

Do Green Accounting, Environmental Cost, Green Intellectual Capital, and Board Diversity Affect Firm Value?

Esther Priscila Chandra¹, Yulia Setyarini²

^{1,2} *Widya Kartika University, Surabaya*

*Email: priscilats66@gmail.com

ABSTRACT

This research aims to prove empirically the effect of green accounting, environmental cost, green intellectual capital, board diversity proxied by gender, age, education, and tenure on firm value. This research is a quantitative descriptive research using secondary data. Through the purposive sampling method, 64 PROPER-rated go public manufacturing companies in 2018 – 2022, then analyzed using the Partial Least Square (PLS) technique with SmartPLS 3 software. The results showed that green accounting, board diversity proxied by age, education, and tenure had no effect on firm value partially. Meanwhile, environmental cost had significant negative effect on firm value. Whereas green intellectual capital and board diversity proxied by gender had significant positive effect on firm value partially.

INTRODUCTION

Indonesia is a country that passes through the ring of fire, making it vulnerable to the risk of hydrometeorological natural disasters, such as climate change. This is indicated by the trend of increasing average air temperature from 1991-2022 of 0.2°C per year (Badan Meteorologi, 2023). This trend of increasing air temperature causes Indonesia to also experience a rise in sea levels of 0.8-1.2 cm per year (Kementerian Energi dan Sumber Daya Mineral, 2023). Considering that around 65% of the population in Indonesia lives in coastal areas, the Indonesian economy has the potential to experience losses worth IDR 554 trillion in 2020-2024 (Ekonomi Bisnis, 2023). Figure 1 below is a world map that illustrates Indonesia as a red area, which means it has a potential level of 'very vulnerable' to climate change (Standard and Poor's, 2022).

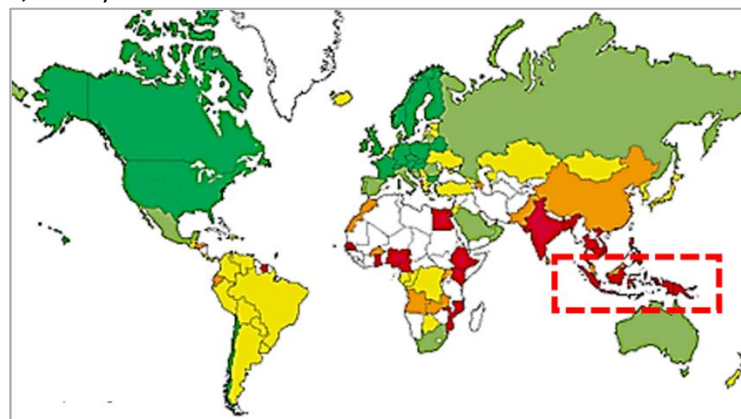


Figure 1. Potential Climate Change Vulnerability (on World Map)

The industrial revolution 4.0 causes competition for every company to meet people's needs by creating production and distribution systems quickly and precisely. However, companies in maximizing the sustainability of their business are not balanced with environmental maintenance activities or are only profit-oriented with activities that are not environmentally friendly (W. C. Nugroho, 2022). Therefore, the Indonesian government is trying to mitigate potential economic losses to the country while paying attention to environmental issues in every economic activity. This economic-environmental degradation is also triggered by the implementation of accounting processes that only focus on financial events/transactions/objects (Lako, 2019).

Reporting from the Bali Ekbis news (2022) which contains workshop material from Mr. Irvan Susandy as Director of the Indonesian Stock Exchange, it can be concluded that nowadays investors tend to be more interested in investing in environmentally friendly companies. Environmentally friendly companies can be defined as companies that have good environmental awareness (Novriana & Fakhroni, 2022). No longer only paying attention to economic risks, investors are now also paying attention to social and environmental risks.

Before an investor invests capital in a company, they will analyze the company from both non-financial and financial aspects of the company. From a non-financial aspect, the company's environmental management is in line with the Company Performance Assessment Program in Environmental Management (PROPER) launched by the Ministry of Environment and Forestry (KLHK) of the Republic of Indonesia since 1995. PROPER is one of the Indonesian government policies aimed at improving the company's performance in managing the environment in accordance with applicable laws and regulations. The PROPER rating will be given to companies that meet the KLHK requirements in managing the environment. The Ministry of Environment and Forestry categorizes PROPER ratings into 5 colors: gold (best), green, blue, red and black (worst).

