

Intellectual Capital Moderation of Carbon Disclosure, Sustainability, and Firm Value

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ABSTRACT

This study investigates the effect of Carbon Disclosure Project (CDP), Sustainability Report (SR), and Sales Growth (SG) on firm value, with Intellectual Capital (IC) serving as a moderating variable. The study is motivated by inconsistent findings in previous research regarding the relationship between sustainability-related disclosures and firm value, particularly among manufacturing firms in emerging markets. This research contributes to the literature by examining the moderating role of Intellectual Capital in strengthening the relationship between sustainability practices and firm value within manufacturing companies participating in the PROPER program in Indonesia. A quantitative approach was employed using panel data regression and Moderated Regression Analysis (MRA) with EViews 13. The sample consisted of manufacturing firms participating in PROPER and listed on the Indonesia Stock Exchange during the 2021-2024 period. The results reveal that the Carbon Disclosure Project, the Sustainability Report, and Sales Growth do not significantly affect firm value when examined individually. However, Intellectual Capital significantly strengthens the relationship between these variables and firm value. These findings support Signaling Theory by suggesting that sustainability disclosures and operational performance are more likely to be valued by investors when supported by strong intellectual capital. Practically, the results highlight the importance of strengthening intellectual capital to enhance the effectiveness of sustainability initiatives and improve firm value.

Keywords: Carbon Disclosure Project; Sustainability Report; Sales Growth; Intellectual Capital; Firm Value



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INTRODUCTION

Amid global pressure on climate change, corporate transparency regarding environmental impacts has become a crucial indicator in determining market value. The manufacturing sector, as one of the largest contributors to carbon emissions, is under pressure to disclose its sustainability activities. However, the phenomenon in Indonesia shows fluctuations in Firm Value that have not fully aligned

with these transparency efforts. The main issue addressed in this study is how environmental disclosure mechanisms and sales growth performance can truly be positively responded to by the market through the role of a company's intellectual capacity. Emissions transparency through the Carbon Disclosure Project (CDP) is expected to reduce information asymmetry and increase Firm Value. However, previous research has shown mixed results. Sari & Wahyuni (2025) emphasize that carbon emission disclosure has an impact on Firm Value, while Setiawan et al. (2024) highlight that carbon knowledge plays a significant role in moderating this relationship. In addition to the CDP, the Sustainability Report is also an important instrument. Pratama & Rahayu (2025) stated that sustainability reports signal long-term commitment, although Selfiani (2023) found that the quality of such disclosure often depends on the company's financial performance. Besides environmental aspects, fundamental factors such as sales growth are traditionally considered the main catalyst for Firm Value. Stable sales growth reflects competitiveness and operational efficiency (Romadhoni, 2022). However, Susanti et al. (2025) revealed that sales growth does not always directly increase Firm Value if it is not accompanied by profitability and good asset management. This indicates a research gap that requires moderating variables to strengthen the relationship.

The inconsistent findings reported in previous studies indicate that the relationship between sustainability-related disclosures, corporate growth, and firm value remains inconclusive. While several studies have documented a positive impact of carbon disclosure and sustainability reporting on firm value, other studies have found insignificant or even contradictory results. These inconsistencies suggest that the effectiveness of sustainability information as a market signal may depend on the presence of other organizational factors capable of enhancing its credibility and relevance to investors. According to Signaling Theory, companies convey information to external stakeholders to reduce information asymmetry and influence investment decisions. However, the effectiveness of a signal depends not only on the information disclosed but also on the firm's internal capability to transform such information into economic value. In this context, Intellectual Capital represents a strategic resource that enables firms to utilize knowledge, innovation, and organizational capabilities to strengthen the market's response to sustainability initiatives and operational performance. (Velte, 2023; García-Sánchez & Aibar-Guzmán, 2024). Although previous studies have examined the direct effects of Carbon Disclosure Project (CDP), Sustainability Report, Sales Growth, and Intellectual Capital on firm value, limited attention has been given to the moderating role of Intellectual Capital in explaining these relationships simultaneously, particularly among manufacturing firms participating in the PROPER program in Indonesia. Therefore, this study seeks to address this gap by investigating whether Intellectual Capital can strengthen the influence of sustainability disclosure and sales growth on firm value.

This study positions Intellectual Capital (IC), specifically Intellectual Capital, as a moderating variable. Intangible assets in the form of knowledge and innovation are considered capable of transforming green strategies into tangible economic value (Pradytia, 2022). Focusing on manufacturing issuers participating in PROPER, this study aims to examine whether a company's intellectual strength can optimize the influence of CDP, Sustainability Reports, and Sales Growth on Firm Value. The novelty of this research lies in the combination of environmental openness and operational growth aspects moderated by intellectual capital in one comprehensive panel data analysis model.

THEORETICAL FRAMEWORK AND HYPOTHESES

Signal Theory

Signaling Theory explains that companies voluntarily disclose information to reduce information asymmetry between management and external stakeholders. Information released by companies serves as a signal regarding current performance and prospects, enabling investors to make more informed investment decisions. Positive signals are expected to increase investor confidence and

ultimately enhance firm value. This concept was first introduced by Spence (1973), who explained that certain data or announcements act as signals from parties with superior information (insiders) to recipients, minimizing information gaps or uncertainty. Informed parties have an incentive to convey relevant and valuable information so that external parties can use it in decision-making. According to Ross (1977), signals conveyed by companies have different meanings for the market depending on the type and quality of the information received. In the context of this study, carbon disclosure, sustainability reporting, and sales growth represent strategic signals communicated by companies to the market. Through these disclosures, firms attempt to demonstrate environmental responsibility, long-term sustainability commitment, and operational performance. The effectiveness of these signals is expected to influence investor perceptions and firm value.

Carbon Disclosure Project and Firm Value

According to Signaling Theory, companies voluntarily disclose information to reduce information asymmetry between management and investors. Carbon disclosure serves as an environmental signal that reflects a company's commitment to managing environmental risks and implementing sustainable business practices. Transparent carbon disclosure enables investors to assess the firm's environmental responsibility and long-term sustainability prospects, thereby influencing market perceptions of firm value. Carbon Disclosure Project (CDP) has emerged as an internationally recognized environmental disclosure platform that provides information regarding climate change management, carbon emissions, water management, and forest conservation. Through CDP disclosure, companies communicate their environmental performance and accountability to stakeholders. Such disclosures are expected to increase investor confidence because they demonstrate transparency and commitment toward sustainable business operations (Juniati Gunawan, 2023). From the perspective of Signaling Theory, carbon disclosure may be interpreted as a positive signal regarding managerial quality and environmental responsibility. The disclosure of carbon emissions can reduce information asymmetry and provide relevant information regarding the company's commitment to sustainability, which may positively influence firm value (Angelina Yuvita Todryanti Mai, 2024).

However, previous empirical findings remain inconclusive. Sari and Wahyuni (2025) found that carbon disclosure positively affects firm value, suggesting that investors increasingly consider environmental information in investment decisions. Conversely, several studies reported insignificant relationships, indicating that investors may not always respond positively to environmental disclosure. These inconsistent findings highlight the need for further investigation, particularly among Indonesian manufacturing firms participating in the PROPER program.

