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Research Article

Environmental innovation and financial performance: A case study of mediating role of environmental management

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ABSTRACT

The purpose of this study is to investigate the impact of environmental innovation which is product innovation (PDI) and process innovation (PCI) on firm's financial performance (FFP). And also, to investigate mediating role of the environment management accounting (EMA) against innovation and FFP. Data were collected from 98 respondents, worked in management positions in Indonesia's manufacturing sectors. The study uses PLS-SEM (partial least square based structural equation modeling) software for the data analysis. The results showed that PDI has positive and significant impacts on FFP. But PCI has not significant impacts on FFP. Furthermore, PDI and PCI have significant impacts on EMA. This study also indicated that EMA mediate the relationship between innovation and FFP in the manufacturing sector of Indonesia. This study suggests the managers of the manufacturing companies or similar sectors to introduce innovations in their products and processes for developing a better EMA system. The current study also tends to assist policymakers in developing appropriate policies for the manufacturing sector of Indonesia by realizing the importance of environmental innovation, EMA, so that their environmental and economic impacts can be managed and regulated.

Keywords: product innovation; process innovation; financial performance; environmental management

1. INTRODUCTION

Sustainable development refers to the development of a entities balancing the three-factors approaches in the form of social development, environmental development, and economic development by paying attention to the aspects of people, planet, and profit for achieving sustainable development (Castro et al., 2016; Novikova et al., 2019; Fitriani et al., 2021; Yuniarti et al., 2020). This is aligned with the main Objective of Environmental Manajemen Accounting (EMA) which focuses stakeholder attention on the influence of manufacturing processes on the environment. A decision making through EMA is very effective for organization and can reduce environmental hazard. A study found that EMA's objective to remain accountable in environmental and financial balance are kept by organizations (Nurmala et al., 2019; Qiu et al., 2016; Yuniarti et al., 2018). Many studies focus on the relationship between EMA and environmental performance (Chaudhry et al., 2020; Yuniarti et al., 2016)). In this study, we investigate the impact of different EMA tools on FFP. Because a few investigate the association between EMA and FFP (Qiu et al., 2016; Yuniarti et al., 2022).

Nowadays, organizations operate the businesses with rapidly changing envirotments and a highly competitive (Lasyoud et al., 2018). In such a competitive and volatile environment forces companies are looking for ways to improve companies performances and innovation strategy to survive and grow. Therefore the firms compete to produce innovative products through innovative process. So as to reduce wastage and increase their profits (Reed et al., 2012). Innovation not only contributes to improving Firm Financial Performance (FFP) but also assist the company in achieving the different strategic and environmental objectives required to achieve in the modern business world to survive and grow efficiently (Chaudhry et al., 2020; Seman et al., 2019; Singh et al., 2020). Basically, stakeholders have different interests and pressure, encourage the firm to adopt certain practices and tools, strategies, and to achieve specific purposes the firm implementing specific systems (Fernando & Lawrence, 2014).

Developing countries such as Indonesia, care less about the environmental strategies and respond efficiently to environmental changes. This led to a significant reduction in FFP. Realizing the severity of the issue, environmental consideration has become a focal point of research and policy in developing country (Haron et al., 2017; Lu & Taylor, 2018). Currently, many companies apply various environmental tools to achieve sustainable goals (Solovida & Latan, 2017). Innovation helps companies in implementing EMA to improve decision-making processes, operations, and strategic positions through innovative implementation of new methods, technologies and (Chaudhry et al., 2020; Seman et al., 2019;

Singh et al., 2020). An effective EMA system is thought to be able to help companies making a decisions and strategies in dealing with environmental problems cost-effectively and efficiently. This explains how EMA contributes to an increase FFP. However, the process that EMA goes through in mediating the relationship between innovation and company performance there is still poor literature study regarding this influence on company performance is still small. The current study intends to fill this gap in the literature by analyzing role between EMA environmental innovation and firm performances in the combined model in context from Indonesia manufacturing sector.

2. RESEARCH METHOD

This study is quantitative research with a positivism philosophy. because the aim of this study is to determine the empirical effect of environmental innovation on FFP with the mediating role of EMA. The non-probability purposive sampling technique has been used in the current study because this sampling technique allows the researcher to choose the right sample, which in accordance with research objectives. Further, the study Smart PLS 3.2.9 software to analyze data screening and test the hypotheses.