In the financial aspect, the company's environmental management performance can be seen from the presentation of environmental costs in the financial reports. The greater the costs a company incurs for the environment, the greater the company's awareness of the environment (Anjanie & Hasyir, 2023). Thus, in accordance with signal theory, this will provide a positive signal in attracting investors to invest their capital so that the value of the company also increases.

In carrying out company environmental management, of course companies need adequate human resources and are aware of the importance of environmental health. Therefore, every company must be able to utilize intellectual capital in every human resource that plays a role in the company. Green intellectual capital is an intangible asset that includes various knowledge resources, innovation and information related to environmental management so that companies have the ability to compete while still paying attention to environmental issues. Therefore, disclosure of green intellectual capital is one of the considerations for investors to provide high market value to a company (Yulandari & Gunawan, 2019).

Effendi (2009) explains that the corporate governance system in Indonesia is two-tiered, where based on its function, the company board is grouped into two, namely the Board of Commissioners (supervisory function) and the Board of Directors (management function). In this study, researchers are interested in focusing on analyzing board diversity in the Board of Directors because of its role in managing, making tactical decisions, and implementing

company strategy. In addition, researchers found that most of previous research on board diversity only focused on the Board of Directors, such as research by Putri (2020), Pradana & Khairusoalihin (2021), and Hayuti & Rosia (2024).

The urgency of environmental issues, corporate governance and intellectual capital in every economic activity has triggered a shift in the business paradigm from initially single bottom line (profit) to triple bottom lines (profit, people, planet). These three aspects are one unit and cannot be separated (Leksono et al., 2022). As the success of a business can be seen from the company's financial and non-financial reports which present the value of its profits (profit), disclosure of environmental responsibility (planet) and social responsibility (people).

There are several previous studies that examined variables similar to this research. The research results of Lestari (2020), Erlangga et al. (2021), Gustinya (2022), Yuliani & Prijanto (2022), and Astuti et al. (2023) shows that the implementation of green accounting has a positive effect on firm value. Research by Gantino et al. (2023) shows that the implementation of green accounting has a negative effect on firm value. On the other hand, the research results of Sapulette & Limba (2021) and Yani et al. (2023) show that the implementation of green accounting has no effect on firm value.

The research results of Wulaningrum & Kusrihandayani (2020) and Setyaningrum & Mayangsari (2022) show that environmental costs have a positive effect on company value and Hapsoro & Adyaksana (2020) show that environmental costs have a negative effect on firm value. In contrast, research by Okta et al. (2022) and Anjanie & Hasyir (2023) show that environmental costs have no effect on firm value.

Previous research related to green intellectual capital, such as research by Tonay & Murwaningsari (2022) shows that green intellectual capital has a positive effect on firm value. Meanwhile, research by T. Astuti et al. (2022) and Sephiani & Machdar (2022) show that green intellectual capital has no effect on firm value.

Several studies related to board diversity, gender diversity has a positive effect on firm value based on research by Pramesti & Nita (2022), Jovanty & Suzan (2022), and Sijaruddin & Mahardika (2023) on the other hand, gender diversity is said to have no effect on firm value based on research by Yogiswara & Badera (2019) and Ikhyannuddin (2021).

Age diversity has a positive effect on company value based on research by Putri (2020) and Hayuti & Rosia (2024), while the research results of Pramesti & Nita (2022) show that there is no effect, and research by I. R. Nugroho et al. (2021) shows the results of a negative influence.

Diversity of educational backgrounds has a positive effect on company value based on research by Yogiswara & Badera (2019) and Pramesti & Nita (2022). However, the results of research by Pradana & Khairusoalihin (2021) shows that diversity of educational backgrounds has a positive effect and even I. R. Nugroho et al. (2021) shows no effect.