H1: Carbon Disclosure Project positively affects Firm Value.

Sustainability Report and Firm Value

Sustainability reporting functions as a communication mechanism through which companies disclose information regarding their environmental, social, and governance (ESG) performance. According to Signaling Theory, sustainability reports provide important signals regarding corporate responsibility, transparency, and long-term commitment to sustainable development. Through such disclosures, companies attempt to build investor confidence and improve market perceptions. (García-Sánchez & Aibar-Guzmán, 2024). The publication of sustainability reports enables stakeholders to evaluate whether corporate activities are aligned with sustainability principles. High-quality sustainability disclosure may reduce uncertainty regarding future business prospects and strengthen investor confidence in the company's ability to maintain long-term performance. Consequently, sustainability reporting is expected to contribute positively to firm value. (Velte, 2023). Previous studies have reported mixed findings regarding the relationship between sustainability reporting and firm value. Pratama and Rahayu (2025) argued that sustainability reports provide positive signals that strengthen investor confidence and enhance firm value. In contrast, Selfiani (2023) found that the effectiveness of sustainability reporting depends on the firm's financial condition and disclosure quality. These inconsistent findings indicate that additional factors may

influence how sustainability information is interpreted by investors. Based on Signaling Theory, sustainability reports are expected to generate positive market responses because they provide information regarding the company's commitment to sustainable business practices and long-term value creation.

H2: Sustainability Report positively affects Firm Value.

Sales Growth and Firm Value

Sales growth reflects a company's ability to expand its market share, increase customer demand, and maintain competitiveness within its industry. In the context of Signaling Theory, sales growth represents a positive signal regarding future business prospects because it indicates the company's ability to generate revenue growth and sustain operational performance. Investors often interpret increasing sales growth as evidence of strong market acceptance and effective managerial performance. Consequently, companies experiencing consistent sales growth are expected to receive positive market responses, leading to higher firm value. Information regarding sales growth becomes particularly important because it reflects future earning potential and the firm's ability to generate sustainable economic benefits. Empirical evidence regarding the relationship between sales growth and firm value remains inconsistent. Romadhoni (2022) stated that sales growth reflects competitiveness and operational efficiency, which may positively influence firm value. However, Susanti et al. (2025) found that sales growth does not necessarily increase firm value unless accompanied by profitability and efficient asset management. These mixed findings suggest that sales growth alone may not always be sufficient to influence investor perceptions. Based on Signaling Theory, higher sales growth is expected to provide positive information regarding future company performance and therefore increase firm value.

H3: Sales Growth positively affects Firm Value.

Intellectual Capital Moderates the Relationship between Carbon Disclosure Project and Firm Value

Intellectual Capital represents intangible resources consisting of knowledge, innovation, organizational capabilities, and human competencies that contribute to value creation. According to Signaling Theory, the effectiveness of information disclosed by a company depends not only on the information itself but also on the firm's ability to transform that information into economic value. (Abdolmohammadi, 2005). Carbon disclosure provides signals regarding environmental responsibility and sustainability commitment. However, such disclosures may not automatically influence investor perceptions if the company cannot implement environmental strategies effectively. Firms with strong Intellectual Capital possess superior knowledge, innovation capacity, and organizational systems that enable them to manage environmental initiatives more efficiently and communicate them more credibly to stakeholders. (Nadeem et al., 2024). Intellectual Capital, in particular, strengthens a company's ability to convert environmental commitment into competitive advantage and sustainable performance. As a result, investors are more likely to respond positively to carbon disclosure when it is supported by strong Intellectual Capital. Therefore, Intellectual Capital is expected to strengthen the relationship between Carbon Disclosure Project and Firm Value (Pradytia, 2022).

H4: Intellectual Capital moderates the relationship between Carbon Disclosure Project and Firm Value.

Intellectual Capital Moderates the Relationship between Sustainability Report and Firm Value

Sustainability reports provide information regarding a company's environmental, social, and governance performance. According to Signaling Theory, sustainability disclosure serves as a signal intended to reduce information asymmetry and increase investor confidence. However, the effectiveness of sustainability reporting depends on whether the company possesses adequate capabilities to implement sustainability initiatives in practice. Intellectual Capital enhances the quality and credibility of sustainability reporting because companies with strong knowledge

resources, innovation capabilities, and organizational competencies are generally more capable of integrating sustainability principles into business operations. Consequently, sustainability reports issued by such companies are perceived as more credible and informative by investors. As explained in previous studies, Intellectual Capital supports the implementation of sustainability strategies and strengthens stakeholder confidence regarding long-term value creation. Therefore, the market response to sustainability reporting is expected to become stronger when supported by high levels of Intellectual Capital (Pradytia, 2022).

H5: Intellectual Capital moderates the relationship between Sustainability Report and Firm Value.

Intellectual Capital Moderates the Relationship between Sales Growth and Firm Value

Sales growth is commonly interpreted as a positive signal regarding future business prospects and operational performance. According to Signaling Theory, increasing sales growth communicates management's ability to maintain competitiveness and generate revenue expansion. Nevertheless, investors may not always perceive sales growth as sustainable unless it is supported by strong organizational capabilities. Intellectual Capital plays a crucial role in transforming sales growth into long-term value creation. Companies with strong Intellectual Capital are better equipped to utilize knowledge, innovation, and managerial expertise to maintain growth momentum and improve operational efficiency. Consequently, sales growth generated by firms with high Intellectual Capital is more likely to be perceived as sustainable and value-enhancing by investors. The presence of Intellectual Capital strengthens the credibility of sales growth as a signal of future performance because it reflects the company's capability to sustain competitive advantages and create economic value over time. Therefore, Intellectual Capital is expected to strengthen the relationship between Sales Growth and Firm Value (Ashiilah Atika Putri, 2024).

H6: Intellectual Capital moderates the relationship between Sales Growth and Firm Value.

Conceptual Framework

Firm value is viewed as the market's response to information provided by the company, including both non-financial and operational performance. Differences in market response across companies indicate that the influence of sustainability disclosure and sales growth on firm value is not uniform. Intellectual capital is positioned as a moderating variable, reflecting a company's internal capabilities in managing knowledge, human resources, organizational systems, and external relationships. A high level of intellectual capital indicates a company's capacity to process information into economic value. Companies with strong intellectual capital are considered better able to utilize carbon emission disclosures, sustainability reports, and sales growth as valuable signals for investors, thereby strengthening their influence on Firm Value.

