Mediating Effect of Financial Performance on The Effect Green Innovation on Firm Value

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Abstract

This study aims to investigate the mediating effect of financial performance on the effect of green innovation on firm value. This study uses secondary data, namely data on manufacturing companies listed on the Indonesia Stock Exchange (IDX) during 2015-2020. The sample in this study was 222 data obtained from 37 companies during the research year. The data analysis technique of this research used partial least square (PLS) analysis. The results of this study indicate that financial performance partially mediates the effect of green innovation on firm value.

Keywords
Financial Performance, green innovation, firm value, Return on asset, price-book value.

1. Introduction

The increasingly fierce business competition makes companies flock to improve their performance to attract potential investors. One way is to apply green innovation. Many companies have implemented environmentally friendly concepts both during the production process and the products produced. Innovation can create growth and competitiveness for companies, increase productivity and economic wealth for companies. It can also reduce waste and damage to the environment, provide better goods and services at lower prices and create jobs for people (Carrión-Flores & Innes, 2010).

Green innovation is a strategy to reduce the possibility of negative impacts from the company's operational activities on the surrounding environment. Preserving the surrounding environment is the company's responsibility. The long-term goal of implementing green innovation is to increase the value of the company. Green innovation can be used as a tool to continuously increase market share (Agustia, Sawarjuwono, and Dianawati 2019). Green innovation is carried out for companies whose operations have a social impact on the surrounding environment. Green Innovation is an attractive alternative concept for companies or organizations that want to apply environmentally friendly concepts both in waste treatment or the products they produce. The application of green innovation in addition to having a positive effect on the environment around the company also has a positive effect on the company's finances.

Several previous studies conducted by Suryani & Dianawati, (2018), Przychodzen *et al*., (2020), Ilker Murat Ar, (2012), Lin *et al*., (2019), dan Miroshnychenko *et al*., (2017) found that green innovation has a positive effect on financial performance. Companies that apply green innovation in their operational activities will increase their financial performance. Küçükoğlu & Pınar (2015) said that when companies implement green innovation, it will improve financial performance, because the application of green innovation eliminates harmful raw materials in the production process, saves energy by using waste fuel that has been processed or using environmentally friendly energy sources so that can minimize costs and increase company profits which will improve financial performance.

This study uses the financial performance variable as a mediating variable on the effect of green innovation on firm value. Financial performance is a description of the company's financial condition in a certain period. Weng et al. (2015) said that financial performance is the main concern of managers, boards of directors, and shareholders to increase company value.

This research was conducted on 37 manufacturing companies listed on the Jakarta Stock Exchange (IDX) during 2015-2020, so the total sample of this study was 222. The data analysis technique in this study used PLS. The results of this study indicate that financial performance partially mediates the effect of green innovation on firm value.

2. Literature Review

2.1 Legitimacy Theory

Legitimacy theory is an interaction theory that focuses on the relationship between companies and society. This theory ensures that the company's activities are following the norms prevailing in society. Legitimacy pressure arises when the company's operational activities are not in line with the rules that exist in society. Companies can minimize legitimacy pressure by having good communication with the community (Mariyamah and Handayani 2019).

Chariri & Ghozali, (2007) argue that companies use economic resources for company operations so that companies have social relations with the community. This relationship makes the company have a responsibility in every business process to the community so that the company in its operational activities must obey the rules and norms that apply in the community.

2.2 *Green Innovation*

Green Innovation (environmentally friendly innovation) is a new technique or modification, practice, system, and production process to reduce the impact of damage to the environment (Agustia *et al*., 2019). *Green Innovation is* also defined as new technology (hardware or software) related to a product or production process that leads to energy saving, pollution reduction, waste recycling, environmentally friendly product design, and environmental management of the company Chen, (1994) in Ilker (2012).

