



**JOURNAL**

**THE INFLUENCE OF GREEN INTELLECTUAL CAPITAL,  
ENVIRONMENTAL COST, CARBON PERFORMANCE, DAN  
INSTITUTIONAL OWNERSHIP ON CARBON EMISSION  
DISCLOSURE**

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**Abstract:**

This study aims to examine and analyze the influence of green intellectual capital, environmental costs, carbon performance, and institutional ownership on carbon emission disclosure. It adopts a quantitative approach using secondary data obtained from sustainability reports and annual reports accessible via [www.idx.com](http://www.idx.com) or the respective company websites. The research population includes companies in the energy and basic materials sectors listed on the Indonesia Stock Exchange (IDX) during the 2022-2023 period. Data analysis methods applied in this study are descriptive statistical analysis and panel data regression using Eviews 13 software. The findings indicate that environmental costs have a significantly positive effect on carbon emission disclosure. In contrast, green intellectual capital, carbon performance, and institutional ownership do not show any influence on carbon emission disclosure.

**Keywords:**

Green Intellectual Capital, Environmental Costs, Carbon Performance, Institutional Ownership, Carbon Emission Disclosure.

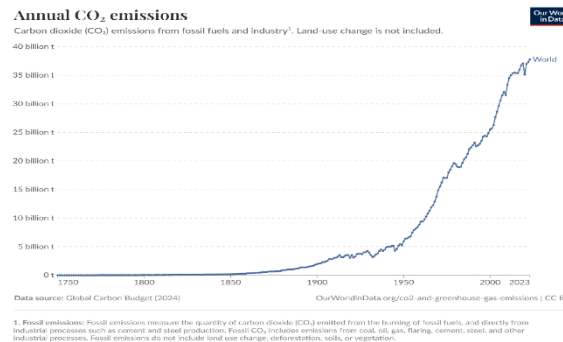
**BACKGROUND**

Everyone has the right to live safely, peacefully, and comfortably in their daily lives. This includes the right to enjoy a clean and healthy environment, free from threats that could damage their quality of life. On the other hand, over time, various environmental issues have emerged as major challenges in achieving these goals. One such issue is climate change. The occurrence of climate change has made the Indonesian public aware that this problem continues to escalate and has serious impacts on daily life, such as the increasing frequency of flash floods, prolonged droughts, and frequent landslides (Iratiwi & Sulfitri, 2023). The main cause of this is global warming, which is making the Earth hotter.

The Earth's temperature in 2023, according to Nuswantoro (2023) in his report for Mongabay Indonesia, was the hottest ever recorded in history, reaching 1.4°C above pre-industrial baseline temperatures of 1850–1900. Human activities, exacerbated by El Nino, have



caused the Earth's temperature to continue rising. Carbon emissions have continued to increase, reaching more than 37.79 billion tons per year in 2023, with Indonesia contributing nearly 733 MtCO<sub>2</sub> and ranking 8th globally, largely due to various energy sources such as coal, natural gas, petroleum, gas flaring, and cement production.



**Figure 1 Increase in Carbon Emissions from 1850–1900**

Source: *Our World in Data* (2024), accessed February 25, 2025

In Indonesia, these various energy sources mainly come from industrial activities that continue to develop. The growth of industry leads to an increase in carbon emissions from these activities, which in turn worsens air quality. Poor air quality caused by pollution can be observed in cases such as PLTU 1 & 2 Nagan Raya, which are still operating in Nagan Raya Regency, Aceh Province (Sigit, 2024).

Reflecting on such cases, companies should not only focus on profit in their operations but also on their concern and responsibility towards society regarding the impact of the emissions they produce, including how well they manage and reduce those emissions (Iratiwi & Sulfitri, 2023). This is in line with the concept of the triple bottom line (3Ps — people, planet, and profit) by Elkington (1994) in (Az Zahra & Aryati, 2023), which states that companies must also consider people and the planet alongside the profits they aim to achieve. In addition to the triple bottom line concept, youth-led climate action has also contributed to combating climate change. Through AMJI in 2024, around 65,000 young people from across Indonesia participated in activities such as mangrove planting, waste clean-up campaigns, and discussions on global warming (Saefullah, 2025).

The various efforts Indonesia has long undertaken to combat climate change and global warming can also be seen in its participation in the international agreement known as the Kyoto Protocol. In 2015, the Paris Agreement emerged as a replacement for the Kyoto Protocol, in which Indonesia strengthened its commitment through Law No. 16 of 2016, setting a target to reduce carbon emissions by 29% by 2030 through its own efforts and 41% with international assistance (Florenca & Handoko, 2021).