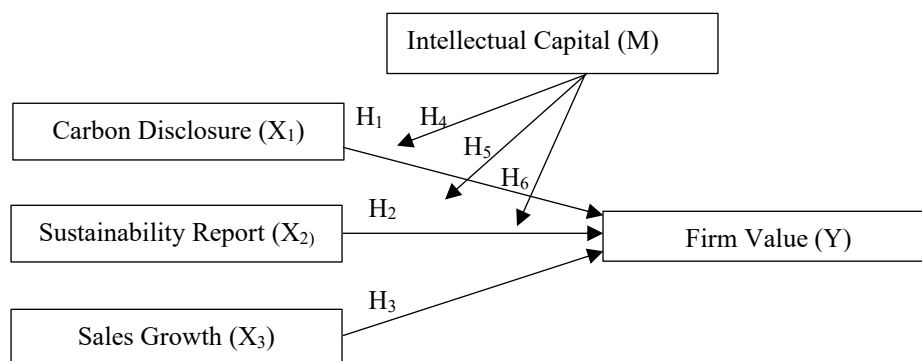


Figure 1. Conceptual Framework

Source: Developed by the authors

Research Method

This study employed a quantitative research approach using secondary data obtained from manufacturing companies listed on the Indonesia Stock Exchange (IDX) during the 2021-2024 period. The study aims to examine the effect of Carbon Disclosure Project (CDP), Sustainability Report (SR), and Sales Growth (SG) on Firm Value, as well as the moderating role of Intellectual Capital (IC). A panel data approach was adopted because it combines cross-sectional and time-series observations, enabling a more comprehensive analysis of corporate behavior over time.

Population and Sample

The population of this study consisted of all manufacturing companies listed on the Indonesia Stock Exchange (IDX) from 2021 to 2024. During the observation period, the manufacturing sector comprised 463 companies, consisting of 109 companies in the Basic Materials sector, 128 companies in the Consumer Non-Cyclicals sector, 165 companies in the Consumer Cyclicals sector, and 61 companies in the Industrials sector. The sample was selected using purposive sampling to ensure the availability and consistency of the required data. The sampling criteria were: (1) manufacturing companies continuously listed on the IDX during the 2021-2024 period; (2) companies participating in the Corporate Performance Rating Assessment Program (PROPER) organized by the Ministry of Environment and Forestry; and (3) companies consistently publishing annual reports and sustainability reports during the observation period. The selection of PROPER participants was motivated by the study's focus on environmental disclosure practices and sustainability performance.

Operational Definition and Measurement of Variables

1. Firm Value (PBV) was measured using the Price to Book Value ratio, reflecting the market's assessment of a company's net assets.
2. The Carbon Disclosure Project (CDP) was measured using a carbon disclosure project based on information disclosed in annual reports and sustainability reports. The index reflects the extent of corporate disclosure regarding carbon emissions management and climate-related initiatives.
3. Sustainability Report (SR) was measured using content analysis based on the Global Reporting Initiative (GRI) Standards. The disclosure score reflects the completeness of sustainability information reported by each company.
4. Sales Growth (SG) was calculated by comparing current-year sales with previous-year sales. This measure reflects the company's ability to increase revenue and maintain business growth.
5. Intellectual Capital (IC) was measured using the Value Added Intellectual Coefficient (VAIC™) approach. Intellectual Capital was included as a moderating variable because it reflects the firm's capability to create value through knowledge, innovation, and organizational resources. Consistent with Pradytia (2022), Intellectual Capital is expected to strengthen the effectiveness of sustainability-related disclosures in influencing firm value.

Data Analysis Technique

The study utilized panel data regression analysis to examine the direct effects of the Carbon Disclosure Project, Sustainability Report, and Sales Growth on Firm Value. To test the moderating role of Intellectual Capital, Moderated Regression Analysis (MRA) was employed.

The regression model is specified as follows:

$$PBV_{it} = \alpha + \beta_1 CDP_{it} + \beta_2 SR_{it} + \beta_3 SG_{it} + \beta_4 IC_{it} + \beta_5 (CDP \times IC)_{it} + \beta_6 (SR \times IC)_{it} + \beta_7 (SG \times IC)_{it} + \epsilon_{it}$$

Data processing was performed using EViews 13 software. The analysis procedure included descriptive statistics, classical assumption tests consisting of normality, multicollinearity, heteroscedasticity, and autocorrelation tests, followed by panel data model selection using the Chow Test and Hausman Test to determine the most appropriate model between the Fixed Effect Model (FEM) and Random Effect Model (REM). This study acknowledges that robustness testing was not

specifically conducted. Therefore, future studies are encouraged to employ alternative estimation techniques and robustness checks to further validate the consistency of the findings.

1. Firm Value (Y)

Firm Value was measured using the Price-to-Book Value (PBV) ratio, which reflects how the market values a company's net assets. PBV compares the market price per share with the book value per share. A higher PBV indicates that investors place a higher valuation on the company and its prospects.

$$PBV = \text{Market Price per Share} / \text{Book Value per Share}$$

2. Carbon Disclosure Project (X1)

The Carbon Disclosure Project (CDP) was measured using a carbon disclosure project derived from information presented in annual reports and sustainability reports. The index reflects the extent to which companies disclose information related to carbon emissions, climate change mitigation, energy consumption, and environmental management practices. A higher disclosure score indicates greater transparency regarding environmental responsibility.

3. Sustainability Report (X2)

Sustainability Report (SR) was measured using content analysis based on the Global Reporting Initiative (GRI) Standards. The disclosure score was calculated by comparing the number of disclosed GRI items with the total applicable disclosure items. A higher score indicates more comprehensive sustainability disclosure. $SR \text{ Index} = \text{Number of Disclosed GRI Items} / \text{Total Applicable GRI Items}$

4. Sales Growth (X3)

Sales Growth (SG) was used to measure the company's ability to increase revenue over time. It was calculated by comparing current-year sales with sales in the previous year. Higher sales growth indicates stronger market performance and business expansion.

$$SG = (\text{Sales}_t - \text{Sales}_{t-1}) / \text{Sales}_{t-1}$$

5. Intellectual Capital (Z)

Intellectual Capital (IC) was measured using the Value Added Intellectual Coefficient (VAICTM) method developed by Pulic. VAIC evaluates the efficiency of value creation generated from intellectual resources and consists of three components: Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Capital Employed Efficiency (CEE). Human Capital Efficiency (HCE) reflects the contribution of employee knowledge, skills, and competencies. Structural Capital Efficiency (SCE) measures the effectiveness of organizational systems, procedures, and innovation. Capital Employed Efficiency (CEE) evaluates the efficiency of physical and financial capital used by the company.

$$VAIC = HCE + SCE + CEE$$

A higher VAIC value indicates that the company is more effective in utilizing its intellectual resources to create economic value and maintain a competitive advantage.