The concept of *Green Innovation is* not much different from the concept of conventional innovation, which aims to improve a product to increase productivity, cost efficiency, and also open up new market opportunities. Meanwhile, *Green Innovation* does not only aim to improve the company's performance economically but also to reduce the negative impact on the environment and create a competitive advantage for the

company. Another advantage of *Green Innovation* is that it encourages companies to convert waste products into viable products that can generate additional profits for the company (Agustia *et al.*, 2019).

2.3 Financial performance

Financial performance is the state of a company's finances that has been analyzed using a financial analysis tool to find out the good and bad state of the company's financial performance which is reflected in a certain period (Gani, Machmud, and Selvi 2020). Performance becomes an important thing for management because performance is the result of work that can be achieved by a person or group in an organization, by their respective authorities and responsibilities to achieve organizational goals. Performance can be divided into two, namely financial and non-financial (Hansen and Mowen, 2005 in Iswati, 2019). In research conducted by (Xie, Huo, and Zou 2019) the company's financial performance is measured using ROA or *Return On Assets* which is used to measure how well the company utilizes assets to generate profits.

This study uses a profitability ratio, namely *Return on* Assets (ROA). ROA is used because it can measure the company's ability to total funds invested in the company's operating activities to generate profits by utilizing its assets. *Return on Assets is* obtained by comparing *net income* to total assets (Ulfa & Asyik 2018).

2.4 The value of the company

The value of the company is the investor's perception of the company's success. For companies that have gone public, the value of the company can be reflected through the company's stock price, while for companies that have not gone public, the value can be seen through the realized value of the company's assets when the company is about to be sold. A high company value will make the market not only believe in the company's current performance but also the future (Agustia, Sawarjuwono, and Dianawati 2019).

The company's value in this study was measured using *Tobin's Q*. According to Lang (1989) quoted in (Sudiyatno and Puspitasari 2010) *Tobin's Q is* used as a measure of company performance, which shows a management performance in managing company assets. *Tobin's Q* shows the condition of the company's investment opportunities. The value of the ratio in this study is known from the market value of shares and market value of debt compared to the total value of capital placed in production assets, then *Tobin's Q* can be used as a measure of company performance which can be seen from the market value of a company.

2.5 Financial performance mediates the effect of green innovation on firm value

The application of *green innovation* requires a large amount of money, but the large cost has a positive effect on competitive advantage and firm value (Xie *et al.* 2019). Shashi *et al.* (2019) said that companies that implement *green process innovation* refer to process improvements or company management systems to achieve energy savings and pollution prevention, to reduce production costs. Companies in achieving energy savings and pollution prevention by adopting advanced equipment have the aim of gaining public confidence that the company's efforts are appropriate, to increase company value (Shashi *et al*. 2019).

The application of *green innovation* is cost-efficient because it can save energy and prevent pollution, to improve the company's financial performance. When the company's financial performance increases, the value of the company will also increase (Sholikhah and Khusnah, 2019). Based on this, the hypothesis proposed in this study is as follows:

H1: Financial performance can mediate the effect of *green innovation* on firm value

3. Research Methods

This research is quantitative research using secondary data. The data in this study were obtained from the financial statements of manufacturing companies listed on the IDX during 2015-2020. The number of data in this study was 222 data obtained from 37 manufacturing companies during the study period.

3.1 Variable measurement
3.1.1 *Green Innovation*
GI is a new or modified technique and production process to reduce the impact of environmental damage, which will lead to energy efficiency, pollution reduction, waste recycling, and environmentally friendly product design. GI(X) was obtained through content analysis in the company's Annual report. Several indicators will be used to determine whether the company has implemented GI. This indicator is derived from Ar (2012). The results of this content analysis will be calculated in terms of ratios. The indicators used in this GI analysis are as follows: (1). The production process uses new technology to reduce energy, water, and waste, (2). the product uses less non-polluting

or harmful substances (environmentally friendly materials), (3). using eco-friendly product packages (eg paper and plastic), and (4). components or materials in the production process can be recycled or reconditioned.