In line with the established regulations and agreements, carbon emission disclosure has become an important aspect for companies to improve their environmental performance. Carbon emission disclosure is carried out by companies with the aim of providing information about the carbon emissions they produce as a form of concern and responsibility towards stakeholders and society. Currently, carbon emission disclosure in Indonesia is still voluntary, meaning that companies operating and based in Indonesia are not yet obliged to disclose their emissions. This is due to the absence of strict regulations to enforce such policies. Although there is no legal requirement forcing all companies to report their carbon emissions, pressure from stakeholders has made such disclosure appear “mandatory” in maintaining a company’s reputation and sustainability. This obligation is reinforced through POJK No.



51/POJK.03/2017, which requires companies to prepare a sustainability report that includes environmental aspects, including greenhouse gas emissions from company operations.

Various studies have been conducted to identify the factors influencing carbon emission disclosure, yielding inconsistent results. These factors include Green Intellectual Capital, Environmental Costs, Carbon Performance, and Institutional Ownership. Researchers Putra & Lindrianasari (2024), Oktris (2018) dan Fabia (2023) state that green intellectual capital has a positive effect on carbon emission disclosure. However, in contrast, Ariani & Puspita (2024) found that only green relational capital affects the implementation of sustainability reports, while green human capital and green structural capital have no effect on the sustainability of the reports.

Furthermore, in supporting carbon emission disclosure, environmental costs can also play a role, representing all company expenditures resulting from environmental damage caused during operational activities. Diyanti & Sa'diyah (2024) found that environmental costs have a positive effect on carbon emission disclosure. Similarly, Novriana & Fakhroni (2022) revealed that environmental costs have a positive effect on eco-efficiency. However, this finding is inconsistent with Sutomo & Ridhawati (2023), who reported that environmental costs have no effect on carbon emission disclosure.

The third factor, which is also one of the variables that can influence carbon emission disclosure, is carbon performance. According to Velte *et al.*, (2020), carbon performance has a positive relationship with carbon emission disclosure. Likewise, Ladista *et al.*, (2023) stated that carbon performance has a positive effect on carbon emission disclosure. In contrast, Ratmono *et al.*, (2020) and Iratiwi & Sulfitri (2023) showed that carbon performance has no significant effect on carbon emission disclosure.

Another factor that can support or influence carbon emission disclosure, aside from green intellectual capital, environmental costs, and carbon performance, is institutional ownership. Amaliya & Solikhah (2019), Angelina & Handoko (2023) found that institutional ownership affects carbon emission disclosure. However, this finding differs from the results of Suherman & Kurniawati (2023), Wulandari & Sasongko (2024), who reported that institutional ownership has no effect on carbon emission disclosure.

## **THEORETICAL FRAMEWORK**

### **Legitimacy Theory**

Legitimacy theory explains that companies need to align their values and operational norms with societal expectations in order to gain social acceptance. This legitimacy can be reinforced through transparent disclosure of environmental information, such as carbon emissions and waste management, which demonstrates the company's commitment to social responsibility and sustainability (Dowling & Pfeffer, 1975).

### **Stakeholder Theory**

Stakeholder theory states that companies are not only profit-oriented but must also fulfill the rights and interests of all parties involved in their operations (Az Zahra & Aryati, 2023). One way to fulfill these obligations is through transparent disclosure of environmental information, which can enhance the trust and support of stakeholders (Sukmawati & Fidiana, 2023).

### **Carbon Emission Disclosure**

Carbon reporting refers to the presentation of both quantitative and qualitative information related to a company's carbon emissions, whether historical or projected, including risks,



opportunities, and strategies for mitigating climate change (Najah, 2012). This practice reflects social and environmental responsibility as mandated in PSAK No. 1, paragraph 9, and is an important part of sustainability reports to demonstrate the company's transparency and accountability regarding the emissions it produces (Anggraeni, 2024).

### **Green Intellectual Capital**

Green intellectual capital is an intangible asset encompassing the company's knowledge, systems, and external relationships that play a role in supporting environmental sustainability. These assets not only help companies manage environmental impacts internally but also encourage compliance with regulations and meet the expectations of stakeholders who are increasingly concerned about environmental issues (Pratiwi & Kusumawardani, 2023).

