

THE IMPACT OF GREEN PROCESS INNOVATION AND GREEN PRODUCT INNOVATION ON FINANCIAL PERFORMANCE

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Abstrak

Penelitian ini bertujuan untuk menguji pengaruh green process innovation dan green product innovation terhadap financial performance pada perusahaan sektor consumer non-cyclicals yang terdaftar di Bursa Efek Indonesia (BEI) periode 2021–2024. Penelitian menggunakan metode kuantitatif dengan sumber data sekunder yang diperoleh dari annual report dan sustainability report perusahaan. Berdasarkan 133 perusahaan dalam populasi, diperoleh 87 perusahaan sebagai sampel melalui teknik purposive sampling. Pengujian dilakukan menggunakan regresi linier berganda dengan bantuan IBM SPSS versi 26. Hasil analisis menunjukkan bahwa green process innovation berpengaruh terhadap financial performance. Selain itu, green product innovation juga terbukti memberikan pengaruh terhadap financial performance.

Kata Kunci: *Green Process Innovation, Green Product Innovation, financial performance*

Abstract

This study examines the effect of green process innovation and green product innovation on financial performance among consumer non-cyclicals companies listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period. A quantitative research approach was employed using secondary data obtained from the companies' annual reports and sustainability reports. From a population of 133 companies, 87 companies were selected as the research sample based on predetermined purposive sampling criteria. The hypotheses were tested using multiple linear regression analysis with the assistance of IBM SPSS version 26. The findings indicate that green process innovation has a significant effect on financial performance. Similarly, green product innovation is also found to have an effect on financial performance.

Keywords: *Green Process Innovation, Green Product Innovation, financial performance*

A. INTRODUCTION

Financial performance is a key indicator used to assess a company's ability to manage its resources efficiently and generate value for its stakeholders (Sudianto, 2023). This reflects both the company's operational effectiveness and its capacity to remain competitive amid growing environmental and regulatory demands. Companies that fail to balance profitability with environmental responsibility risk losing public trust, which can directly affect their financial standing (Nurdy & Khusnah, 2023).

PT Unilever Indonesia Tbk faced public backlash after being identified as one of the largest contributors to plastic waste pollution in Indonesia, based on an audit by the Break Free from Plastic movement. Despite the company's stated commitment to reducing virgin plastic use, continued large-scale production of single-use packaging raised public doubt about the seriousness of its environmental efforts. This incident triggered protests from Greenpeace Indonesia and contributed to declining consumer trust and product demand, which in turn affected the company's financial performance. This case highlights the importance of understanding how green innovation practices influence financial outcomes. As corporate leaders, executives can take proactive steps to strengthen environmentally responsible strategies, which may help sustain long-term financial performance (Mongabay, 2024).

One factor that predicts financial performance is green process innovation. Green process innovation refers to improvements in existing production processes or the introduction of new operational methods aimed at reducing environmental impact and production costs (Khairani et al., 2022). Companies can use this strategy to enhance efficiency, minimize waste, and strengthen their reputation as environmentally responsible entities (Fernindhia & Susilawati, 2026).

Green product innovation is another indicator that predicts financial performance. Green product innovation refers to the development of environmentally friendly products aimed at increasing market value and strengthening a company's competitiveness (Millenia &

Murwaningsari, 2023). This innovation is designed to improve production output while maintaining environmental sustainability (Amalia, 2023).

Natural Resource Based View Theory

Natural resource based view theory, first introduced by Hart (1995). It posits that a company bears responsibility not only for its business operations but also for the environment. Corporate environmental responsibility can take the form of utilizing eco-friendly resources and technologies. The efficient and effective use of such resources and technologies can impact a company's financial performance (Sari, 2024). This suggests that environmentally responsible practices are not merely a compliance obligation but a potential source of value for the company's financial performance.

Financial Performance

Financial performance represents the extent to which a company is capable of generating profits from the resources and activities it manages (Ramadhani et al., 2022). The information derived from financial performance can also be utilized to evaluate future business prospects and formulate appropriate strategies for maintaining the continuity of corporate operations (Munawaroh & Kurniawati, 2025). In this regard, financial performance provides an overview of a company's effectiveness in utilizing its resources, supporting long-term growth, and sustaining investor confidence.

Green Process Innovation

Green Process Innovation involves modifying production activities through the adoption of environmentally oriented technologies and practices designed to limit negative effects on the environment (Amalia, 2023). Such practices may include improving energy efficiency, reducing the consumption of raw materials, minimizing waste, and managing natural resources more sustainably. In addition to supporting environmental objectives, these improvements can enhance production efficiency and lower operating expenses over time, thereby contributing to stronger financial performance. The positive relationship between green process innovation and financial

performance is also supported by (2022) and Sari & Sumarna (2025). Have reported a positive association between green process innovation and financial performance. This relationship may be explained by the ability of environmentally focused process improvements to streamline production, reduce energy and operational expenditures, and limit hazardous waste generation. Moreover, better environmental management can help firms reduce the risk of regulatory sanctions and strengthen their competitive position, which may ultimately support improved financial outcomes.