3.1.2 Financial performance

The financial performance variable uses the profitability ratio. Profitability is a measure measuring the percentage used to assess the company in generating profits at an acceptable level. In this study, the profitability ratio is proxied by *return on assets* (ROA). Here is the formula for calculating ROA:

$$ROA = \frac{Net\ profit}{Total\ Asset}$$

3.1.3 Firm Value

Measurement of firm value using *price-book value* (PBV). PBV is the result of the comparison between the stock price and the book value of the stock, if the PBV value is high then market confidence will increase in the company's prospects and indicate. the prosperity of good shareholders. The PBV formula is as follows:

$$PBV = \frac{Stock\ market\ price}{Stock\ book\ value}$$

4. Results

The results of hypothesis testing in this study were tested using the Partial Least Square (PLS) using the WarpPLS 6.0 application, here are the steps:

4.1 Evaluation of the Measurement Model (Outer Model)

The next step is to evaluate the outer model which is carried out through three criteria, namely convergent validity, discriminant validity, and composite reliability. The following are the results of data processing: Another measurement of convergent validity is by looking at the Average Variance Extracted (AVE) value.

Table 1.1
Output Latent Variable Coefficient

Variable	GI	CA	Financial performance	NP
R-square		0.016	0.165	0.985
Composite reliable.	1,000	1,000	1,000	1,000
Cronbach's alpha	1,000	1,000	1,000	1,000
Avg. var. extract	1,000	1,000	1,000	1,000
Full collin. VIF	1.032	1.038	61,083	61.784
Q-square		0.020	0.187	0.986

Source: WrapPLS 6.0 Output Results (2021)

Based on these calculations, the four constructs have met the convergent validity criteria, namely > 0.50. Green innovation has a value of 1,000 > 0.50; competitive advantage has a value of 1,000 > 0.50; financial performance has a value of 1,000 > 0.50; and the value of the company has a value of 1,000 > 0.50. From these calculations, it can be concluded that the four constructs have met the convergent validity criteria.

The next step is the standard error analysis in table 1.1 which has been written with the word SE. According to a statistical consultant (2009) cited by Arista, (2015) if the standard error value is small from an indicator, then it can be said to be good or feasible. On the other hand, if the standard error value is large, it indicates the unfeasibility of the developed model. The standard error can be said to be eligible if it meets the criteria < 0.5 or < 0.4 and cannot be negative. The following is presented in tabular form for each variable:

Table 1.2
Standard Error Results

	SE (Standard Error)	Criteria	Information
GI	0.056	< 0.5 or < 0.4 and not negative	Meets Model Eligibility
CA	0.056		Meets Model Eligibility
Financial performance	0.056		Meets Model Eligibility
NP	0.056		Meets Model Eligibility

Source: WrapPLS 6.0 (2021) output results

Based on the table, it can be concluded that all variables meet the feasibility of the model. Green innovation variable with indicator the production process uses new technology to reduce energy, water, and waste, the product uses a small amount of harmless or environmentally friendly materials, and the components used in the production process can be recycled has a standard error value of 0.056 according to the criteria < 0.5 then it is considered feasible. The competitive advantage variable with the ROIC indicator has a standard error value of <0.5, so it is considered feasible. The financial performance variable with the ROA indicator has a standard error value of < 0.5, so it is considered feasible. The firm value variable with the Tobins'Q indicator has a standard error value of < 0.5, so it is considered feasible.

Based on this statement, it can be concluded that all variables have standard error values and meet the criteria < 0.5, so that all variables can be said to have met the feasibility of the model.

Structural Model Evaluation (Inner Model)

The next stage is to evaluate by testing the suitability of the model, path coefficient, and R2. In the compatibility test, there are three tests, namely Average Path Coefficient (APC), Average R-square (ARS), and Average Variance Factor (AVIF). APC and ARS can be accepted if they meet the criteria for the p-value <0.05 and the AVIF value must meet the criteria <5(Sholihin & Ratmono, 2021).