### **Environmental Cost**

Environmental costs are company expenditures related to the management and remediation of ecological impacts resulting from operational activities, whether those impacts have already occurred or are anticipated in the future. These costs are often perceived as an additional burden rather than a strategic investment; therefore, they need to be integrated into company policies to support sustainability (Putri & Pandin, 2025).

### **Carbon Performance**

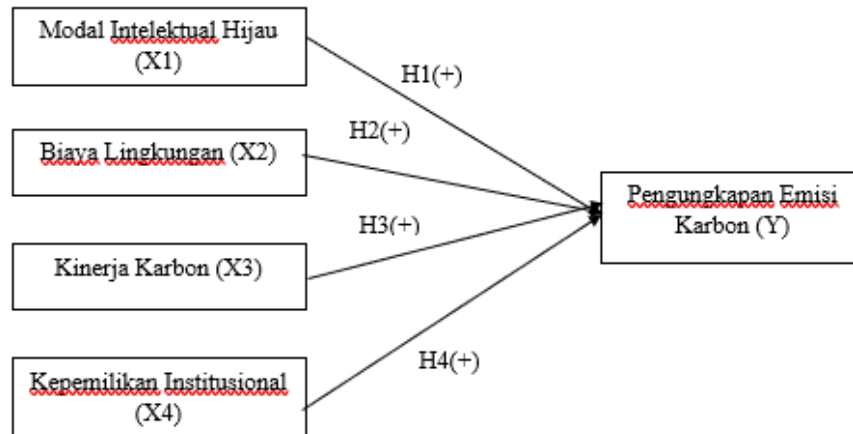
Carbon performance is a measure of a company's effectiveness in reducing carbon emissions as a result of its operational activities and decarbonization strategies. This concept reflects the tangible impact of corporate efforts to reduce greenhouse gas emissions, particularly CO<sub>2</sub>, as part of its commitment to sustainability (Anggraeni, 2024).

### **Institutional Ownership**

Institutional ownership refers to the proportion of a company's shares owned by external institutions such as pension funds and insurance companies, which play a role in overseeing management and encouraging long-term oriented policies, including environmental responsibility (Zahroh et al., 2023).

## **CONCEPTUAL FRAMEWORK**

This study examines the effect of green intellectual capital, environmental costs, carbon performance, and institutional ownership on corporate carbon emission disclosure. The conceptual framework is developed based on the research objectives, underlying theories, operational definitions of variables, and formulated hypotheses, and is presented in the following diagram:



**Figure 2 Conceptual Framework Diagram**

Source: Processed Data by the Researcher (2025)

## METHOD

This study employs a quantitative approach, focusing on companies with high carbon emissions, such as those in the energy sector and the basic materials sector, listed on the Indonesia Stock Exchange for the 2022–2023 period. The information analyzed is sourced from secondary data collected through annual reports and sustainability reports, which can be accessed via the official IDX website or the official websites of each company. The sample selection was conducted using purposive sampling. The population in this study consists of 202 companies, with 107 companies excluded from the sample because their annual and sustainability reports were not publicly available, and 60 companies did not use the GRI 305: Emissions standard as a basis for carbon emission disclosure. A total of 35 companies were identified as meeting the sample criteria over a two-year period, resulting in 70 observations analyzed in this study.

## Carbon Emission Disclosure

Carbon emission disclosure in this study uses GRI 305: Emissions. This is supported by previous researchers Kartikasary *et al.*, (2023), Padilah *et al.*, (2025), Fahrozi *et al.*, (2025).

**Table 1 Carbon Emission Disclosure**

| Pengungkapan GRI:305 EMISI |                                                                                  |
|----------------------------|----------------------------------------------------------------------------------|
| Index                      | Item Pengungkapan                                                                |
| GRI 103                    | Pengungkapan pendekatan manajemen                                                |
| GRI 305-1                  | Emisi GRK (Cakupan 1) langsung                                                   |
| GRI 305-2                  | Emisi energi GRK (Cakupan 2) tidak langsung                                      |
| GRI 305-3                  | Emisi GRK (Cakupan 3) tidak langsung lainnya                                     |
| GRI 305-4                  | Intensitas emisi GRK                                                             |
| GRI 305-5                  | Pengurangan emisi GRK                                                            |
| GRI 305-6                  | Emisi zat perusak ozon (ODS)                                                     |
| GRI 305-7                  | Nitrogen oksida (NOx), belerang oksida (Sox), dan emisi udara signifikan lainnya |