H1: Green process innovation has an effect on financial performance

Green Product Innovation

Green Product Innovation can be understood as an effort to develop products or services by incorporating environmentally responsible materials into the production process (Budiono & Handoko, 2025). The increasing concern among consumers regarding environmental sustainability encourages firms to adopt product-oriented green innovations, such as producing goods that require less energy and utilize environmentally safer materials. Beyond addressing environmental concerns, these innovations can enhance the value perceived by consumers while supporting production efficiency and potentially lowering operating costs. The resulting improvements in efficiency and consumer value may contribute to higher profitability and, consequently, stronger financial performance. The positive relationship between green product innovation and financial performance is also supported by Amalia (2023) and Sari & Handayani (2020). Firms that demonstrate commitment to environmentally oriented product innovation may receive greater attention from investors because such practices can strengthen their competitive position. Green innovation may contribute to improved profit margins, stronger brand visibility, and an expanded customer base. These outcomes can increase firm value and subsequently enhance investor interest in the company's shares.

H2: Green product innovation has an effect on financial performance

B. METHOD

A quantitative methodology was applied to examine the effects of green process innovation and green product innovation on financial performance. The analysis utilized secondary data derived from corporate annual reports and sustainability reports for the 2021–2024 period. These documents were accessed through the Indonesia Stock Exchange (IDX) and the official websites of the companies under study. The sample was determined based on predetermined criteria through purposive sampling. After the data were collected and processed, multiple linear regression was employed to test the proposed relationships among the research variables.

Table 1 Sampling Criteria

No.	Description	
1.	The non-cyclical consumer sector listed on the Indonesia Stock Exchange for the 2021–2024 period.	133
2.	The non-cyclical consumer sector that has not published annual reports and sustainability reports, respectively, from 2021 to 2024.	(46)
The number of non-cyclical consumer sectors serves as the sampling criterion.		87
The number of observations for the non-cyclical consumer sector during the 2021–2024 period that meet the study criteria.		348

Operational Definition of Variabels

No.	Variable	Formula	Scale
1.	Financial Performance	$ROA = \frac{\text{Profit After Tax}}{\text{Total Assets}}$	Ratio
2.	Green Process Innovation	$GPI = \frac{\text{Total Green Process}}{\text{Total Item}}$	Ratio
3.	Green Product Innovation	$GPrI = \frac{\text{Total Green Product}}{\text{Total Item}}$	Ratio

C. RESULTS AND DISCUSSIONS

1. Descriptive Statistics

Table 2 Descriptive Statistics Result

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Green Product <u>Innovaation</u>	312	0.80	2.00	1.6090	0.29992
Green Process Innovation	312	0.00	1.67	0.4439	0.39493
Financial Performance	312	-0.11	0.21	0.0542	0.06519
Valid N (listwise)	312				

Source: Processed Data, 2026

2. Results of Classical Assumption Tests

a. Normality Tests

Table 3 Normality Test Results

One-Sample Kolmogorov-Smirnov Test			
			Unstandardized Residual
N			312
Monte Carlo Sig. (2-tailed)	Sig. 99% Confidence Interval	Lower Bound	0.359 ^d
		Upper Bound	0.346
			0.371

Source: Processed Data, 2026

To determine whether the residuals met the assumption of normality, a Kolmogorov–Smirnov test based on Monte Carlo estimation was conducted. The resulting significance level was 0.359, exceeding the criterion of 0.05. Hence, the normality assumption for the residuals was satisfied.

b. Multicollinearity Test

Table 4 Multicollinearity Test Result

		<u>Coefficients^a</u>	
Model		Collinearity Statistics Tolerance	VIF
1	(Constant)		
	Green process Innovation	0.931	1.074
	Green Product Innovation	0.931	1.074

Source: Processed Data, 2026

An examination of the tolerance and Variance Inflation Factor (VIF) statistics confirms that the regression model meets the required criteria for the absence of multicollinearity. Both green process innovation and green product innovation recorded a tolerance value of 0.931, exceeding the 0.10 cutoff. In addition, the VIF statistic for each variable was 1.074, which remains substantially below the maximum value of 10. These findings indicate that the independent variables are not strongly correlated with one another.

c. Heteroscedasticity Test

Table 5 Heteroscedasticity Test Result

		<u>Coefficients^a</u>				
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	-7.151	0.382		-18.737	0.000
	Green Process Innovation	0.573	0.543	0.062	1.056	0.292
	Green Product Innovation	-0.031	0.432	-0.004	-0.071	0.943

a. Dependent Variable: LnU2i

Source: Processed Data, 2026

The absence of heteroscedasticity can be observed from the results of the Park test. The analysis generated significance values of 0.292 for green process innovation and 0.943 for green product innovation. As both significance values exceed the 0.05 level, the residual variance is regarded as consistent, indicating that the regression model does not suffer from heteroscedasticity.

d. Autocorrelation Test

Table 6 Autocorrelation Test Result

<u>Model Summary^b</u>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.225 ^a	0.051	0.044	0.05202	2.098

Source: Processed Data, 2026

The Durbin–Watson analysis produced a statistic of 2.098 for the 312 observations included in the model with three independent variables. The calculated value is positioned between the lower and upper decision boundaries, as shown by $1.82797 < 2.098 < 2.17203$.

