0.010	0.000
Performance	0.462	0.445

R-square is used as variable X affects Z1, Z2, and Y. An R-square adjusted variable is a variable that affects Z1, Z2 and Y, outside of the studied variable X. The results of the inner model test show that environment-based organisational culture of performance has a coefficient of 0.4 0.462, which means that it influences 0.462, while the rest is influenced by other factors of

0.445. Whereas the organisational culture toward innovation, both product innovation and process innovation, has no effect, considering its coefficient of 0,000 and 0,010.

Hypothesis Testing

The structural equation method through the PLS (Partial Least Square) approach, tests the significance of the path coefficients in the model. The PLS approach is used to test the complex hypothesis by calculating the effect of the independent variable (exogenous) on a dependent variable (endogenous) and the effect of the mediating variable, if it is tested on the path that tested 96 1.96, the research hypothesis is proven or accepted. Detailed test results can be seen below.

Table 5: Path Coefficients

	Original Sample	Sample Mean (M)	Standard Deviation	T Statistics	P Values
Culture -> Product Innovation	0.016	0.072	0.106	0.146	0.844
Culture -> Process Innovation	0.101	0.098	0.095	1.068	0.286
Culture -> Performance	0.630	0.637	0.059	10.684	0.000
Product Innovation -> Performance	0.015	0.003	0.044	0.346	0.730
Process Innovation -> Performance	0.197	0.192	0.075	2.605	0.009

The results conclude that the environment-based organisation and performance has a significant relationship. Hypothesis 1 is acceptable, because the value of the T statistic is above 1.96, while the variable of environment-based culture of product innovation is not significant, because the T statistic is below 1.96. Environment-based culture of process innovation is also not significant, because it has a statistic below 1.96. The product innovation variable on performance is not significant, because the statistical T value is 1.96, and finally, the process innovation on performance has a significant result because the value of the T statistic is above 1.96.

Environment-Based Culture Effect on Performance

The results of statistical tests in this study indicate that environmental-based organisational culture has a positive effect, and is shown to significantly affect financial performance, so that Hypothesis 1 (H1) is accepted. Organisational culture shapes the behaviour of employees in organisations, ultimately influencing new ideas and ways of thinking, and encouraging management to more effectively use resources in the production process, so that production costs can be reduced and improve company performance. An environment-based corporate

climate will also shape environmentally-based employee behaviour, which will have an impact on improving company performance.

Environment-Based Cultural Influence on Green Innovation

The results of the statistical tests in this study indicate that environmental-based organisational culture has not been proven to influence financial performance, so Hypothesis 2 (H2) is not accepted. This hypothesis examines the effect of environment-based culture on green innovation, which consists of green processes and green products. Effective environment-based corporate culture in a company will encourage management to be more proactive in improving environment-based innovation efforts, helping meet all stakeholders' expectations, and avoiding possible problems. The management of a company will be proactive in mobilising all of its resources to improve environment-based innovation, as the values of a company absorb the values of its surrounding community. Absorbing these values becomes part of the corporate cultures, which will encourage company management to be more concerned with efforts to create products and processes that are environmentally friendly. The results of testing this hypothesis show that the two dimensions of innovation, which are not influenced by an environment-based culture.

Effect of Green Innovation on Company Performance

The results of statistical tests in this study indicate that green innovation, which is divided into two dimensions – green process and green innovation, represented by green products – statistically shows that green innovation is not proven to affect company performance, while green process is in fact shown to influence company performance.

Green product innovation has an important role to play in improving a company's financial performance (Grekova et al., 2013). Green product innovation enables companies to avoid using materials that contain chemicals and poisons and creating products that can be recycled. Products produced through green product innovation help companies minimise the use of resources, increasing operational cost efficiency. These efforts help improve financial performance.

Green product innovation is a unique tool for conducting marketing activities, by increasing market share continuously. Increasing market share, through the encouragement of new products created through product innovation, has a positive impact on increasing sales. New products do not have many competitors, so a company can determine high prices on innovative products, due to this absence of competitors. This increase in market share, along with high prices for innovative products, helps increase company profits (Sudaryati & Amelia, 2015).

Yu-Shan Chen (2012) explained that innovative green products are an advantage for companies when carrying out differentiation strategies. Companies that pioneer green product innovation can obtain competitive advantages, and enable them to sell environmentally friendly products, improving their company's reputation and creating new markets (Chen, Lai, & Wen, 2006).

The results of this study do not support research conducted by Ar (2012); Miroshnychenko, Barontini and Testa (2017); C. H. Chang and Chen (2013); and Ren, Tang and E. Jackson (2017). On the other hand, it provides empirical evidence that the application of green product innovation can influence a company's financial performance. While the results of this study are in line with research conducted by Aguilera-Caracuel and Ortiz-de-Mandojana (2013) and Fitriani (2013), who show that green product innovation that has no significant effect on financial performance.

The results of statistical tests on these green process dimensions show there is an influence on company performance. Green process innovation has an important role in improving a company's financial performance. Green process innovation is the process of how companies pay more attention to the environment in production (Grekova et al., 2013). Green process innovation builds environmentally friendly and effective production processes by efficiently using raw materials and energy.

This is in line with research conducted by Alhadid and Abu-Rumman (2014) and C. H. Chang and Chen (2013), which revealed that green process innovation can affect financial performance. But it is not in line with the research conducted by C. Chang (2011) and Gunday, Ulusoy, Kilic and Alpkan (2011), showing that companies that innovate do not directly benefit a company's financial performance.

Green Innovation Mediation on the Influence of Environment-Based Culture on Company Performance

The results of testing mediated green innovation statistics on environment-based culture on performance were not proven – the hypothesis was not accepted. These results indicate that environment-based culture is indirectly linked to green innovation and company performance.

Conclusion and Suggestion

Based on the explanation above, the following conclusions have been made:

No	Hypothesis	Result
1.	*H1*: Environment-based corporate culture has a positive effect on company performance.	Confirmed *H1*
2.	*H2:* Environment-based corporate culture has a positive effect on environment-based innovation.	Rejected *H2*
3.	*H3a*: Green process innovation influences financial performance. *H3b*: Green product innovation influences financial performance.	Confirmed *H3a*
4.	*H4:* Environment-based innovation mediates the influence of environment-based corporate culture on company performance.	Confirmed *H3b* Rejected *H4*

Conclusion

The results of these tests show that green innovation has not been proven to mediate the influence of environmental-based culture on company performance. Although, the green process dimension influences company performance. The influence of environment-based culture on company performance creates an environmentally friendly culture, which encourages management to care for the environment, impacting company performance. Green process innovation has been proven to affect company performance, showing that environmentally friendly processes have the capacity to improve both financial and operational performance.

Suggestions

The results of this study suggest that companies should be expected to foster an environment-based organisational culture for all employees, especially management, to focus on environmental issues and improving process innovation, providing a minimal environmental impact, as it is proven to improve financial performance.

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