Table 1.3
Output General SEM Analysis Result

	Index	P-Value	Criteria	Information
APC	0.328	< 0.001	< 0.05	Accepted
ARS	0.388	< 0.001	< 0.05	Accepted
AVIF	1.006 Good if <5		< 5	Accepted

Source: WrapPLS 6.0 (2021) output results

Based on the table above, it can be concluded that the APC has an index value of 0.328 with a p-value <0.001, then the inner model of the APC is accepted because it meets the criteria <0.05. ARS has an index value of 0.388 with a p-value <0.001, then the inner model on ARS is accepted because it meets the criteria <0.05. AVIF has an index value of 1.006 which indicates that AVIF has met the criteria <5, so the AVIF inner model index can be accepted. The three inner models have index values that have met the criteria so that APC, ARS, and AVIF can be accepted.

Hypothesis testing

The results of testing the hypothesis of this study are presented in the figure and table below.

Figure 1.1
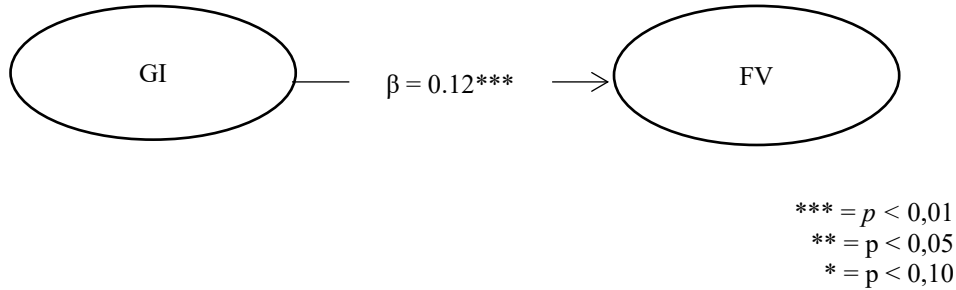Estimation of the direct relationship between *green innovation* and firm value.

$$*** = p < 0,01$$
$$** = p < 0,05$$
$$* = p < 0,10$$

Figure 1.1 above shows the direct effect of green innovation on firm value which has a beta coefficient value of 0.12 with a p-value <0.001. The test results indicate that green innovation affects firm value so that the first requirement in testing the mediation hypothesis in this study is fulfilled and proceeds to the next step.

Figure 1.2
Indirect relationship estimation (full model)

$$R^2 = 0.98$$

$$*** = p < 0,01$$
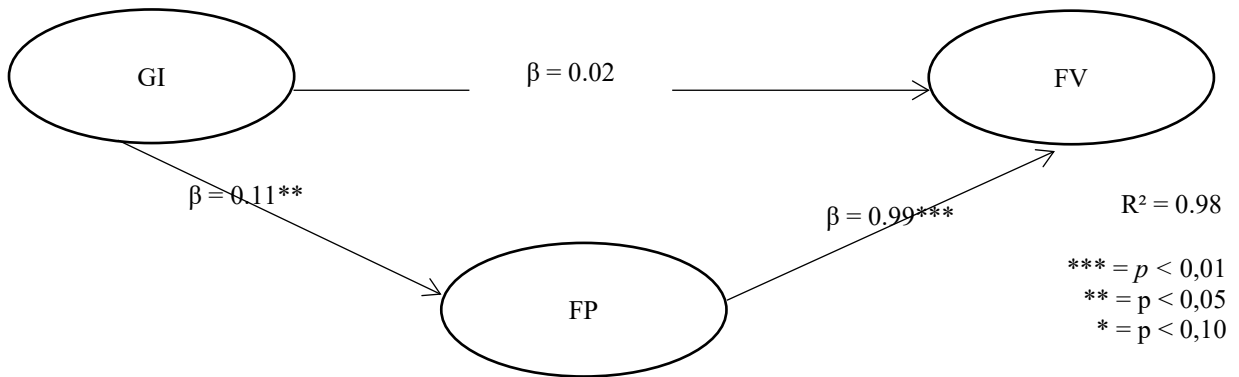$$** = p < 0,05$$
$$* = p < 0,10$$