RESULTS AND DISCUSSION

Descriptive Statistics Test

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CDP	112	0.111111	0.888889	0.568452	0.190122
SR	112	0.188034	1.000.000	0.567689	0.209175
SG	112	-0.384916	0.754716	0.080737	0.191193
PBV	112	0.198169	5302939	3.272.891	8.091.803
IC	112	6.225.910	6.508.146	7.772.066	1106102

Source: Data processed in Eviews 13, 2026

1. Table 1 presents the descriptive statistics of the variables used in this study. The Carbon Disclosure Project (CDP) variable has a mean value of 0.568452, with a minimum value of 0.111111 and a maximum value of 0.888889. This indicates that the level of carbon disclosure among manufacturing firms participating in PROPER varies considerably, although on average companies disclosed more than half of the carbon disclosure items assessed.
2. The Sustainability Report (SR) variable shows a mean value of 0.567689, with values ranging from 0.188034 to 1.000000. These results suggest that the extent of sustainability disclosure differs across firms, reflecting variations in corporate commitment to sustainability reporting practices.
3. Sales Growth (SG) has a mean value of 0.080737, indicating that, on average, sample companies experienced sales growth of approximately 8.07% during the observation period. However, the minimum value of -0.384916 and the maximum value of 0.754716 indicate substantial differences in business performance among firms.
4. Firm Value (PBV) records a mean value of 3.272891, with a minimum value of 0.198169 and a maximum value of 53.02939. The standard deviation of 8.091803 exceeds the mean value, indicating considerable variation in firm value across manufacturing companies. This suggests that the market assigned different valuations to firms during the study period.
5. Intellectual Capital (IC) has a mean value of 7.772066, with values ranging from 6.225910 to 16.508146. These results indicate differences in the efficiency of intellectual capital utilization among sample firms. Companies with higher intellectual capital are expected to possess stronger capabilities in creating value through knowledge, innovation, and organizational resources.

Classical Assumption Test

Table 2. Normality Test

Series: Standardized Residuals Sample 2021 - 2024 Observations 112	
<i>Probability:</i>	0,124

Source: Data processed in Eviews 13, 2026

Based on the normality test results, a probability value of 0.124 was obtained, which is greater than the 0.05 significance level. This result indicates that the residuals of the regression model are normally distributed. Thus, the normality assumption has been met, making the regression model suitable for further testing. The normal distribution of the residuals also indicates that the resulting parameter estimates can be used to draw more reliable statistical conclusions.

Table 3. Multicollinearity Test

<i>Corellation</i>					
	PBV	CDP	SR	SG	IC
PBV	1,000000	0,018836	0,034073	-0,106362	0,791241
CDP	0,018836	1,000000	0,697365	-1,295887	0,047147
SR	0,034073	0,697365	1,000000	-0,195679	0,107201
SG	-0,106362	-0,295787	-0,195679	1,000000	0,010304
IC	0,791241	0,047147	0,107201	0,010304	1,000000

Source: Data were processed in Eviews 13, 2026

The results of the multicollinearity test indicate that all correlation values between independent variables are below the critical limit of 0.90. This indicates that there is no very strong relationship between the independent variables in the research model. Therefore, the regression model is free from multicollinearity, allowing each variable to independently explain its influence on firm value.

Table 4. Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey	
Obs*R-squared	0,619

Source: Data were processed in Eviews 13, 2026

The heteroscedasticity test using the Breusch-Pagan-Godfrey method showed a probability value of 0.619, which is greater than 0.05. This result indicates that the residual variance is constant, or homoscedastic. Therefore, the regression model does not experience heteroscedasticity and meets one of the important assumptions in panel regression analysis.

Table 5. Autocorrelation

Durbin-Watson stat	2,691
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Source: Data were processed in Eviews 13, 2026

The autocorrelation test results showed a Durbin-Watson value of 2.691. This value hovers around 2, indicating that the regression model does not experience serious autocorrelation issues. Therefore, the residuals in the research model are considered independent across observation periods, making the regression estimation results reliable for use in hypothesis testing.

Panel Data Regression Model Selection

Table 6. Chow Test

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	29.140430	(27,80)	0.0000
Cross-section Chi-square	266.870460	27	0.0000

Source: Data were processed in Eviews 13, 2026

The Chow test was conducted to determine whether the Common Effect Model (CEM) or the Fixed Effect Model (FEM) was more appropriate for panel data estimation. As presented in Table X, the Cross-section F and Cross-section Chi-square tests produced probability values of 0.0000, which are lower than the 0.05 significance level. Therefore, the null hypothesis is rejected, indicating that the Fixed Effect Model is statistically more appropriate than the Common Effect Model. This result suggests that individual firm characteristics significantly influence firm value and should be accommodated through firm-specific effects in the regression model.

Table 7. Hausman Test

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	73.786901	4	0.0000

Source: Data were processed in Eviews 13, 2026

The Hausman test was subsequently performed to determine whether the Fixed Effect Model (FEM) or the Random Effect Model (REM) should be employed. The test yielded a probability value of 0.0000, which is below the significance level of 0.05. Accordingly, the null hypothesis is rejected, indicating that the Fixed Effect Model is preferred over the Random Effect Model. This finding implies that the unobserved individual effects are correlated with the explanatory variables, making the Fixed Effect Model the most appropriate estimation technique for this study.

Table 8. Panel Data Regression Results

Variabel	<i>t-statistics</i>	<i>Prob.</i>
CDP	-1,620	0,109
CDP x IC	3,725	0,000
SR	-0,179	0,857
SR x IC	2,216	0,029
SG	-1,191	0,236
SG x IC	4,824	0,000

Source: Data were processed in Eviews 13, 2026

$Y = 5.045045 + 5.603515 X_1 - 5.893307 X_2 + 0.426284 X_3 - 0.002912 M - 0.153294 X_1M + 0.118127 X_2M - 0.000274 X_3M$. In detail, the analysis of the constants and regression coefficients of each independent variable and their interactions is described as follows.

Hypothesis Testing and Discussion

Effect of Carbon Disclosure Project on Firm Value (H1)

The regression results indicate that the Carbon Disclosure Project (CDP) has no significant effect on Firm Value, indicating that the level of carbon emission disclosure made by manufacturing companies participating in the PROPER program has not been able to increase investors' valuation of the company. Thus, Hypothesis 1 (H1), which proposed that the Carbon Disclosure Project positively affects Firm Value, is rejected. From the perspective of Signaling Theory, carbon disclosure is expected to function as a positive signal that reflects a company's environmental responsibility, transparency, and long-term commitment to sustainable business practices. By voluntarily disclosing carbon emission information, companies are expected to reduce information asymmetry and strengthen investor confidence. However, the findings of this study indicate that such environmental information has not yet become a primary consideration in investors' decision-making within the Indonesian capital market. Investors appear to place greater emphasis on financial performance, profitability, and growth prospects than on non-financial environmental disclosures when assessing firm value. This finding suggests that carbon disclosure has not yet been perceived as a value-relevant signal capable of influencing market valuation, particularly when investors remain uncertain about the economic benefits generated by corporate environmental initiatives. This interpretation is consistent with the findings of Sari and Wahyuni (2025).

Furthermore, this result is in line with the study of Setiawan et al. (2024), which also reported that carbon disclosure does not significantly affect firm value. One possible explanation is that the quality, consistency, and comprehensiveness of carbon disclosure among manufacturing companies remain highly heterogeneous. Consequently, investors may perceive carbon disclosure primarily as a form of regulatory compliance rather than as evidence of superior environmental performance or sustainable competitive advantage. The absence of standardized disclosure practices may also reduce the credibility of carbon-related information, limiting its usefulness in investment decisions. These findings imply that environmental disclosure alone is insufficient to enhance firm value unless it is accompanied by strong organizational capabilities and tangible economic outcomes. In other words, investors are more likely to respond positively when sustainability initiatives are integrated with strategic corporate resources that can generate long-term value creation. Therefore, companies should not only improve the quantity of carbon disclosure but also enhance its quality, credibility, and strategic integration with overall business performance to strengthen investor confidence and market valuation.