Source: *Global Reporting Initiative: GRI 305: Emisi* (2016), Kartikasary *et al.*, (2023)



The measurement of carbon emission disclosure can be carried out by assigning a score of 1 for each disclosed item and 0 for each undisclosed item. Thus, carbon emission disclosure is calculated as the total number of GRI 305: Emissions items disclosed by the company divided by the total number of GRI 305: Emissions items.

$$\text{Pengungkapan Emisi Karbon} = \frac{\text{Item diungkapkan dengan GRI 305}}{\text{Total item yang diungkapkan GRI 305}}$$

### Green Intellectual Capital

This study employs green intellectual capital consisting of 18 disclosure items, which include green human capital (5 items), green structural capital (8 items), and green relational capital (5 items). The use of green intellectual capital in this study is supported by previous researchers Zalfa & Novita (2021), Riyanti & Murwaningsari (2023), Putri & Murtanto (2023) which primarily adopts the work of researchers Chen (2007), Chang & Chen (2012).

**Table 2 Green Intellectual Capital**

| <i>Green Human Capital (GHC)/Modal Manusia Hijau</i>         |                                                                                                                                               |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Index</b>                                                 | <b>Item Pengungkapan</b>                                                                                                                      |
| GHC-1                                                        | Setiap karyawan terlibat secara aktif dalam proses produksi yang ramah lingkungan dan berkelanjutan.                                          |
| GHC-2                                                        | Perusahaan didukung oleh karyawan yang kompeten dalam perlindungan lingkungan.                                                                |
| GHC-3                                                        | Karyawan perusahaan berkontribusi dalam perlindungan lingkungan dengan memberikan produk dan layanan yang berkelanjutan dan ramah lingkungan. |
| GHC-4                                                        | Tingkat kerjasama tim yang berkaitan dengan perlindungan lingkungan terjadi pada tingkat yang tinggi.                                         |
| GHC-5                                                        | Dukungan penuh dari manajer membantu karyawan mencapai tujuan perlindungan lingkungan.                                                        |
| <i>Green Structural Capital (GSC)/Modal Struktural Hijau</i> |                                                                                                                                               |
| <b>Index</b>                                                 | <b>Item Pengungkapan</b>                                                                                                                      |
| GSC-1                                                        | Perusahaan mengelola lingkungan dengan sistem yang terorganisir dan optimal.                                                                  |
| GSC-2                                                        | Perusahaan memiliki rasio karyawan pengelolaan lingkungan yang tinggi dari total karyawannya.                                                 |
| GSC-3                                                        | Perusahaan melakukan investasi belanja modal sebagai upaya perlindungan lingkungan.                                                           |
| GSC-4                                                        | Tercipta efisiensi kegiatan operasi dan bisnis perusahaan yang berorientasi terhadap lingkungan.                                              |
| GSC-5                                                        | Perusahaan memiliki system manajemen pengetahuan mengenai lingkungan yang menguntungkan.                                                      |
| GSC-6                                                        | Perusahaan memiliki tim khusus pemantau operasional ramah lingkungan.                                                                         |
| GSC-7                                                        | Perusahaan memiliki peraturan bisnis ramah lingkungan yang rinci.                                                                             |
| GSC-8                                                        | Adanya system penghargaan bagi karyawan yang berhasil menjalankan bisnis ramah lingkungan.                                                    |





| Green Relational Capital (GRC)/Modal Relasional Hijau |                                                                                                                            |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Index                                                 | Item Pengungkapan                                                                                                          |
| GRC-1                                                 | Dalam merancang produk atau layanan ramah lingkungan, perusahaan menyesuaikannya dengan keinginan pelanggan.               |
| GRC-2                                                 | Kepuasan pelanggan ditunjukkan dari berhasilnya perusahaan dalam memberikan produk atau jasa yang ramah lingkungan.        |
| GRC-3                                                 | Hubungan kerjasama antar perusahaan dengan pemasok terjalin secara stabil dalam mendukung perlindungan lingkungan.         |
| GRC-4                                                 | Hubungan kerjasama antar perusahaan dengan pelanggan terjalin secara stabil dalam mendukung perlindungan lingkungan.       |
| GRC-5                                                 | Hubungan kerjasama antar perusahaan dengan mitra lainnya terjalin baik dan stabil dalam mendukung perlindungan lingkungan. |

Source: Chang & Chen (2012), Putri & Murtanto (2023)