Tenure diversity has a positive effect on company value based on research by Ikhyannuddin (2021) and Pramesti & Nita (2022), while the results of Putri (2020) research show that there is no effect, and research by I. R. Nugroho et al. (2021) shows the results of a negative influence.

After summarizing various previous research results, the inconsistency of the results becomes a research gap in this research. Therefore, this research needs to be carried out further using samples from manufacturing companies that went public (listed on the Indonesia Stock Exchange) during 2018-2022. Data collection for 5 consecutive years is

intended to make the data obtained more varied. Meanwhile, the manufacturing industry was chosen as a sample because it is the main contributor to the Indonesian economy which will grow 4.9% in 2022, an increase of 1.5% from 2021 (Kementerian Keuangan Republik Indonesia, 2023). Apart from that, researchers observed a decrease in the Composite Stock Price Index (IHSG) of accumulative manufacturing companies by IDR 172 from 2018 to 2022.

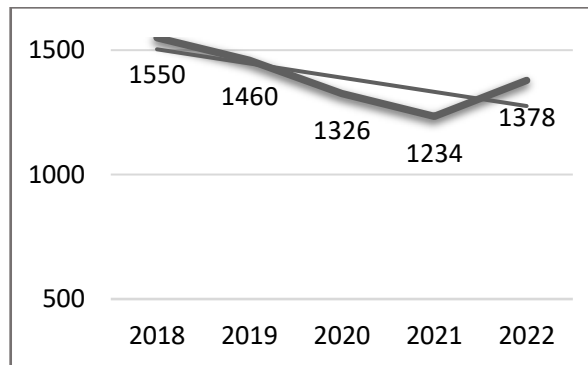


Figure 2. Composite Stock Price Index for Manufacturing Companies 2018-2022

LITERATURE REVIEW

Signaling Theory

Spence (1973) introduced signal theory by explaining that companies convey information, both financial and non-financial reports, to external stakeholders (investors and the public) to reduce information asymmetry about the uncertainty of the company's future prospects. A company strategy that is not only oriented towards profit but also towards the environment will be a positive signal for investors regarding the company (Rahmianingsih & Dewi, 2020). Thus, this theory becomes a strong basis for this research which examines the influence of information disclosure related to a company's environmental responsibility on firm value.

Legitimacy Theory

Legitimacy theory was first coined by Dowling & Pfeffer (1975) which focuses on the role of society and government in the sustainability of a company. A company must follow social norms and government regulations that apply in society so that the company becomes more legitimate, which is then beneficial for the sustainability of a company. The implementation of legitimacy theory in this research aims to bridge information from the company to the local community that the company is trying to protect the environment around its operations and will not have a negative impact on the surrounding area. It is hoped that the good reputation that is built will foster a sense of mutual trust among the local community that the company encourages sustainable development so that the company's business activities will not have a negative impact on society and the environment.

Agency Theory

Corporate governance is closely related to agency theory. Jensen & Meckling (1976) put forward agency theory that there is a difference in interests between the agent (manager) and the principal (owner) where the agent wants to gain personal profit so that it can trigger agency conflicts due to the agent's actions not being what the principal wants. To overcome

this, the Board of Directors is obliged to reduce agency conflicts between agents and principals by minimizing information asymmetry (Rahma & Mawardi, 2023). Information asymmetry as a problem is caused by differences in interests but they work together in different divisions of tasks. One way to reduce information asymmetry is to disclose information more widely with composition and disclosure patterns related to the characteristics of the Board of Directors as decision makers (Yeo & Suparman, 2021).

Resource-based Theory

Resource-based theory was first introduced by Penrose (1959) arguing that the characteristics and performance of resources in a company are heterogeneous (various). Resource-based theory is a resource management strategy by a company to gain competitiveness and added value compared to other companies. Thus, the trust of stakeholders, especially investors, becomes higher and they invest more capital in the company. The assessment of green intellectual capital and the existence of board diversity is in line with this theory. Companies will gain added value from the application of green intellectual capital as a resource that has advantages in environmental management and board diversity as a form of heterogeneity of company resources, both in demographic and cognitive aspects.