Effect of Sustainability Report on Firm Value (H2)

The regression results indicate that the Sustainability Report (SR) does not have a significant effect on Firm Value. This finding suggests that the sustainability information disclosed by manufacturing companies participating in the PROPER program has not been sufficient to influence investors' valuation of the company. Therefore, Hypothesis 2 (H2), which proposed that the Sustainability

Report positively affects Firm Value, is rejected. From the perspective of Signaling Theory, sustainability reporting is expected to function as a strategic communication mechanism through which companies disclose their environmental, social, and governance (ESG) commitments to external stakeholders. By providing comprehensive sustainability information, companies are expected to reduce information asymmetry, enhance transparency, and strengthen investor confidence. Nevertheless, the results of this study indicate that sustainability disclosures have not yet become value-relevant information for investors in the Indonesian capital market. Investors appear to place greater emphasis on financial indicators, such as profitability, cash flow, and future growth prospects, than on non-financial disclosures contained in sustainability reports. Consequently, sustainability reporting has not yet generated a positive market response capable of increasing firm value. This finding is consistent with the study of Selfiani (2023), which suggested that the effectiveness of sustainability reporting depends not only on the disclosure itself but also on the company's ability to demonstrate tangible economic benefits derived from its sustainability initiatives. Conversely, this result differs from the findings of Pratama and Rahayu (2025), who reported that sustainability reporting positively affects firm value because investors perceive sustainability disclosure as a credible signal of long-term corporate commitment. These inconsistent findings may be explained by differences in research periods, sample characteristics, industrial sectors, and the level of investor awareness regarding ESG-related information.

Furthermore, the insignificant relationship may indicate that sustainability reporting among manufacturing companies participating in the PROPER program is still perceived primarily as a regulatory compliance instrument rather than as a strategic corporate resource capable of creating economic value. Investors may require stronger evidence that sustainability initiatives improve operational efficiency, innovation, risk management, and long-term profitability before incorporating sustainability information into their investment decisions. Therefore, companies should focus not only on increasing the quantity of sustainability disclosures but also on improving their quality, credibility, and integration with corporate strategy so that sustainability reporting can serve as a more effective signal for enhancing firm value. Effect of Sales Growth on Firm Value (H3). The regression results indicate that Sales Growth (SG) does not have a significant effect on Firm Value. This finding suggests that an increase in sales achieved by manufacturing companies participating in the PROPER program has not been sufficient to enhance investors' valuation of the company. Therefore, Hypothesis 3 (H3), which proposed that Sales Growth positively affects Firm Value, is rejected.

According to Signaling Theory, sales growth represents a positive signal reflecting a company's ability to expand its market share, strengthen its competitive position, and generate future business opportunities. Consistent sales growth is generally expected to increase investor confidence because it indicates favorable business prospects and potential future cash flows. Nevertheless, the findings of this study reveal that sales growth has not yet become a value-relevant signal for investors in the Indonesian capital market. Investors appear to evaluate not only the magnitude of revenue growth but also the company's ability to transform that growth into sustainable profitability, operational efficiency, and long-term financial performance. This finding supports the study of Susanti et al. (2025), which reported that sales growth does not necessarily increase firm value because investors tend to assess the quality and sustainability of corporate growth rather than the growth rate itself. Likewise, Romadhoni (2022) argued that although sales growth reflects business expansion and market competitiveness, its contribution to firm value depends on management's ability to convert increased sales into improved financial performance. In manufacturing companies, higher sales are often accompanied by increased production costs, distribution expenses, and working capital requirements. Consequently, sales growth may not automatically improve firm value if it is not followed by higher profitability and more efficient resource utilization.

Furthermore, the insignificant relationship indicates that investors place greater emphasis on the company's capacity to create sustainable economic value rather than on revenue growth alone. Sales

growth can only become an effective market signal when it demonstrates that the company is capable of generating stronger earnings, improving operational efficiency, and maintaining long-term business sustainability. Therefore, companies should focus not only on increasing sales but also on ensuring that business expansion is supported by effective cost management, productivity improvements, and strategic resource utilization so that sales growth can ultimately contribute to higher firm value. The regression results indicate that the interaction between the Carbon Disclosure Project (CDP) and Intellectual Capital (IC) has a significant positive effect on Firm Value. Accordingly, Hypothesis 4 (H4), which proposes that Intellectual Capital moderates the relationship between the Carbon Disclosure Project and Firm Value, is accepted. This finding indicates that Intellectual Capital strengthens the influence of carbon disclosure on firm value by enhancing the credibility and effectiveness of environmental information disclosed by manufacturing companies participating in the PROPER program.

From the perspective of Signaling Theory, carbon disclosure functions as a signal that reflects a company's commitment to environmental responsibility and sustainable business practices. However, the effectiveness of this signal depends not only on the disclosure itself but also on the firm's capability to transform environmental initiatives into measurable economic value. In this context, Intellectual Capital represents a strategic intangible resource consisting of organizational knowledge, employee competencies, innovation capabilities, and managerial expertise that enables companies to implement sustainability strategies more effectively. Consequently, firms with stronger Intellectual Capital are more capable of converting environmental commitments into operational improvements, innovation, and long-term competitive advantages, thereby increasing investor confidence. The findings of this study suggest that carbon disclosure alone is insufficient to enhance firm value, as demonstrated by the insignificant direct effect identified in H1. Nevertheless, when supported by strong Intellectual Capital, carbon disclosure becomes a more credible and value-relevant signal for investors. This indicates that investors not only evaluate whether environmental information is disclosed but also assess whether the company possesses sufficient organizational capabilities to implement its sustainability commitments effectively. As a result, Intellectual Capital enhances the market's confidence that environmental initiatives will generate tangible economic benefits and sustainable corporate performance.

This finding is consistent with Pradytia (2022), who argued that Intellectual Capital plays an essential role in supporting the successful implementation of environmental strategies and sustainable value creation. It also reinforces the perspective that intangible strategic resources enable companies to transform sustainability initiatives into competitive advantages that are recognized by investors and reflected in higher firm value. These results further support the argument that the effectiveness of sustainability-related disclosures depends not only on the quality of the information disclosed but also on the firm's internal capabilities to execute its environmental strategies successfully. Furthermore, the significant moderating effect demonstrates that Intellectual Capital serves as an important strategic mechanism linking environmental disclosure with corporate value creation. Companies seeking to maximize the benefits of carbon disclosure should therefore strengthen their intellectual resources through continuous investment in human capital, organizational learning, technological innovation, and knowledge management. Such improvements will enhance the credibility of environmental disclosures, increase investor confidence, and ultimately contribute to sustainable firm value in the long term.

