The Effect of Green Innovation on Financial Performance With Environmental Dynamism As Moderating Variable

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ABSTRACT

Introduction: The Company claims that the product is finally categorized as environmentally friendly, but industrial entities do not provide sufficient explanation regarding their efforts to reduce environmental degradation.
Purpose: The purpose of this paper is to determine influence of the green innovation on financial performance as well as through environmental dynamism as a moderating variable.
Method: The data used in this research are secondary data involving 246 companies listed on the Indonesian Stock Exchange for the period 2012-2018. The data used in this study were analyzing using partial least square and carried out with the help of software Warp PLS 6.0.
Finding: The result show that the green innovation has a positive significant effect on financial performance. Originality: The result also show environmental dynamism strengthens of green innovation on financial performance.

Keywords
Green Innovation, Financial Performance, Environmental Dynamism

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Introduction

Environmental problems have developed very rapidly. The initial concern is environmental damage which results in pollution, water contamination, and climate change[1]. To preserve the environment, companies are expected to reduce the consumption of natural resources by turning technology into environmentally friendly[2][3].Green innovation is hardware and software innovation that is used in the company's operational activities in the form of environmentally friendly processes and products to improve company competitiveness including innovations in technology such as energy savings, prevention of pollution, recycling of waste products or environmentally friendly company management. Environmental issues have a global scope related to corporate environmental management increasingly important in developing countries; most studies focus more on developed countries[4]. Companies in developing countries have different cultural and socio-political aspects from businesses in developed countries that are directly connected globally[5], revealed that green innovation research in developing countries is still small compared to developed countries.Indonesia does not yet have regulations

governing mandatory green innovation disclosure, because so far it has been done voluntarily. In addition, governments often provide policies (not direct regulations) to encourage companies to implement environmental innovations[6]. the sustainability of a company's business is guaranteed if the company does not only focus on profit, but also cares about the condition of the community and the environment. By preserving the environment, companies can benefit indirectly, in terms of health, comfort, and availability of resources[7]. To attract investors, companies must report good performance. The company's performance is said to be well marked by the company being able to survive in the market under any conditions by innovating[8]. Environmental innovations implemented by companies to reduce environmental pollution and pollution[9]. revealed that companies that make environmental innovations according to regulations will improve financial performance. Financial performance is the main concern of managers, boards of directors and understanders to achieve competitive advantage[10]. Companies

that invest in green innovation have strong financial performance. The literature produces various findings related to green innovation and financial performance support the positive relationship between green innovation and financial performance as a way of overcoming environmental problems to increase corporate competitiveness through reducing production costs. found there is a positive relationship between environmental innovation and ROA as well as return on equity in Polish and Hungarian companies. revealed that there was an influence between green innovation on company performance. Xie et al., proving that green innovation can improve financial performance[11][12]. Based on the critical review revealed that 59% of research results have a positive influence between green innovation on financial performance while 41% of research results show insignificant or mixed results between green innovation and financial performance[13]. revealed that not all companies can invest in green innovation, because it requires high costs[14]. showed that there is continuous pressure from external parties to encourage companies to do green innovation but not increase company profits because of the high prices offered in the market. revealed that the influence of green innovation with financial performance is not enough evidence to show the influence between green innovation and financial performance. found no effect of green innovation on financial performance due to environmental factors. designs used between companies in an environment adapted to the conditions of each company[15].

The external business environment influencing the organization consists of a macro environment and an industrial environment that serves to accelerate environmental change.Inconsistent results of research that the possible influence of green innovation on financial performance depends on context. revealed that environmental dynamics is one of the contextual variables. The environment is an important variable to examine the effect of green innovation on financial performance[16][17]. proved that environmental dynamics variables moderate the company's performance. This research develops the influence of green innovation, environmental dynamics and fills the research gap. provides suggestions for research that will come to add another green innovation variable[18]. When the dynamics of the environment are high, the company will adjust what design is appropriate for the company it leads to its competitors, because organizational design is tailored to the needs of each company Thus, this study proposes environmental dynamics as moderating the effect of green innovation on financial performance. This research model uses a moderation model[19][20].

Literature Review and Hypotheses Development

Teori Stakeholder

Freeman, (1984), concluded that the real purpose of a company is to meet the needs of stakeholders, ie. Those affected by the decisions taken by the company. Gray et al. (1995) said that the survival of a company depends on the support of its stakeholders, and that support should be sought so that company should seek the support. The stronger the stakeholders, the more the companies are trying to adapt. Stakeholder theory is important in this research because the theory related to the parties that are interested in the company, those who will be affected and influence by activities of the company, such accountability of management to stakeholders in the form of green innovation and financial performance. Teori Kontijensi. Otley (1980), revealed that there are no organizational concepts and designs that can be applied universally wherever and any conditions effectively. This approach tries to explain the operating procedures of organizational control and the reasons for different accounting systems between companies according to the conditions faced (Dess& Beard, 1984), (Eroglu& Hofer, 2014). Contingency theory emphasizes companies that depend on situations when company activities adapt to dynamic environments and companies are required to have the ability to create new thoughts and ideas related to innovative products and service improvement (Dayuan Li et al., 2018). EffectGreen Innovation on Financial Performance.Investors invest their funds in companies that care about the environment. Green innovation is the company's effort to reduce the negative impact on the company. An increase in