The measurement of green intellectual capital can be carried out by assigning a score of 1 for each disclosed item and 0 for each undisclosed item. Thus, green intellectual capital is calculated as the total disclosures made by the company divided by the total number of green intellectual capital items.

$$\text{Modal Intelektual Hijau} = \frac{n}{k}$$

### Environmental Cost

The environmental costs used in this study are supported by the research of Veradine & Praptoyo (2024), Lusiana & Mujiyati (2025), Zulaikan & Mariani (2024), with the following formula:

$$\text{Biaya Lingkungan} = \frac{\text{Biaya CSR}}{\text{Laba bersih setelah pajak}}$$

### Carbon Performance

Carbon performance in this study is supported by the research of Putri & Murtanto (2023), with the following formula:

$$\text{Kinerja Karbon} = \frac{\text{Total Emisi Scope 1} + \text{Total Emisi Scope 2}}{\text{Total Penjualan pada Periode Berjalan}}$$

### Institutional Ownership

Institutional ownership in this study is supported by the research of Amaliya & Solikhah (2019), Angelina & Handoko (2023), Rosita *et al.*, (2024), with the following formula:

$$\text{Kepemilikan Institusional} = \frac{\text{Jumlah saham yang dimiliki institusi}}{\text{Jumlah saham beredar}}$$



## RESULT

### Descriptive Statistics Analysis

**Table 3 Descriptive Statistics Analysis Result**

|              | Y         | X1        | X2          | X3         | X4        |
|--------------|-----------|-----------|-------------|------------|-----------|
| Mean         | 0.676786  | 0.728571  | 0.229421    | 0.000009   | 0.625576  |
| Median       | 0.750000  | 0.722222  | 0.016184    | 0.000000   | 0.650002  |
| Maximum      | 1.000000  | 0.888888  | 9.895549    | 0.000107   | 1.000000  |
| Minimum      | 0.125000  | 0.611111  | -0.070718   | 0.000000   | 0.021174  |
| Std. Dev.    | 0.254927  | 0.074200  | 1.227926    | 0.000023   | 0.221776  |
| Skewness     | -0.582803 | -0.063139 | 7.270252    | 2.814711   | -0.681471 |
| Kurtosis     | 2.161011  | 2.324324  | 56.795871   | 10.442674  | 3.364845  |
| Jarque-Bera  | 6.015745  | 1.378080  | 9057.480840 | 253.994379 | 5.806280  |
| Probability  | 0.049397  | 0.502058  | 0000000     | 0.000000   | 0.054851  |
| Sum          | 47.375000 | 51.000000 | 16.059486   | 0.000657   | 43.790310 |
| Sum Sq. Dev. | 4.484152  | 0.379894  | 104.038365  | 0.000000   | 3.393746  |
| Observations | 70        | 70        | 70          | 70         | 70        |

Source: Processed Data by the Researcher (2025)

Descriptive statistical analysis serves to present data concisely so that the information conveyed becomes clearer and easier for the reader to understand. The results of the descriptive statistical analysis above show the mean, standard deviation, minimum value, and maximum value for each variable in this study.

### Chow Test

**Table 4 Chow Test Result**

Redundant Fixed Effects Tests  
Equation: Untitled  
Test cross-section fixed effects

| Effects Test             | Statistic | d.f.      | Prob.    |
|--------------------------|-----------|-----------|----------|
| Cross-section F          | 8.83697   | (30,27)   | 0.000000 |
| Cross-section Chi-square | 147.63999 | 30.000000 | 0.000000 |

Source: Processed Data by the Researcher (2025)

According to the data in Table 5, the Chow test in this study obtained a probability value (Cross-section F) of  $0.0000 < 0.05$ . This means that the selected regression model is the Fixed Effect Model. In this case, further testing is required, namely the Hausman test.

### Hausman Test

**Table 5 Hausman Test Result**

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 | 3.215466          | 4            | 0.522437 |





Source: Processed Data by the Researcher (2025)

Based on Table 6, the results of the Hausman test in this study, using E-Views 13 software, show a probability value (Cross-section F) of  $0.5224 > 0.05$ . This means that the selected regression model is the Random Effect Model. Therefore, the next model selection test required is the Lagrange Multiplier test.