Firm Value

According to Sujoko & Soebiantoro (2007), firm value is investors' perception of the company's level of success which is related to its share price. In line with the opinion of Mayangsari (2018) who defines company value as a reflection of society in assessing company performance as reflected in share prices which are formed by demand and supply in the capital market.

Green Accounting

Green accounting is a process that combines recognition, measuring value, recording, summarizing and reporting financial, social and environmental information in an integrated manner in one accounting reporting package that is useful for stakeholders in making economic and non-economic decisions (Lako, 2019).

Environmental Cost

Environmental costs are the total costs incurred from environmental protection and damage activities in the external and internal scope of the company (Novriana & Fakhroni, 2022). It can also be defined as all costs incurred by the company due to the impact of a poor environmental management system due to the company's poor production process (Wulaningrum & Kusrihandayani, 2020).

Green Intellectual Capital

Green topic innovation in the concept of intellectual capital was first coined by Chen (2008) which added to the specifications of company resources in terms of the environment. Bontis (2000) defines intellectual capital as an intangible resource in the form of competencies and abilities that can create value, productivity and company performance.

Board Diversity

Clarke & Branson (2012) argue that board diversity is a personal division between interdependent members in a work unit. According to Alexandra Watson in Time for Diversity, board members from different backgrounds will be sensitive to different risks, they can change the executive team to manage the company more effectively.

HYPOTHESIS DEVELOPMENT**The Relationship of Green Accounting to Firm Value**

The research results of Lestari (2020), Erlangga et al. (2021), Gustinya (2022), Yuliani & Prijanto (2022), and N. K. Astuti et al. (2023) show that the implementation of green accounting has a positive effect on increasing firm value. This is because the application of green accounting is proof that a company cares about the surrounding environment and creates a good image, so that the products distributed will be accepted by the public. Environmental issues make people aware and participate in preventing environmental damage, so that this awareness will create a feeling of choosing safe and environmentally friendly products, which will improve the company's image (value). Therefore, the hypothesis of this research:

H1 = Green Accounting has an effect on Firm Value

The Relationship of Environmental Cost to Firm Value

The research results of Wulaningrum & Kusrihandayani (2020), Setyaningrum & Mayangsari (2022), and Putri et al. (2024) shows that environmental costs have a positive effect on increasing firm value. This is because allocating environmental costs shows that the company has responsibility and cares about the company's environmental conditions. The greater the environmental costs paid by the company, the greater the positive signal that stakeholders will receive. Therefore, the hypothesis of this research:

H2 = Environmental Cost has an effect on Firm Value

The Relationship of Green Intellectual Capital to Firm Value

The research results of Gunaensis (2022), Tonay & Murwaningsari (2022), and M. Lestari (2023) show that green intellectual capital has a positive effect on increasing firm value. This is because green intellectual capital is one of the company's competitive advantages in improving its financial performance. In this case, it means that the higher the green intellectual capital, the higher the firm value. Therefore, the hypothesis of this research is:

H3 = Green Intellectual Capital has an effect on Firm Value

The Relationship of Board Diversity Proxied by Gender to Firm Value

The research results of Joevanty & Suzan (2022), Pramesti & Nita (2022), and Sijaruddin & Mahardika (2023) show that board diversity proxied by gender has a positive effect on increasing firm value. This is because women dominate company boards because women are considered to carry out all actions more carefully, are reluctant to take risks, and are more thorough than men. These women's characteristics are in accordance with signaling theory which emphasizes transparency and encourages investors to trust and invest with confidence. Therefore, the hypothesis of this research is:

H4.1 = Board Diversity Proxied by Gender has an effect on Firm Value

The Relationship of Board Diversity Proxied by Age to Firm Value

The research results of Putri (2020) and Hayuti & Rosia (2024) show that board diversity, which is proxied by age, has a positive effect on increasing firm value. This is because older board members have broader knowledge and experience so they can improve performance and ultimately increase firm value. Based on previous research, it was stated that board members aged 40 years had achieved career satisfaction. In accordance with signaling theory, investors are more confident in investing their funds in companies with older board members. Therefore, the hypothesis of this research is:

H4.2 = Board Diversity Proxied by Age has an effect on Firm Value

The Relationship of Board Diversity Proxied by Education to Firm Value

The research results of Yogiswara & Badera (2019), Ikhyanuddin (2021), and Pramesti & Nita (2022) show that board diversity proxied by education has a positive effect on increasing firm value. This is because company performance can be better if board members have an educational background in economics and business. Although there is no requirement that board members have an educational background in economics and business, knowledge that is linear to their work will make it easier for board members to understand and make important company decisions. Yogiswara & Badera (2019) argue that educational diversity between economics and non-economics will make board members more competent, thus creating a positive signal for investors that the company is being managed well. Therefore, the hypothesis of this research is:

H4.3 = Board Diversity Proxied by Education has an effect on Firm Value

The Relationship of Board Diversity Proxied by Tenure to Firm Value

The research results of Ikhyanuddin (2021) and Pramesti & Nita (2022) show that board diversity, which is proxied by tenure, has a positive effect on increasing firm value. This is because board members have greater competence, experience and commitment to the company when they have a long term of office. Pramesti & Nita (2022) argue that the ideal time period for a board to understand the company is around 3 – 5 years. The length of tenure of the board members is in accordance with signaling theory which emphasizes the encouragement of investors to trust and invest with confidence. Therefore, the hypothesis of this research is:

H4.4 = Board Diversity Proxied by Tenure has an effect on Firm Value

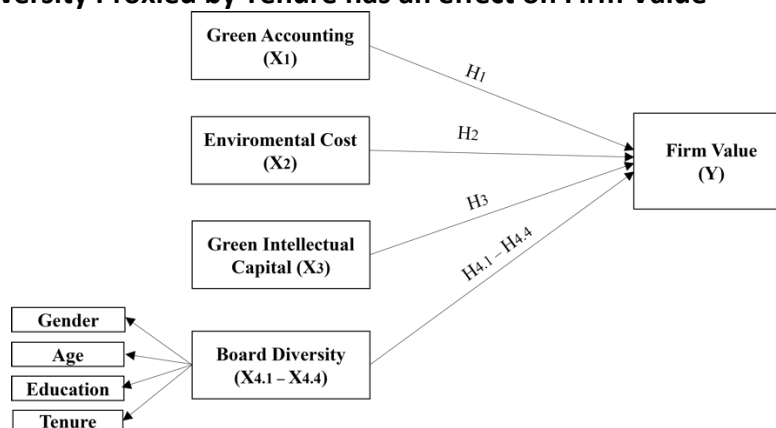


Figure 3. Conceptual Framework

METHODS

This research is descriptive research with a quantitative approach. Descriptive research is defined as research that uses data collection methods to test hypotheses or answer questions related to research subjects factually regarding an object, situation, current phenomenon along with appropriate interpretations (Purba, 2021). This is in line with the researcher's aim of describing the influence of Green Accounting, Environmental Cost, Green Intellectual Capital, and Board Diversity on Company Value. The approach in this research is quantitative, which means the research is carried out using statistics as a data processing tool so that the data obtained is in the form of numbers (Sahir, 2021:13).

The following are the operational definition of exogenous and endogenous variables in this research:

Table 1. Operational Definition

No	Variable	Indicator	Scale																		
1	Green Accounting	PROPER index (score: 1 - 5 based on color)	Ordinal																		
		<table border="1"> <thead> <tr> <th>Color</th> <th>Description</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>Gold</td> <td>Very Good</td> <td>5</td> </tr> <tr> <td>Green</td> <td>Good</td> <td>4</td> </tr> <tr> <td>Blue</td> <td>Fair</td> <td>3</td> </tr> <tr> <td>Red</td> <td>Poor</td> <td>2</td> </tr> <tr> <td>Black</td> <td>Very Poor</td> <td>1</td> </tr> </tbody> </table>	Color	Description	Score	Gold	Very Good	5	Green	Good	4	Blue	Fair	3	Red	Poor	2	Black	Very Poor	1	
Color	Description	Score																			
Gold	Very Good	5																			
Green	Good	4																			
Blue	Fair	3																			
Red	Poor	2																			
Black	Very Poor	1																			
2	Environmental Cost	$EC\% = \frac{\sum \text{Environmental Cost}}{\text{Earning After Tax}}$	Ratio																		
3	Green Intellectual Capital	$GICI\% = \frac{\text{Number of items disclosed by the company}}{\text{Total number of items in GICI}}$	Ratio																		
4	Board Diversity -Gender	$GEN\% = \frac{\sum \text{Female Board of Directors}}{\sum \text{Board of Directors}}$	Ratio																		
5	Board Diversity -Age	$AGE\% = \frac{\sum \text{Board of Directors with } \geq 40 \text{ years old}}{\sum \text{Board of Directors}}$	Ratio																		
6	Board Diversity - Education	$EDU\% = \frac{\sum \text{Board of Directors with background in economics education}}{\sum \text{Board of Directors}}$	Ratio																		
7	Board Diversity -Tenure	$TNR\% = \frac{\sum \text{Board of Directors with } \geq 5 \text{ years tenure}}{\sum \text{Board of Directors}}$	Ratio																		
8	Firm Value	Tobin's Q = $\frac{\text{Shares Market Value} + \text{Total Debt}}{\text{Total Assets}}$	Ratio																		

Source: Author's compilation

The population in this research is all manufacturing companies going public (listed on the Indonesia Stock Exchange) in 2018-2022. Furthermore, the sampling technique in this research is purposive sampling. Purposive sampling was carried out for certain considerations

which were believed to represent the research conducted. The sampling criteria are as follows.

Table 2. Purposive Sampling

Criteria	Q	Size
Manufacturing companies listed on the IDX as of December 31, 2022.	227	Companies
Manufacturing companies have not gone public or been delisted during 2018-2022 period consecutively.	(62)	Companies
Companies with incomplete Annual Reports for the 2018-2022 period consecutively.	(22)	Companies
Companies with incomplete Sustainability or Corporate Social Responsibility Reports in Annual Reports for the 2018-2022 period consecutively.	(22)	Companies
Companies that did not achieve PROPER ranking during 2018-2022 period consecutively.	(57)	Companies
Total companies used	64	Companies
Number of years	5	Years
Total sample	320	Companies

Source: *Author's compilation*

This research uses documentation methods to collect data. Research data was obtained from the official website of the Indonesia Stock Exchange www.idx.co.id as well as the official website of each sample company which publishes Financial-Management Report data which is integrated in the Annual Report and the company's Sustainability Report. Meanwhile, PROPER is obtained from the official website <https://proper.menlhk.go.id/>. The data analysis technique used in this research is Partial Least Square (PLS) using SmartPLS software version 3.

RESULTS

Table 3. Descriptive Statistics

	Mean	Min.	Max.	Std. Deviation
GA	3,069	2,000	5,000	0,520
EC	0,067	-2,622	11,810	0,709
GIC	0,435	0,000	0,929	0,234
GEN	0,122	0,000	0,667	0,155
AGE	0,942	0,333	1,000	0,132
EDU	0,622	0,000	1,000	0,231
TNR	0,480	0,000	1,000	0,349

Source: *Author's compilation, SmartPLS 3*

Based on the results of descriptive statistical tests obtained and presented in Table 3 above, it can be concluded that the minimum value for the Green Accounting (GA) variable is 2 because there are companies that have achieved a red PROPER rating, such as INAI, UNIC, BOLT, and KBLM. Meanwhile, the maximum score is 5 because there are companies that have achieved a gold PROPER rating, such as SIDO, BRPT, and SMCB.

In the Environmental Cost (EC) variable, the results show that the minimum value is -2.622 which is negative because there are companies that experience losses, namely CTBN in 2020. Meanwhile, the maximum value is 11.810 which is in 2019, namely MRAT in 2019 because the number net profit as a divisor is relatively small and the amount of environmental costs as a relatively large numerator exceeds the amount of net profit.

The minimum value for the Green Intellectual Capital (GIC) variable is 0 because no disclosure was found by the company in a particular year, either in the Sustainability Report or the CSR section of the Annual Report, such as KIAS in 2018 – 2020. Meanwhile, the maximum value is 0.929 because 13 of the 14 indicators disclosed were found, such as ADMG in 2021 – 2022.