green innovation by the company will improve the company's performance as seen from the increase in sales and the company's stock price (Sucuahi & Cambarihan, 2016). Osazuwa & Che-Ahmad (2016) and Guenster et al. (2011), the results of his research prove that green innovation can improve company performance. Rosli & Sidek (2013), revealed that green innovation has a positive effect on financial performance supported by research conducted by (Camisón & López (2014), (Weng et al., 2015), (Singh et al., 2016), (Arenhardtet al ., 2016), (Hojnik & Ruzzier 2017) (Saedi & Othman 2017), (Usman et al., 2017) (Tang et al., 2017); (Rajapathirana & Hui, 2017) (Xie et al., 2019). Based on the description above, this research develops the following hypothesis:

H1 : Green innovation effect on financial performance.
The effect of Green Innovation Financial Performance as moderating environmental dynamism

The company's strategy must be oriented to the needs of the environment which is certainly dynamic. If the company's strategy is not aligned with what is needed by the environment it will have a negative impact on company performance (Eiadat et al., 2008). Li and Liu (2014) and Chandkk. (2016), shows that environmental dynamics strengthen the influence of green innovation and company performance.A dynamic environment can create green innovation in improving company performance. Prajogo (2016), that environmental dynamics strengthen the relationship between product innovation and business performance. Green innovation can substantially reduce air pollution, the cost of greenhouse emissions so as to increase production output by reducing market limits and increasing demand for green product innovation for sustainable results in order to strengthen global awareness of the challenges of climate change (Chan et al., 2016) (Singh et al., 2016). Jayaram et al. (2014), the results show that environmental dynamics have a positive relationship with green innovation. Tang et al. (2017), shows that managerial concern environment is able to moderate green innovation on company performance. On the basis of this hypothesis the research is as follows:

H2 : Environmental dynamics moderate the influence of green innovation on financial performance

Research Methodology

Data Collection and Samples

The research sample is a manufacturing company with a total of 246 companies. The sampling technique is the saturated sample of the 2012-2018 observation periods. The data used are secondary data in the form of financial reports, annual reports and ongoing reports of companies listed on the Indonesia Stock Exchange from 2012 to 2018 through. Operational definitions and measurement of variables, Green innovation. Green innovation is an improvement in manufacturing processes and systems to reduce negative impacts on the environment, such as energy savings, pollution prevention, waste recycling and others (Qi et al., 2010). Green innovation is measured using awards or certifications received by companies from external parties related to environmental management. Green innovation in Indonesia can be measured using Corporate Performance Rating Program (PROPER) by the Ministry of Environment. The PROPER rating consists of five colors, which are: gold, green, blue, red and black, where the gold color is the highest rank that indicates very good performance, meanwhile black is for the lowest rating, which indicates the poorest performance. Data taken from companies achieving the five color indicators in PROPER during 2012–2018 are based on their annual reports and sustainability reports.

Financial Performance

One of measurements to evaluate company’s financial performance is ROA (Return on Asset). ROA is one of the accounting-based measurements employed to assess company’s operational and financial performances (Klapper& Love, 2002). ROA provides information about how efficient the management utilizes the assets to obtain profit ROA is calculated as company’s operational income before depreciation, divided

by the assets (Jacobs et al., 2017). ROA can also be calculated as the ratio of company's net income of the current period to the total assets of the current period. The following is the ROA calculation formula:

$$\text{ROA} = \frac{\text{Net Profit}}{\text{Total Asset}}$$

Environmental Dynamism

Environmental Dynamics is the complexity and instability in the environment in the form of technological changes, customer demands and the level of market competition and care for the environment. Measurement of environmental dynamics in this study revealed the Herfindall index. The first step taken to calculate the value of market share can be measured from total manufacturing sales divided by total sales of each manufacturing sector (Dess& Beard, 1984). The second step, determine the value of the herfindall index from the number of squares of the market share value of all manufacturing companies (Bradley & Taylor, 2002). Formula used:

a. Market share is calculated from total manufacturing sales divided by total manufacturing industry sales

$$\text{Market Share} = \frac{\text{Total Sales}}{\text{Total Industry Sales}}$$

b. The Herfindahl Index is calculated by the number of market shares squared from all companies in the industry.

$$\text{IHH} = \sum_{i=1}^{I} X^2$$

Model Analysis and Testing of Hypotheses

The model used in this study is partial least square (PLS) and uses one modeling model, inner model to evaluate structural models (Ghozali&Latan, 2014). Internal models are used to test the relationship between variables using R2. Values are 0.70, 0.45 and 0.25 R2 shows that each model is strong, moderate and weak (Ghozali&Latan, 2014). The design of the hypothesis test was made based on the purpose of the study, namely the hypotesis test to see the effect of independent variables separately. The level of confidence used $\alpha = 5\% = 0.05$. so:

If ρ-vaue is greater than α (0.05), so H_0= accepted and H_a = rejected

If ρ-value is less than α (0.05), so H_0= rejected and H_a = accepted.