### Lagrange Multiplier Test

**Table 6 Lagrange Multiplier Test Result**

Lagrange Multiplier Tests for Random Effects

Null hypotheses: No effects

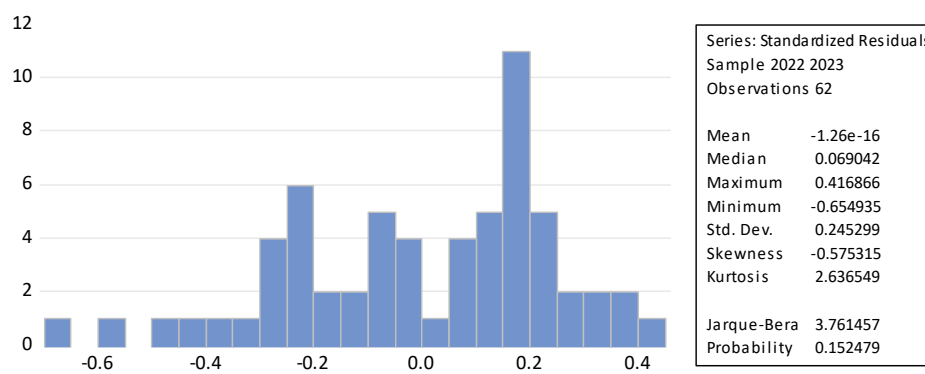
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided  
(all others) alternatives

|               | Test Hypothesis       |                      |                       |
|---------------|-----------------------|----------------------|-----------------------|
|               | Cross-section         | Time                 | Both                  |
| Breusch-Pagan | 19.106627<br>(0.0000) | 1.002445<br>(0.3167) | 20.109072<br>(0.0000) |

Source: Processed Data by the Researcher (2025)

Table 6 presents the results of the Lagrange Multiplier test, with a Breusch-Pagan probability value of  $0.0000 < 0.05$ . This indicates that the appropriate regression model for this study is the Random Effect Model.

### Normality Test



**Figure 2 Normality Test Result**

Source: Processed Data by the Researcher (2025)

Based on Figure 2, the results of the normality test in this study show a probability value of  $0.1574 > 0.05$ . Thus, it can be concluded that the data in this study are normally distributed.



## Heteroscedasticity Test

**Table 7 Heteroscedasticity Test Result**

Heteroskedasticity Test: White

Null hypothesis: Homoskedasticity

|                     |          |                      |        |
|---------------------|----------|----------------------|--------|
| F-statistic         | 1.753915 | Prob. F(14,47)       | 0.0761 |
| Obs*R-squared       | 21.27597 | Prob. Chi-Square(14) | 0.0948 |
| Scaled explained SS | 14.51500 | Prob. Chi-Square(14) | 0.4121 |

Source: Processed Data by the Researcher (2025)

Based on Table 8, the results of the heteroscedasticity test indicate that there is no heteroscedasticity problem. This is evidenced by the Chi-Square probability value of 0.0948, indicating that this study is homogeneous and shows no symptoms of heteroscedasticity.

## Multicollinearity Test

**Table 8 Multicollinearity Test Result**

|    | X1        | X2        | X3        | X4        |
|----|-----------|-----------|-----------|-----------|
| X1 | 1.000000  | -0.069854 | -0.160153 | -0.232407 |
| X2 | -0.069854 | 1.000000  | -0.036836 | -0.130718 |
| X3 | -0.160153 | -0.036836 | 1.000000  | -0.000579 |
| X4 | -0.232407 | -0.130718 | -0.000579 | 1.000000  |

Source: Processed Data by the Researcher (2025)

The results of the multicollinearity test shown in Table 9 are  $< 0.80$ . This means that the regression model used is a regression model that does not experience symptoms of multicollinearity.

## Autocorrelation Test

**Table 9 Autocorrelation Test Result**

| Weighted Statistics |          |                    |          |
|---------------------|----------|--------------------|----------|
| R-squared           | 0.223813 | Mean dependent var | 0.212835 |
| Adjusted R-squared  | 0.169344 | S.D. dependent var | 0.120882 |
| S.E. of regression  | 0.110173 | Sum squared resid  | 0.691867 |
| F-statistic         | 4.108975 | Durbin-Watson stat | 2.023480 |
| Prob(F-statistic)   | 0.005395 |                    |          |

Source: Processed Data by the Researcher (2025)

Table 10, which presents the autocorrelation test in this study, shows that the Durbin-Watson statistic is 2.0234. This result indicates that the regression model in this study falls within the range of -2 to 2, namely  $-2 < 2.0234 < 2$ . Thus, the model is free from autocorrelation problems.