Figure 1.2 is an indirect relationship between green innovation and firm value through financial performance. This image is the second step of testing the mediation hypothesis in this study. Based on the picture above, it can be calculated in the table below:

Table 1.4
Calculation of the mediation hypothesis

Indirect relationship (figure 1.2)		
GI→ FP → FV	0.11*0.99	0,109
Total Indirect relationship		0,109
Direct relationship (figure 1.1)		
GI → FV		0,12
Total direct relationship		0,12
Total relationship	0,109 + 0,12 = 0,229	
VAF (GI → FP → FV)	Indirect relationship = 0,109 Total relationship 0,229	**0,48**

Table 1.4 above shows the calculation of the Variance Accounted For (VAF) of this research hypothesis. The table above shows the steps for calculating the indirect relationship of green innovation (GI) to firm value (FV) through financial performance (FP) of 0.109. Then the table above also shows a direct calculation between GI to FV of 0.12. In this FAV method, to find out which research variables can mediate or not, the indirect and direct relationships must first be summed so that it becomes a total relationship. The VAF value is obtained by dividing the total indirect relationship by the total relationship so that the value becomes 0.48.

Based on the Variance Accounted For (VAF) test results above, it can be seen that financial performance partially mediates the effect of green innovation on firm value. This shows that the green innovation variable can affect the firm value directly or through the financial performance variable. *Green innovation* is a plan that can be used to increase firm value by using new techniques, systems, practices, and production processes or something changed to reduce the impact of damage to the environment (Dewi & Rahmianingsih, 2020). In addition, *Green Innovation* can be implemented in all business processes regularly so that it will improve the company's financial performance, thus indirectly increasing the value of the company. The company that implements green innovation financial performance will increase, because the application of green innovation eliminates raw materials harmful in the production process, saving energy by using fuel result of waste that is processed or energy sources that are environmentally friendly to minimize costs and increase your profits which in turn will improve financial performance. The results of this study are in line with research conducted by Prena & Muliyawa (2020), Akmalia *et al.*, (2017), Anugraini & Khusnah, (2019), Sholikhah & Khusnah, (2019), Khusnah *et al.*, (2019), (Satria., Sunaryo., and ABS. 2017).

5. Conclusion

This study aims to investigate the mediating effect of financial performance on the effect of green innovation on firm value. The results of this study indicate that financial performance partially mediates the effect of green innovation on firm value. Based on these results, it can be concluded that green innovation can increase firm value directly or through financial performance.

Acknowledgments

References

Agustia, Dian, Tjiptohadi Sawarjuwono, and Wiwiek Dianawati. 2019. "The Mediating Effect of Environmental Management Accounting on Green Innovation - Firm Value Relationship." *International Journal of Energy Economics and Policy* 9(2): 299–306.

Akmalia, Alien, Dio Kevin, and Hesty Nurul. 2017. "Pengaruh Kinerja Keuangan Terhadap Nilai Perusahaan Dengan Corporate Social Responsibility Dan Kepemilikan Institusional Sebagai Variabel Pemoderasi (Studi Empiris Pada Perusahaan Manufaktur DI Bursa Efek Indonesia)." *Unisia* 35(78): 17–24.

Anugraini, Mardiyah, and Hidayatul Khusnah. 2019. "Employee Stock Ownership Program (Esop) Dan Nilai Perusahaan : Dengan Profitabilitas Sebagai Variabel Intervening." : 113–24.

Carrión-Flores, Carmen E., and Robert Innes. 2010. "Environmental Innovation and Environmental Performance." *Journal of Environmental Economics and Management* 59(1): 27–42.