The procedure for testing the environmental dynamics hypothesis as a moderating variable for green innovation and financial performance is carried out in two (2) steps:

a. Estimating green innovation directly on financial performance without involving environmental dynamics

b. Doing the interaction of moderating variables (environmental dynamics) with green innovation on financial performance.

Analysis and Results

Table 1. Statistic Descriptif

Variable	N	Min	Max	Mean	StdDev
PROPER	246	2	5	3.18	0.51
ROA	246	-0.09	0.27	0.05	0.08
IHH	246	0.47	1	0.94	0.13
Firm Age	246	9	86	35.20	13.37
Firm Size	246	5.54	12.33	7.95	1.51

The description of these variables is presented in Table 1. Based on the table, theaverage value of financial performance (ROA) during the observation year is 0.05 with standard deviation value of 0.08. In this study, the highest value of financial performance reaches 0.27, while the lowest value is -0.09. The IHH has been implemented by the company in its annual report.

The average value of IHH during the observation year is 0.94 with standard deviation value of 0.13. In this study, the highest IHH value reaches 1, while the lowest IHH value is 0.47. The average value of firm age during the observation year is 35.20 with standard deviation 13.37. In this study, the highest value of firm age 86, while the lowest value is 9. The average value of firm size during observation result is 7.95 with standard deviation 1.51. In this study, the highest value of firm size 12.33, while the lowest value is 5.54.

Table 2. Proper

Category	Frequency	percentage
2	5	2.01
3	198	80.45
4	35	14.23
5	8	3.31
Total	246	100

According to Table 2, the total frequency is 246 with details as follow; red PROPER rank frequency of 5 indicates the percentage of 2.01%, blue PROPER rank frequency of 198indicates the percentage of 80.45%, green PROPER rank frequency of 35indicates the percentage of 14.23%, while gold PROPER rank of 8 shows the percentage of 3.31%.

Testing of Inner Model

Table 3. Test Results Inner Model

Variable	Value of Adjusted Square	Value of Q Square
Financial Performance	0.327	0.502

For Table 3, variables of financial performance each have a value of R^2 of 0.327. This mean that financial performance variable can be explained 32.7 percent by green innovation variable while. Based on the result of predictive validity (Q^2) calculation, the obtained value of Q^2 0.502 that is greater than zero so that they meet the criteria of good predictive validity.

Table 4. Test results Model Fit

Average Path Coefficient (APC)	0.189; P<0.01
Average R-Squared (ARS)	0.210; P<0.01
Average Adjusted R-Squared (AARS)	0.200; P<0.01
Average Block Variance Inflation Factor (AVIF)	1.233

Based on the result of data processing in Table 4, shows a good fit model. APC, ARS and ARS have p-value <0.05 that has met the criteria of goodness of fit model. AVIF value either in variable that is less than 3.3 indicate that there is no problem of collinearity between independent variables in the model.

Discussion

Table 5 shows the result of hypothesis testing using PLS analysis

Table 5. Moderation Effect

Effect between variable	*Path Coefficient*	ρ-value
PROPER ⟶ ROA	0.354	<0.01**
Effect between variable		
PROPER ⟶ ROA	0.195	0.027**
IHH*ROA ⟶ KK	0.148	0.041**

Source: Data processed result using WarpPLS software (2020)

Effect Green Innovation and Financial Performance

The direct of green innovation on the financial performance shows positive significant effect. The result of this study indicate that the green innovation in the company to improve company performance. The result of this study are in line with research conducted by Osazuwa & Che-Ahmad (2016)and Guenster et al. (2011)Rosli & Sidek (2013), Camisón & López (2014), Weng et al., (2015), Singh et al., (2016),Arenhardt et al., (2016), Hojnik & Ruzzier (2017)Saedi & Othman (2017), Usman et al.,(2017), Tang et al., (2017), Rajapathirana & Hui, (2017), Xie et al., (2019) which states that the gree innovation has a positive and significant impact on financial performance. The result of this study are not in line with Santos et al. (2014),Chang (2011)stating that green innovation have no significant effect on financial performance.

Effect Green Innovation, Environmental Dynamism and Financial Performance

The calculation results can be concluded that environmental dynamics moderate the effect of green innovation on financial performance. A positive sign on the coefficient indicates the influence of environmental dynamics that can strengthen the influence of green innovation on financial performance. The results of this study are in line with the research of Chan et al., (2016), Jayaram et al., (2014) which shows that environmental dynamics strengthen the influence of green innovation on company performance. The results of this study are not in line Prajogo, (2016) shows that green innovation does not affect company performance, because the use of technology is not optimal.

Conclusion

Testing and analysis results shows that green innovation have a positive effect on financial performance. Environmental performance strengthens the effect of green innovation to financial performance. A limitation of study is that this study only examines green process innovation using the PROPER measure while the green process innovation measure is thought to be related to company value such as content analysis has not been discussed at all in this article and the research sample is limited to manufacturing companies. This scope may not be able to describe the overall conditions in Indonesia.

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