## Regression Analysis

**Table 10 Regression Analysis Result**

Dependent Variable: Y  
Method: Panel EGLS (Cross-section random effects)  
Date: 07/19/25 Time: 00:50  
Sample: 2022 2023  
Periods included: 2  
Cross-sections included: 31  
Total panel (balanced) observations: 62  
Swamy and Arora estimator of component variances

| Variable | Coefficient | Std. Error  | t-Statistic | Prob.    |
|----------|-------------|-------------|-------------|----------|
| C        | 0.307807    | 0.339671    | 0.906191    | 0.368650 |
| X1       | 0.312590    | 0.387396    | 0.806903    | 0.423077 |
| X2       | 3.0099551   | 0.765316    | 3.932957    | 0.000230 |
| X3       | -227.558899 | 1848.235823 | -0.123122   | 0.902443 |
| X4       | 0.131278    | 0.178498    | 0.735457    | 0.465077 |

Source: Processed Data by the Researcher (2025)

The results of the regression analysis in this study can be presented using the following regression equation model:

$$Y = 0,3078 + 0,3125X1 + 3,0099X2 - 227,5588X3 + 0,1312X4 + \varepsilon$$

## T Test (Hypothesis Test)

**Table 11 T Test Result**

| Variable | Coefficient | Std. Error  | t-Statistic | Prob.    |
|----------|-------------|-------------|-------------|----------|
| C        | 0.307807    | 0.339671    | 0.906191    | 0.368650 |
| X1       | 0.312590    | 0.387396    | 0.806903    | 0.423077 |
| X2       | 3.0099551   | 0.765316    | 3.932957    | 0.000230 |
| X3       | -227.558899 | 1848.235823 | -0.123122   | 0.902443 |
| X4       | 0.131278    | 0.178498    | 0.735457    | 0.465077 |

Source: Processed Data by the Researcher (2025)

The t-test results in this study can be seen in Table 12, with the analysis findings as follows:

- Green intellectual capital has no effect on carbon emission disclosure. This lack of effect is shown by the probability value for green intellectual capital of  $0.4230 > 0.05$ . The t-statistic is  $0.8069 < \text{the t-table value of } 2.0452$ . This means **H1 rejected**.
- Environmental costs have a positive effect on carbon emission disclosure. The influence of environmental costs on carbon emission disclosure is indicated by the probability value of  $0.0002 < 0.05$ . The t-statistic is  $3.9329 > \text{the t-table value of } 2.0452$ . This means, **H2 accepted**.
- Carbon performance has no effect on carbon emission disclosure. This is because the probability value for carbon performance is  $0.9024 > 0.05$ . The t-statistic is  $-0.1231 < \text{the t-table value of } 2.0452$ . This means, **H3 rejected**.



- d. Institutional ownership has no effect on carbon emission disclosure. This absence of effect is shown by the probability value of  $0.4650 > 0.05$ , and the t-statistic of  $0.7354 < \text{the t-table value of } 2.0452$ . This means, **H4 rejected**.

### F Test (Model Feasibility Test)

**Table 12 F Test Result**

| Weighted Statistics |          |                    |          |
|---------------------|----------|--------------------|----------|
| R-squared           | 0.223813 | Mean dependent var | 0.212835 |
| Adjusted R-squared  | 0.169344 | S.D. dependent var | 0.120882 |
| S.E. of regression  | 0.110173 | Sum squared resid  | 0.691867 |
| F-statistic         | 4.108975 | Durbin-Watson stat | 2.023480 |
| Prob(F-statistic)   | 0.005395 |                    |          |

Source: Processed Data by the Researcher (2025)

The F-test results shown in Table 13 indicate that the regression model in this study is feasible for examining the effect of green intellectual capital, environmental costs, carbon performance, and institutional ownership on carbon emission disclosure.

### Coefficient Determination Test

**Table 13 Coefficient Determination Test Result**

| Weighted Statistics |          |                    |          |
|---------------------|----------|--------------------|----------|
| R-squared           | 0.223813 | Mean dependent var | 0.212835 |
| Adjusted R-squared  | 0.169344 | S.D. dependent var | 0.120882 |
| S.E. of regression  | 0.110173 | Sum squared resid  | 0.691867 |
| F-statistic         | 4.108975 | Durbin-Watson stat | 2.023480 |
| Prob(F-statistic)   | 0.005395 |                    |          |

Source: Processed Data by the Researcher (2025)

Table 14, which presents the results of the coefficient of determination test, shows an Adjusted R-Square value of 0.1693. This means that 16.93% can be explained by green intellectual capital, environmental costs, carbon performance, and institutional ownership, while the remaining 83.07% is influenced by independent variables outside the scope of this study.