The regression results indicate that the interaction between the Sustainability Report (SR) and Intellectual Capital (IC) has a significant effect on Firm Value. Accordingly, Hypothesis 5 (H5), which proposes that Intellectual Capital moderates the relationship between Sustainability Report and Firm Value, is accepted. This finding indicates that Intellectual Capital strengthens the influence of sustainability reporting on firm value by enhancing the credibility and effectiveness of sustainability-related information disclosed by manufacturing companies participating in the PROPER program. From the perspective of Signaling Theory, sustainability reporting serves as a

strategic communication mechanism through which companies disclose their environmental, social, and governance (ESG) commitments to external stakeholders. Such disclosures are expected to reduce information asymmetry and signal the company's long-term commitment to sustainable business practices. However, the findings of H2 revealed that sustainability reporting alone was insufficient to increase firm value. This suggests that investors do not merely evaluate the existence of sustainability disclosures but also assess whether companies possess the organizational capabilities required to implement sustainability commitments effectively.

In this context, Intellectual Capital represents a strategic intangible resource consisting of organizational knowledge, employee competencies, innovation capabilities, and managerial expertise that enables firms to integrate sustainability initiatives into their business strategies. Companies with stronger Intellectual Capital are better able to transform sustainability commitments into operational improvements, innovation, risk management, and long-term competitive advantages. Consequently, sustainability reports become more credible and informative because investors perceive that the disclosed commitments are supported by the firm's actual capabilities to execute sustainable business practices. This finding is consistent with Pradytia (2022), who argued that Intellectual Capital plays an essential role in creating sustainable corporate value through the effective utilization of intangible resources. Likewise, Pratama and Rahayu (2025) suggested that sustainability reporting contributes to higher firm value when stakeholders perceive sustainability commitments as credible, strategic, and capable of generating long-term economic benefits. The present findings reinforce these arguments by demonstrating that Intellectual Capital enhances the effectiveness of sustainability reporting as a market signal, thereby increasing investor confidence.

Furthermore, the significant moderating effect indicates that the relationship between sustainability reporting and firm value cannot be fully explained without considering the company's intellectual resources. Sustainability reporting alone may not influence investor decisions; however, when supported by strong Intellectual Capital, sustainability disclosures become more reliable indicators of future corporate performance and sustainable value creation. Therefore, companies should continuously strengthen their human capital, organizational learning, innovation capability, and knowledge management so that sustainability reporting can function not merely as a compliance instrument but as a strategic resource for enhancing firm value.

Moderating Effect of Intellectual Capital on the Relationship between Sales Growth and Firm Value (H6)

The regression results indicate that the interaction between Sales Growth (SG) and Intellectual Capital (IC) has a significant positive effect on Firm Value. Accordingly, Hypothesis 6 (H6), which proposes that Intellectual Capital moderates the relationship between Sales Growth and Firm Value, is accepted. This finding demonstrates that Intellectual Capital strengthens the influence of sales growth on firm value by enhancing the company's ability to transform business expansion into sustainable economic value. From the perspective of Signaling Theory, sales growth serves as a positive signal reflecting a company's market performance, competitiveness, and future business prospects. Continuous growth in sales generally indicates increasing customer demand and the firm's ability to expand its market presence. However, the findings of H3 revealed that sales growth alone was insufficient to increase firm value. This suggests that investors do not merely consider the magnitude of sales growth but also evaluate whether the company possesses the organizational capabilities required to convert higher revenues into sustainable profitability and long-term value creation.

In this context, Intellectual Capital represents a strategic intangible resource comprising organizational knowledge, employee competencies, innovation capabilities, and managerial expertise that enables firms to optimize the benefits of business growth. Companies with stronger Intellectual Capital are better equipped to improve operational efficiency, develop innovative products and processes, manage organizational knowledge effectively, and allocate resources more

efficiently. Consequently, sales growth is more likely to generate higher profitability and sustainable competitive advantages, thereby strengthening investor confidence and increasing firm value. This finding is consistent with Pradytia (2022), who emphasized that Intellectual Capital plays a crucial role in enhancing organizational performance and creating sustainable competitive advantages through the effective utilization of intangible resources. Likewise, Romadhoni (2022) argued that although sales growth reflects business expansion and market competitiveness, its contribution to firm value depends on management's ability to utilize organizational resources efficiently. The present findings extend these arguments by demonstrating that Intellectual Capital strengthens the effectiveness of sales growth as a market signal, enabling firms to transform business expansion into long-term corporate value. Furthermore, the significant moderating effect indicates that the relationship between sales growth and firm value cannot be fully understood without considering the company's intellectual resources. Sales growth alone may not influence investor decisions; however, when supported by strong Intellectual Capital, business growth becomes a more credible indicator of sustainable future performance and value creation. Therefore, companies should continuously invest in human capital development, organizational learning, innovation capability, and knowledge management to ensure that business expansion is accompanied by improved operational performance and sustainable firm value.

The Effect of the Carbon Disclosure Project on Firm Value

Based on the results of the first hypothesis (H1) tested using EViews 13, the Carbon Disclosure Project (CDP) was found to have no significant effect on Firm Value among manufacturing companies participating in the PROPER program and listed on the Indonesia Stock Exchange. Accordingly, Hypothesis 1 (H1) is rejected. This finding indicates that carbon emission disclosure alone has not been sufficient to influence investors' valuation of manufacturing companies. From the perspective of Signaling Theory, carbon disclosure is expected to function as a positive signal reflecting a company's environmental responsibility, transparency, and commitment to sustainable business practices. Such disclosures are intended to reduce information asymmetry and strengthen investor confidence. However, the findings suggest that environmental information has not yet become a primary consideration in investment decisions within the Indonesian capital market. Investors appear to place greater emphasis on financial performance, profitability, and long-term earnings potential than on voluntary environmental disclosures. Consequently, carbon disclosure has not yet become a value-relevant signal capable of increasing firm value.

One possible explanation is that investors still perceive carbon disclosure primarily as a regulatory compliance activity associated with participation in the PROPER program rather than as an indicator of superior corporate performance. In addition, differences in the quality, consistency, and comprehensiveness of carbon disclosure among manufacturing firms may reduce the credibility and comparability of the information presented. As a result, investors may experience difficulty in assessing whether environmental initiatives are capable of generating long-term economic benefits. This interpretation is consistent with Nadeem et al. (2024), who argued that sustainability-related disclosures will only influence market valuation when they are supported by strong organizational capabilities and are perceived as economically relevant. These findings are consistent with the studies of Suripto and Islami (2024) and Setiawan et al. (2024), which reported that carbon disclosure does not automatically generate a positive market response. Setiawan et al. (2024) further emphasized that firm characteristics, particularly company size and organizational capacity, play a more important role in determining the effectiveness of carbon disclosure than the disclosure itself. In contrast, this finding differs from Sari and Wahyuni (2025), who found that carbon disclosure positively affects firm value. Such inconsistencies may be attributed to differences in industrial characteristics, research periods, and investor perceptions across sectors. In industries with greater exposure to climate-related risks, such as mining, environmental disclosure may carry stronger informational value than in the manufacturing sector.