Next, the results of descriptive statistical tests on the Board Diversity variable using 4 proxies. In the Gender (GEN) proxy, the result was that the minimum value was 0 because several companies did not have female directors at all, such as KLBF, SIDO, ADES, and CAMP. The maximum value is 0.667 because the number of female directors is 2 out of 3 people, namely at the MRAT in 2018.

In the Age (AGE) proxy, the results show that the minimum value is 0.33 because there are companies where 2 out of 3 directors are under 40 years old, namely MRAT in 2019 - 2022. The maximum value is 1 because there are companies where all the directors are Those who took office that year were all aged 40 years or more, such as INTP, SMBR, and SMCB.

In the Education (EDU) proxy, the result is that the minimum value is 0 because there are companies where none of the directors have a business or economic education background, such as STTP. The maximum value is 1 because there are companies whose entire directors have business or economic education, such as INDR.

In the Tenure (TNR) proxy, the result is that the minimum value is 0 because there are companies whose entire directors have not served for 5 years or more at the end of that year, as in CTBN. The maximum value is 1 because there are companies whose entire directors have served for 5 years or more at the end of that year, such as INDR and ULTJ.

The results of descriptive statistical tests on the Company Value (FV) variable can be concluded that the minimum value was 0.002 by SMBR in 2018 because the company's market value was much smaller than its book value (undervalued). The maximum value was 18,355 by UNVR in 2018 because the company's market value was much greater than its book value (overvalued).

Outer (Measurement) Model

This research uses Partial Least Square (PLS) as a data analysis technique. Partial Least Square (PLS) is a variance-based data analysis technique that can be used to analyze several exogenous and endogenous variables simultaneously. This research uses validity and reliability tests in testing the measurement model (outer model). The validity test is divided into 2 models, namely convergent validity and discriminant validity. The convergent validity test uses Outer Loading and Average Variance Extracted (AVE), while the indicator

discriminant validity test uses Cross Loading. The reliability test in this research used Composite Reliability.

Outer loading is used to test the validity of indicators in SEM. As presented in table 4 below, the outer loading is 1,000 (≥ 0.7), which means the data is valid.

Table 4. Outer Loading

	BD- Age	BD- Edu	BD- Gender	BD- Tenure	Environ- mental Cost	Green Acc	Green Intel- lectual Capital	Firm Value
AGE	1,000							
EC					1,000			
EDU		1,000						
FV								1,000
GA						1,000		
GEN			1,000					
GIC							1,000	
TNR				1,000				

Source: Author’s compilation, SmartPLS 3

AVE (Average Variance Extracted) is used to evaluate the discriminant validity of each construct and variable with a limit value of 50% or 0.5 (Muhson, 2022). Meanwhile, CR (Composite Reliability) measures the reliability of indicators where if the value is > 0.7 then the data is accepted and said to be reliable (Muhson, 2022).

Table 5. Composite Reliability dan Average Varians Extracted

	Composite Reliability	Average Variance Extracted (AVE)
Board Diversity - Age	1,000	1,000
Board Diversity - Education	1,000	1,000
Board Diversity - Gender	1,000	1,000
Board Diversity - Tenure	1,000	1,000
Environmental Cost	1,000	1,000
Green Accounting	1,000	1,000
Green Intellectual Capital	1,000	1,000
Firm Value	1,000	1,000

Source: Author’s compilation, SmartPLS 3

As presented in Table 5 above, the Average Variance Extracted is 1,000 (≥ 0.5), which means the data is valid and the Composite Reliability is 1,000 (≥ 0.7), which means the data can be said to be reliable.

Cross loading is used to test the discriminant validity of each variable, which will be said to be valid if the loading of an indicator on the construct being measured should be greater than the loading on another construct. Based on Table 6 below, it can be concluded that the cross loading value for each indicator of this variable has a higher cross loading value than the cross loading value for other variables. Hence, each variable indicator used in this research is valid.