## DISCUSSION

### The Effect of Green Intellectual Capital on Carbon Emission Disclosure

This study shows that green intellectual capital has no effect on carbon emission disclosure. The three components of green intellectual capital are green human capital, green structural capital, and green relational capital have not been effectively integrated to encourage transparency in environmental information. Green human capital has not fully supported transparency because environmental training focuses more on internal efficiency than on external reporting, and evaluations are often overlooked. Green structural capital, such as ISO 14001, tends to be administrative in nature and does not yet reflect a genuine commitment to emission reporting. Meanwhile, green relational capital does not exert sufficient pressure because external parties, such as consumers and suppliers, still place greater emphasis on price and product quality rather than environmental issues. These findings are inconsistent with the perspective of legitimacy theory, which states that companies should be driven to disclose carbon emissions in order to maintain their image and public support. The ineffective



utilization of green intellectual capital indicates that companies have not positioned these intangible assets as strategic tools to respond to social pressure and enhance environmental transparency.

The results of this study are in line with Angelita & Murwaningsari (2023) yang menyatakan bahwa modal intelektual hijau tidak berpengaruh terhadap kinerja perusahaan who stated that green intellectual capital has no effect on company performance. Similarly, Bangun *et al.*, (2024), Sari & Nursal (2024) also found that green intellectual capital has no effect on financial performance.

### **The Effect of Environmental Cost on Carbon Emission Disclosure**

The findings of this study indicate that environmental costs have a positive effect on carbon emission disclosure. This is because the greater the allocation of environmental costs by a company, the higher the tendency for the company to transparently disclose its carbon emissions. These findings reflect that companies investing in environmental activities generally have a high level of awareness of the environmental impact of their operations. This phenomenon aligns with stakeholder theory, which emphasizes the importance of companies in meeting the expectations and interests of stakeholders. High environmental costs accompanied by comprehensive carbon emission disclosure demonstrate an alignment between environmental responsibility and corporate transparency.

This study supports the findings of Diyanti & Sa'diyah (2024) and Hapsari *et al.*, (2021) who stated that environmental costs have a positive effect on carbon emission disclosure. However, the results of this study are not in line with those of Sutomo & Ridhawati (2023).

### **The Effect of Carbon Performance on Carbon Emission Disclosure**

The results of this study show that carbon performance has no effect on carbon emission disclosure. The amount of emissions produced by a company does not directly encourage it to be more transparent in conveying environmental information. In some cases, high emissions are deliberately avoided in disclosures because they may pose reputational risks and reduce public trust, especially if not accompanied by adequate management strategies. These findings are inconsistent with legitimacy theory, which states that companies with poor environmental performance should be motivated to disclose information to maintain their image and social legitimacy. On the contrary, companies tend to avoid disclosing carbon emissions when their environmental performance is unfavorable, as they fear negative impacts on reputation and public acceptance.

These findings support the results of Iratiwi & Sulfitri (2023), Ratmono *et al.*, (2020), who found that carbon performance has no effect on carbon emission disclosure.

### **The Effect of Institutional Ownership on Carbon Emission Disclosure**

This study finds that institutional ownership has no effect on carbon emission disclosure. This is presumably due to weak oversight by institutional investors on environmental issues and the limited analytical capacity to assess the impact of a company's carbon emissions. Many institutional investors are passive and more focused on short-term financial gains, thus failing to exert sufficient pressure on management to enhance environmental transparency. These findings are inconsistent with stakeholder theory, which emphasizes that the presence of stakeholders, including institutional investors, should encourage companies to fulfill their



social and environmental responsibilities. When investors' interests are not aligned with sustainability, companies tend to neglect carbon emission disclosure as part of their accountability strategy.

Based on the above findings, this is consistent with the research conducted by Suherman & Kurniawati (2023), Wulandari & Sasongko (2024), Putri *et al.*, (2022) which stated that institutional ownership has no effect on carbon emission disclosure. This is because institutional share ownership does not provide sufficient control and strong pressure for companies to disclose their carbon emissions.

## CONCLUSION

This study yields the following results:

- a. Green intellectual capital has no effect on carbon emission disclosure.
- b. Environmental costs have a positive effect on carbon emission disclosure
- c. Carbon performance has no effect on carbon emission disclosure.
- d. Institutional ownership has no effect on carbon emission disclosure

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