2.1 Measures

This study used a five-point Likert scale indicating 1 for “strongly disagree” to 5 for “strongly agree” was used to measure the responses. Environmental innovation was measured in terms of two dimensions, namely PCI and PDI. The instrument regarding the PCI and PDI was adopted from the study of (Chaudhry et al., 2020; Gunday et al., 2011; Wang et al., 2004). EMA was measured through the scale developed and used by (Ferreira et al., 2010) but this study just used 6 from 13 indikators. FFP was measured through a scale: sales growth, market share, dan return on investment developed by (Butler et al., 1997; Cardinaels & van Veen-Dirks, 2010; de Clercq et al., 2010; Kraus et al., 2012; Matsuno et al., 2002; Vij & Bedi, 2016; Wiklund & Shepherd, 2003)

3. RESULTS AND DISCUSSION

3.1 Demographics Analysis

Data collected from 98 CEO and manager of manufacturing companies in Indonesia. Among the 98 respondents, 60% respondents were males and the remaining 40 respondents were females. The educational qualification of respondents indicated that most of the respondents were having a postgraduate degree (46.5%). And 54,5% respondents had a graduation degree. 20% of the total sample were having more than 16 years of education.

3.2 Descriminant Validity

Fornell and Larcker (1981) suggest that composite reliability (CR) is a good measure to establish the reliability of scales used in a study. Therefore, to assess convergent validity was used the outer loading of each indicator and average variance extract (AVE). The rule of thumb for convergent validity is if loading factor > 0.70 and AVE > 0.50. Regarding the Smart-PLS analysis, this study tested the first outer model, the measurement model. Thus, the outer model involves identifying to examining the individual item reliability, checking the internal consistency reliability among the items of the construct, and the discriminant validity of the variables (Hair et al., 2016). Hence, the measurement model was concerned with estimating the goodness of measures (see **Table 1**).

Table1. Discriminant Validity Matrix

	Environment Management Accounting	Product Innovation	Financial Performance	Process Innovation
EMA	0.847			
PDI	0.496	0.792		
FPF	0.400	0.037	0.912	
PCI	0.502	0.285	0.289	0.838

3.3 Convergent Validity

Fornell and Larcker (1981) said that composite reliability (CR) is a good measure to establish the reliability of scales. The current study's CR value for all constructs varies from 0.702 to 0.938. CR values range from 0 to 1; the threshold value should not be less than 0.60 in Table 1. (Hair et al., 2016). They define convergent validity as "the extent to which a latent construct explains the variance of its indicators." Furthermore, he said that each construct should acquire at least a 50% variance (AVE 0.50). As a result, table 2 reveals that the AVE value of all constructs in the current investigation is greater than variance.

Table 2. Laten Variable Coefficient

	PCI	PDI	EMA	FPF
Composite reliability	0.876	0.836	0.938	0.908
Croncach’s alpha	0.791	0.730	0.921	0.810
AVE	0.702	0.630	0.718	0.831

3.4 Structural Equation Modeling

To test structural equation modelling or inner model by look at significance of relationship between latent constructs. Path coefficient describes the strength between constructs variables. The output result showed that adjusted R2 value for EMA construct with the path scheme was o.37, it was mean the variation in EMA explained by PCI and PDI contructs variable 37%, and the rest was explained by othe variables outside the model. Likewise, for the FFP contruct variable, variation in FFP can be explained by PCI and PDI variables were 18%. To assess the effects of PDI and PCI on FFP and the mediating paths, SEM has been performed in which direct, total, and indirect effects of variables along with their significance levels have been computed.

This study found that PDI has significant effects on firms' financial performance, and EMA. PCI has significant effects on EMA, but PCI has not significant effects on firms' financial performance. It means that an increase in PCI and PDI caused a significant increase of EMA, because p-values corresponding to regression weight is less than 0.05. the increase of PDI has a significant effect on firms' financial performance Similarly, the regression weights of each of EMA on FFP are also positive and significant. It means that an improvement in EMA caused a significant increase in FFP.

Table 3 showed the mediating variable used in this study has a significant effect to moderate both PCI and PDI on FFP. Hypotheses 6 and 7 were accepted. There were a mediating effect of EMA used between PCI and PDI on FFP. These results are consistent with some prior studies that proved the positive and significant association of EMA with firm performance (Chaudhry et al., 2020; Ferreira et al., 2010). The results of SEM are presented in **Figure 1** and **Table 3**.