The findings also indicate that the effectiveness of environmental disclosure cannot be separated from the firm's internal capabilities to implement sustainability initiatives. Carbon disclosure alone is insufficient to create economic value unless it is supported by strategic organizational resources capable of transforming sustainability commitments into operational performance and long-term competitive advantages. This finding provides an important implication for manufacturing companies, suggesting that improving the quality, credibility, and strategic integration of carbon disclosure is essential if environmental information is expected to function as a meaningful market signal capable of enhancing firm value. Based on the results of testing the second hypothesis (H2) using EViews 13, the Sustainability Report (SR) was found to have no significant effect on the Firm Value of manufacturing companies participating in the PROPER program. Accordingly, Hypothesis 2 (H2) is rejected. This finding indicates that the Sustainability Report alone has not been sufficient to influence investors' valuation of manufacturing companies listed on the Indonesia Stock Exchange.

From the perspective of Signaling Theory, the Sustainability Report is expected to function as a strategic communication mechanism through which companies disclose their environmental, social, and governance (ESG) commitments to external stakeholders. Such disclosures are intended to reduce information asymmetry, enhance corporate transparency, and provide positive signals regarding long-term business sustainability. However, the findings of this study suggest that sustainability information has not yet become a primary consideration for investors in the Indonesian capital market. Investors appear to place greater emphasis on financial performance, profitability, and future growth prospects than on non-financial disclosures contained in sustainability reports. One possible explanation is that the Sustainability Report among manufacturing companies participating in the PROPER program may still be perceived primarily as a regulatory compliance activity rather than as a strategic initiative capable of generating long-term economic value. In addition, differences in the quality, consistency, and credibility of sustainability disclosures across companies may reduce investors' confidence in the information presented. Consequently, sustainability reports alone may not provide a sufficiently strong signal to influence market valuation.

These findings are consistent with Herawati Dwi Wulandari and Suwarno (2025), who reported that the Sustainability Report does not independently increase firm value. Likewise, Susanti et al. (2025) argued that non-financial disclosures are unlikely to enhance market valuation unless they are accompanied by improvements in corporate performance and operational efficiency. Conversely, this finding differs from Rahmawati and Suwarno (2025), who found Sustainability Report positively influences firm value because investors perceive sustainability disclosure as a credible signal of long-term corporate commitment. Such differences may be explained by variations in research periods, industrial characteristics, and investor awareness regarding ESG-related information. The findings of this study also indicate that the effectiveness of the Sustainability Report depends on the firm's internal capabilities to implement sustainability initiatives successfully. This interpretation is supported by the significant moderating effect of Intellectual Capital identified in H5, indicating that the Sustainability Report becomes more value-relevant when companies possess strong intellectual resources. Therefore, manufacturing companies should focus not only on expanding sustainability disclosures but also on strengthening their organizational capabilities, innovation, and knowledge management so that sustainability reporting can function as a credible strategic signal capable of enhancing firm value.

Based on the results of testing the third hypothesis (H3) using EViews 13, Sales Growth (SG) was found to have no significant effect on the Firm Value of manufacturing companies participating in the PROPER program. Accordingly, Hypothesis 3 (H3) is rejected. This finding indicates that an increase in sales does not necessarily lead to higher market valuation, suggesting that investors do not rely solely on revenue growth when assessing corporate value. From the perspective of Signaling Theory, sales growth is generally regarded as a positive signal reflecting a company's ability to

expand its market share, strengthen competitiveness, and generate future business opportunities. However, the findings of this study suggest that sales growth alone has not yet become a value-relevant signal in the Indonesian capital market. Investors appear to evaluate not only the magnitude of revenue growth but also whether such growth is accompanied by improvements in profitability, operational efficiency, and long-term financial performance. Consequently, increased sales may not automatically enhance firm value if investors remain uncertain about the company's ability to transform business expansion into sustainable economic benefits.

These findings are consistent with Putri Salsabillah Damanik et al. (2024), who argued that corporate growth is not always the primary determinant of firm value because investors tend to consider broader aspects of financial performance and business sustainability. Likewise, Susanti et al. (2025) emphasized that business expansion through increased sales does not automatically improve market valuation unless it is supported by effective managerial capabilities and efficient resource utilization. These findings indicate that investors assess the quality and sustainability of growth rather than focusing solely on the rate of sales growth. The results also imply that manufacturing companies participating in the PROPER program are expected to demonstrate that business expansion is accompanied by efficient resource management and sustainable value creation. This interpretation is reinforced by the significant moderating effect of Intellectual Capital identified in H6, indicating that sales growth becomes more valuable to investors when supported by strong organizational knowledge, innovation capability, and managerial competence. Therefore, companies should not only pursue higher sales but also strengthen their intellectual resources to ensure that business growth contributes to sustainable firm value. Based on the results of the Moderated Regression Analysis (MRA) using EViews 13, the interaction between the Carbon Disclosure Project (CDP) and Intellectual Capital (IC) was found to have a significant effect on Firm Value. Accordingly, Hypothesis 4 (H4) is accepted. These findings indicate that Intellectual Capital strengthens the relationship between carbon disclosure and firm value, suggesting that environmental disclosure becomes more meaningful to investors when supported by strong organizational capabilities.

From the perspective of Signaling Theory, carbon disclosure is expected to function as a positive signal reflecting a company's commitment to environmental responsibility and sustainable business practices. However, the findings of H1 revealed that carbon disclosure alone was insufficient to influence firm value. This suggests that investors do not merely assess whether environmental information is disclosed but also evaluate whether the company possesses the capabilities required to implement environmental strategies effectively. Consequently, the credibility of carbon disclosure depends on the firm's ability to transform sustainability commitments into tangible economic benefits. In this context, Intellectual Capital represents a strategic intangible resource comprising organizational knowledge, employee competencies, innovation capabilities, and managerial expertise that enables firms to implement environmental initiatives more effectively. Companies with stronger Intellectual Capital are better able to integrate environmental strategies into business operations, improve operational efficiency, encourage green innovation, and manage sustainability-related risks. As a result, carbon disclosure becomes a more credible and value-relevant signal because investors perceive that environmental commitments are supported by adequate organizational capabilities.

These findings are consistent with Sari and Wahyuni (2025), who argued that Intellectual Capital enhances stakeholder confidence in corporate environmental initiatives and contributes to higher firm value. Likewise, Selfiani and Usmar (2023) emphasized that companies with stronger Intellectual Capital tend to produce higher-quality sustainability disclosures because they possess better organizational capabilities and knowledge resources. The present study extends these findings by demonstrating that Intellectual Capital does not merely improve disclosure quality but also strengthens the effectiveness of carbon disclosure in influencing market valuation. The findings imply that manufacturing companies participating in the PROPER program should not rely solely on environmental disclosure to improve firm value. Instead, companies need to strengthen their

intellectual resources through continuous investment in human capital, organizational learning, innovation capability, and knowledge management. By integrating environmental disclosure with strong Intellectual Capital, firms can increase the credibility of sustainability information, strengthen investor confidence, and create sustainable long-term firm value.