Since this result meets the required $dU < DW < 4 - dU$ condition, there is insufficient evidence of autocorrelation in the regression model.

3. Results of Hypothesis Tests

a. Multiple Linear Regression Test

Table 7 Results of Multiple Linear Regression Test

		<u>Coefficients^a</u>	
		Unstandardized Coefficients	
Model		B	Std. Error
1	(Constant)	-0.008	0.009
	Green Process Innovation	0.040	0.013
	Green Product Innovation	0.021	0.011

Source: Processed Data, 2026

The regression model can be expressed as Financial Performance = $-0.008 + 0.040X_1 + 0.021X_2 + e$. The constant of -0.008 indicates that financial performance is expected to have a value of -0.008 when both green process innovation and green product innovation are assumed to be zero. The coefficient of green process innovation (X_1) is 0.040, indicating that a one-unit increase in green process innovation is expected to raise financial performance by 0.040, assuming the other variables remain unchanged. In contrast, green product innovation (X_2) has a coefficient of 0.021, which suggests that every one-unit increase in this variable is associated with a 0.021 increase in financial performance, with the other variables held constant.

b. Goodness Of Fit Test (F-test)

Table 8 Results of the Simultaneous Test (F-test)

		<u>ANOVA^a</u>				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.044	2	0.022	8.207	0.000 ^b
	Residual	0.833	308	0.003		
	Total	0.878	310			

Source: Processed Data, 2026

The regression model yields a significance level of 0.000, which is below the 0.05 criterion.

This finding confirms that the model is statistically significant, indicating that green

process innovation and green product innovation jointly provide an explanatory contribution to financial performance. Thus, the regression model is appropriate for further analysis.

c. Partial Test (t-test)

Table 9 Results of Partial Test (t-test)

		<u>Coefficients^a</u>			
		Unstandardized Coefficients		Standardized Coefficients	
Model		B	Std. Error	Beta	t Sig.
1	(Constant)	-0.008	0.009		-0.894 0.372
	Green Process Innovation	0.040	0.013	0.170	2.981 0.003
	Green Product Innovation	0.021	0.011	0.114	2.001 0.046

a. Dependent Variable: Financial Performance

Source: Processed Data, 2026

The statistical analysis indicates that green process innovation has a significance level of 0.003, which is below the 0.05 threshold. This finding demonstrates that green process innovation significantly influences financial performance, supporting H1. Similarly, green product innovation records a significance value of 0.046, also lower than 0.05. Hence, green product innovation is found to have a significant effect on financial performance, providing support for H2.

d. Determination Coefficient (Adjusted R²) Test

Table 10 Result Test of Determination Coefficient (Adjusted R²)

<u>Model Summary^b</u>				
Adjusted R				
Model	R	R Square	Square	Std. Error of the Estimate
1	0.225 ^a	0.051	0.044	0.05202

a. Predictors: (Constant), Green Product Innovation, Green Process Innovation

b. Dependent Variable: Financial Performance

Source: Processed Data, 2026

Based on the results presented in the table, the Adjusted R Square is 0.044, indicating that green process innovation and green product innovation collectively account for 4.4% of the variation in financial performance. The remaining 95.6% is attributable to other factors that are not incorporated into the regression model.

C. CONCLUSIONS

The findings demonstrate a positive relationship between green process innovation and financial performance. The adoption of environmentally oriented production processes can improve operational efficiency by limiting waste generation, reducing energy consumption, applying technologies that control pollution, and utilizing raw materials more efficiently. Such improvements in resource efficiency can contribute to lower operating costs and, consequently, strengthen the company's financial results.

The analysis also confirms that green product innovation is associated with financial performance. Through the development of environmentally responsible products, companies can offer greater value to consumers while addressing environmental concerns. This distinctive product positioning may strengthen customer loyalty and broaden the company's market reach, which can subsequently support higher revenues and improve overall financial performance.

D. SUGGESTIONS

The results of this research extend the existing understanding of factors associated with financial performance among consumer non-cyclicals companies. They also offer useful implications for both academic development and business decision-making, particularly in evaluating the contribution of green process innovation and green product innovation to financial outcomes. Subsequent studies may consider including other relevant determinants and covering a broader research setting to provide a more extensive understanding of the factors influencing financial performance.

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