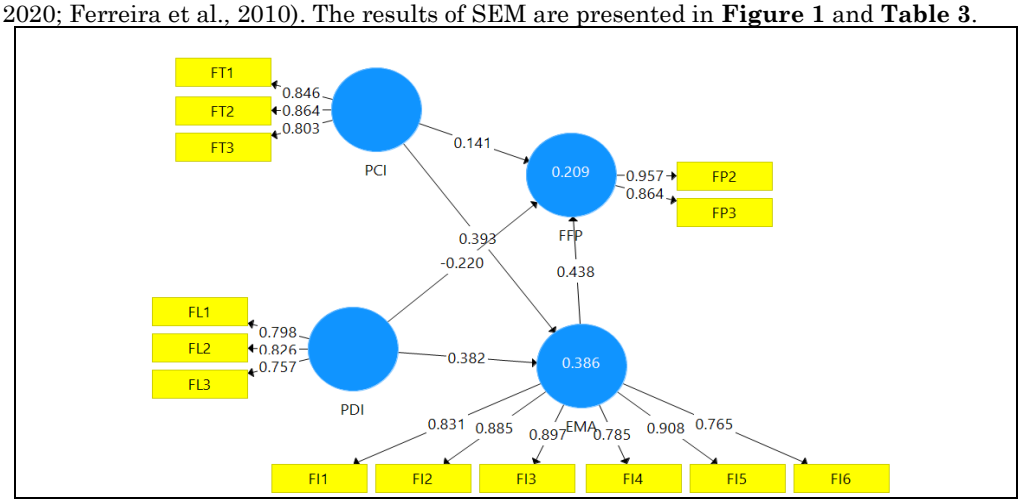

Figure 1. Loading Factor Research Model

Table 3. The Result of Inner Weight

No	Hypothesized Path	Original Sample (O)	Sample Mean (M)	Standard Error	T Statistics	P Values	Decision
H1	PCI –> EMA	0.393	0.403	0.078	5.024	0.000	Supported
H2	PDI –> EMA	0.382	0.393	0.094	4.062	0.000	Supported
H3	PCI –> FFP	0.141	0.150	0.111	1.266	0.208	Not Supported
H4	PDI –> FFP	-0.220	-0.218	0.107	2.064	0.042	Supported
H5	EMA –> FFP	0.438	0.432	0.107	4.108	0.000	Supported
H6	PCI –> EMA –> FFP	0.172	0.176	0.059	2.920	0.004	Supported
H7	PDI –> EMA –> FFP	0.167	0.168	0.052	3.209	0.002	Supported

4. CONCLUSION

The purpose of this research was to examine the effect of product and PCI on FFP along with mediating effects of EMA the relationship between two dimensions of environmental innovations and the firm's performance. Subsequently, it assessed the separate effect of PCI and PDI on FFP through the mediating roles of EMA. The results of the current research indicate that PDI has a positive and significant effect on FFP. Based on these results, it is suggested that the successful PDI will result in cost reductions and eventually will lead to the enhancement of the profitability of the organizations. Based on the empirical analysis done in this study, we may conclude that the companies that produce a wide range of products by using innovative techniques and processes will be able to attract more customers, for a greater timespan. This will enable them to increase their profitability. PCI and PDI are an advancement or improvement in the company's existing system which leads to attracting more clients/buyers. Innovation brings a competitive edge for the company over its competitors and consequently increases the company's performance. Moreover, based on this study's results, it is deemed that EMA play a vital role between environmental innovation and firm performance. When firms adopt innovative processes and offerings, they get into a better position to improve their EMA system so that, they can make improved and informed decisions through an effective EMA system. This improvement in the EMA system contributes towards the FFP positively. Therefore, it can be suggested here that EMA plays a positive mediating role in the relationship between innovation and firm's performance.

RECOMMENDATION

The current study contributes to the literature by addressing the existing gaps in the literature regarding the mediating role between innovation and firm's performance. Empirical evidence supports the proposed theory explaining the mechanism of improving financial performance through environmental innovation. The model presented in this study will help researchers and practitioners to understand the phenomenon in detail. Furthermore, the literature on contingency theory, stakeholders' theory, and TOCD will be enhanced through current findings. In addition to the contribution, there are several limitations in this study thar must be overcome in the future. First, the current study and its results are limited to manufacturing companies in Indonesia because the findings are based on the perspective of managers of manufacturing companies in Indonesia. The role of innovation, EMA towards the corporate FFP may vary across all sectors, industries, or firms. Therefore, future researchers are advised to carry out cross-sector checks and comparisons for to improve their research findings and generalizability. Second, the current study used quantitative measures for evaluating the FFP.

AUTHOR'S CONTRIBUTIONS

All authors discussed the results and contributed to from the start to final manuscript.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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