Based on the results of the Moderated Regression Analysis (MRA) using EViews 13, the interaction between the Sustainability Report (SR) and Intellectual Capital (IC) was found to have a significant effect on Firm Value. Accordingly, Hypothesis 5 (H5) is accepted. These findings indicate that Intellectual Capital strengthens the relationship between Sustainability Report and firm value, suggesting that sustainability disclosures become more meaningful to investors when supported by strong organizational capabilities. From the perspective of Signaling Theory, the Sustainability Report is expected to communicate a company's commitment to environmental, social, and governance (ESG) practices and to reduce information asymmetry between management and investors. However, the findings of H2 revealed that the Sustainability Report alone was insufficient to increase firm value. This indicates that investors do not merely assess whether sustainability information is disclosed but also evaluate whether the company possesses the organizational capabilities necessary to implement its sustainability commitments effectively. Consequently, the credibility of the Sustainability Report depends on the firm's ability to transform sustainability initiatives into measurable economic benefits.

In this context, Intellectual Capital represents a strategic intangible resource consisting of organizational knowledge, employee competencies, innovation capabilities, and managerial expertise that enables companies to integrate sustainability initiatives into business operations. Firms with stronger Intellectual Capital are better able to improve operational efficiency, manage sustainability-related risks, develop innovative business practices, and create long-term competitive advantages. As a result, sustainability reports become more credible and value-relevant because investors perceive that the disclosed sustainability commitments are supported by adequate organizational capabilities. These findings are consistent with Fitri Arinda Rahmawati and Suwarno (2025), who concluded that Intellectual Capital strengthens the positive influence of Sustainability Report on stakeholder confidence. Likewise, Selfiani and Usmar (2023) emphasized that companies with stronger Intellectual Capital tend to produce higher-quality sustainability disclosures because they possess better organizational capabilities and knowledge resources. The present study extends these findings by demonstrating that Intellectual Capital not only improves the quality of the Sustainability Report but also enhances its effectiveness in influencing market valuation. The findings imply that the Sustainability Report alone is insufficient to enhance firm value unless it is supported by strong intellectual resources capable of implementing sustainability strategies effectively. Therefore, manufacturing companies participating in the PROPER program should continuously strengthen their human capital, organizational learning, innovation capability, and knowledge management so that the Sustainability Report functions not merely as a compliance instrument but as a credible strategic signal capable of increasing investor confidence and creating sustainable firm value.

The Role of Intellectual Capital as a Moderating Variable in the Relationship between Sales Growth and Firm Value

Based on the results of the Moderated Regression Analysis (MRA) using EViews 13, the interaction between Sales Growth (SG) and Intellectual Capital (IC) was found to have a significant effect on Firm Value. Accordingly, Hypothesis 6 (H6) is accepted. These findings indicate that Intellectual Capital strengthens the relationship between sales growth and firm value, suggesting that business growth becomes more meaningful to investors when supported by strong organizational capabilities. From the perspective of Signaling Theory, sales growth is generally regarded as a positive signal reflecting a company's ability to expand its market share, strengthen competitiveness, and generate future business opportunities. However, the findings of H3 revealed that sales growth alone was insufficient to increase firm value. This suggests that investors do not merely consider the magnitude

of revenue growth but also evaluate whether the company possesses the organizational capabilities required to transform business expansion into sustainable economic value. Consequently, the credibility of sales growth as a market signal depends on the firm's ability to manage its resources efficiently and maintain long-term business performance.

In this context, Intellectual Capital represents a strategic intangible resource consisting of organizational knowledge, employee competencies, innovation capabilities, and managerial expertise that enables firms to maximize the benefits of business growth. Companies with stronger Intellectual Capital are better able to improve operational efficiency, develop innovative products and processes, optimize resource allocation, and strengthen competitive advantages. As a result, sales growth becomes a more credible indicator of future corporate performance because investors perceive that the company has sufficient capabilities to sustain business expansion over the long term. These findings are consistent with Susanti et al. (2025), who argued that business expansion through increased sales does not automatically enhance firm value unless supported by effective managerial capabilities and efficient resource utilization. Likewise, Putri Salsabillah Damanik et al. (2024) emphasized that corporate growth alone is not the primary determinant of firm value because investors also consider the quality and sustainability of that growth. The present study extends these findings by demonstrating that Intellectual Capital enhances the effectiveness of sales growth as a market signal, thereby strengthening its contribution to firm value.

The findings imply that manufacturing companies participating in the PROPER program should not focus solely on increasing sales volume but should also strengthen their intellectual resources through continuous investment in human capital, organizational learning, innovation capability, and knowledge management. By integrating business growth with strong Intellectual Capital, companies can improve investor confidence, enhance operational performance, and create sustainable long-term firm value.

CONCLUSION

The Carbon Disclosure Project (CDP) does not have a significant effect on Firm Value among manufacturing companies participating in the PROPER program and listed on the Indonesia Stock Exchange. This finding indicates that carbon disclosure alone has not been sufficient to influence investors' valuation of companies, as investors continue to place greater emphasis on financial performance and the company's ability to generate sustainable economic benefits. Sustainability Report (SR) disclosure does not have a significant effect on Firm Value. This result suggests that the Sustainability Report has not yet become a primary consideration for investors when assessing firm value. Sustainability information is perceived as more meaningful when accompanied by evidence of strong organizational capabilities and long-term business performance. Sales Growth (SG) does not have a significant effect on Firm Value. This finding demonstrates that business growth, as reflected by increased sales, does not automatically increase firm value. Investors tend to evaluate not only the magnitude of sales growth but also the company's ability to transform such growth into sustainable profitability and competitive advantage.

Intellectual Capital (GIC) significantly moderates the relationship between the Carbon Disclosure Project and Firm Value. This finding indicates that Intellectual Capital strengthens the effectiveness of carbon disclosure in enhancing firm value by improving the credibility of environmental information and the company's capability to implement sustainable business strategies. Intellectual Capital (GIC) significantly moderates the relationship between Sustainability Report disclosure and Firm Value. This result suggests that the Sustainability Report becomes more relevant and valuable to investors when companies possess strong intellectual resources, organizational knowledge, innovation capability, and environmentally oriented managerial competencies. Intellectual Capital (GIC) significantly moderates the relationship between Sales Growth and Firm Value. This finding

demonstrates that Intellectual Capital enables companies to transform business growth into sustainable economic value by improving operational efficiency, innovation capability, and long-term competitive performance, thereby increasing firm value. Overall, this study concludes that the direct effects of the Carbon Disclosure Project, Sustainability Report, and Sales Growth on Firm Value are not significant. However, Intellectual Capital plays a crucial moderating role by strengthening the relationships between these variables and Firm Value. These findings extend Signaling Theory by demonstrating that the effectiveness of sustainability-related disclosures and business performance indicators depends not only on the information disclosed but also on the company's capability to utilize intellectual resources to create sustainable corporate value. Therefore, Intellectual Capital can be regarded as a strategic intangible asset that enhances investor confidence and supports long-term firm value creation.

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