Chariri, Anis, and Imam Ghozali. 2007. "Teori Akuntansi Edisi 3." *Semarang: Badan Penerbit UNDIP*.

Gani, Agustin Sri Mutiara, Rizan Machmud, and Selvi Selvi. 2020. "The Influence of Intellectual Capital on the Profitability of Banking Companies." *Jambura Science of Management* 2(1): 01–07.

Ilker Murat Ar. 2012. "The Impact of Green Product Innovation on Firm Performance and Competitive Capability: The Moderating Role of Managerial Environmental Concern." *Procedia - Social and Behavioral Sciences* 62: 854–64.

Khusnah, Hidayatul. 2019. "EMPLOYEE STOCK OWNERSHIP PROGRAM (ESOP), INTELLECTUAL CAPITAL DAN NILAI PERUSAHAAN : EFEK MEDIASI DARI KINERJA KEUANGAN (Studi Pada Perusahaan Non Keuangan Yang Terdaftar Di BEI Periode."

Küçükoğlu, Mübeyyen Tepe, and R. İbrahim Pınar. 2015. "Positive Influences of Green Innovation on Company Performance." *Procedia - Social and Behavioral Sciences* 195: 1232–37.

Lin, Woon Leong, et al. 2019. "Does Firm Size Matter? Evidence on the Impact of the Green Innovation Strategy on Corporate Financial Performance in the Automotive Sector." *Journal of Cleaner Production* 229: 974–88. https://doi.org/10.1016/j.jclepro.2019.04.214.

Mariyamah, and Susi Handayani. 2019. "PENGARUH GREEN INNOVATION TERDAHAP ECONOMIC PERFORMANCE DENGAN ENVIRONMENTAL MANAGEMENT ACCOUNTING SEBAGAI VARIABEL MODERASI." *Journal of Chemical Information and Modeling* 53(9): 1689–99.

Miroshnychenko, Ivan, Roberto Barontini, and Francesco Testa. 2017. "Green Practices and Financial Performance: A Global Outlook." *Journal of Cleaner Production* 147: 340–51.

Przychodzen, Wojciech, Dante I. Leyva-de la Hiz, and Justyna Przychodzen. 2020. "First-Mover Advantages in Green Innovation—Opportunities and Threats for Financial Performance: A Longitudinal Analysis." *Corporate Social Responsibility and Environmental Management* 27(1): 339–57.

Satria., M. Agung Jaya, Hadi Sunaryo., and M. Khoirul ABS. 2017. "E-Jurnal Riset Manajemen Prodi Manajemen Fakultas Ekonomi Unisma Website :" *e-jurnal Riset Manajemen Prodi Manajemen*: 51–69.

Shashi, Piera Centobelli, Roberto Cerchione, and Rajwinder Singh. 2019. "The Impact of Leanness and Innovativeness on Environmental and Financial Performance: Insights from Indian SMEs." *International Journal of Production Economics* 212(February): 111–24.

Sholikhah, Putri, and Hidayatul Khusnah. 2019. "Sustainability Reporting Terhadap Nilai Perusahaan : Dengan Knerja Keuangan Sebagai Variabel Intervening Pada Perusahaan Non Keuangan Yang Terdaftar Di Bursa Efek Indonesia Periode 2016 – 2019."

Sudiyatno, Bambang, and Elen Puspitasari. 2010. "223-Article Text-431-1-10-20120216(1)." 2(1): 9–21.

Suryani, Movie Rahmatika, and Wiwiek Dianawati. 2018. "The Effect of Environmental Management Activities on Financial Performance." *Korea Association of Business Education* 33(5): 547–73.

Xie, Xuemei, Jiage Huo, and Hailiang Zou. 2019. "Green Process Innovation, Green Product Innovation, and Corporate Financial Performance: A Content Analysis Method." *Journal of Business Research* 101(June 2018): 697–706. https://doi.org/10.1016/j.jbusres.2019.01.010.

Biography

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