Table 6. Cross Loading

	Board Diversity - Age	Board Diversity - Edu	Board Diversity - Gender	Board Diversity - Tenure	Environmental Cost	Green Accounting	Green Intellectual Capital	Firm Value
AGE	1,000	-0.023	-0.266	0.178	-0.269	0.241	0.053	0.004
EC	-0.269	0.102	0.054	-0.061	1,000	-0.119	0.038	-0.042
EDU	-0.023	1,000	0.071	-0.222	0.102	0.046	-0.059	0.058
FV	0.004	0.058	0.209	-0.122	-0.042	0.184	0.367	1,000
GA	0.241	0.046	-0.242	-0.065	-0.119	1,000	0.374	0.184
GEN	-0.266	0.071	1,000	-0.206	0.054	-0.242	-0.039	0.209
GIC	0.053	-0.059	-0.039	-0.028	0.038	0.374	1,000	0.367
TNR	0.178	-0.222	-0.206	1,000	-0.061	-0.065	-0.028	-0.122

Source: Author's compilation, SmartPLS 3

Inner (Structural) Model

The structural model test is used to identify and see the relationships between latent variables. In this research, the structural model test carried out was an evaluation of the path coefficient to answer the hypothesis along with the coefficient of determination (R-Squared).

Table 7. Path Coefficient

Hypothesis	β	Standard Error	T Statistics	P Values	Conclusion
H1 GA (X1) → FV (Y)	0,096	0,071	1,355	0,176	No effect (H1 rejected)
H2 EC (X2) → FV (Y)	-0,059	0,028	2,126	0,034	Significant negative effect (H2 accepted)
H3 GIC (X3) → FV (Y)	0,342	0,049	6,953	0,000	Significant positive effect (H3 accepted)
H4.1 BD-GEN (X4.1) → FV (Y)	0,240	0,071	3,402	0,001	Significant positive effect (H4.1 accepted)
H4.2 BD-AGE (X4.2) → FV (Y)	0,021	0,057	0,366	0,715	No effect (H4.2 rejected)
H4.3 BD-EDU (X4.3) → FV (Y)	0,052	0,045	1,144	0,253	No effect (H4.3 rejected)
H4.4 BD-TNR (X4.4) → FV (Y)	-0,052	0,038	1,392	0,165	No effect (H4.4 rejected)

Source: Author's compilation, SmartPLS 3

Table 8. R Square

	R Square
Firm Value	0.205

Source: Author's compilation, SmartPLS 3

Based on Table 8 above, it is known that the R-squared value obtained is 0.205 or 20.5%. This means that the construct validity of Green Accounting, Environmental Cost, Green Intellectual Capital, and Board Diversity is only able to have an influence of 20.5% on Company Value and 79.5% is influenced by other variables not used in this research.

DISCUSSION

The Effect of Green Accounting on Firm Value

The results of this research were obtained from testing the Green Accounting hypothesis on Firm Value in PROPER rated manufacturing companies in 2018 - 2022 with a P Value of 0.176. So, it can be concluded that Green Accounting has no effect on Firm Value. These results are in accordance with the research results of Sapulette & Limba (2021) and Yani et al. (2023).

This means that the PROPER rating that has been achieved and disclosed by the company has no impact on stakeholder decision making. Meanwhile, Ekawati (2023) explains that companies that only focus on the environment cannot increase the interest of potential investors who will increase the value of the company. A company's intensity in improving environmental performance may not necessarily attract the attention of investors who tend to be conservative, even though this indicates that the company has ambition to achieve sustainability goals. Therefore, in theory, the legitimacy of green accounting as proxied by PROPER is still unable to create recognition for increasing firm value.

Ekawati (2023) also explains that there are other important factors that encourage potential investors to invest capital in a company, namely related to product sales performance or company income. This is because investors consider that economic performance can further improve company welfare, especially in the post-pandemic period. Weda & Sudana (2021) also explained that many investors are still not aware and understand the importance of sustainability of environmental performance and are only assessed as an effort to legitimize.

The following are companies that are in accordance with the results of the analysis, namely a comparison of the results of the PROPER score classification which shows that it does not affect the level of the Firm Value ratio (Tobin's Q) respectively from 2018 - 2022.

Table 9. Comparison of PROPER with Tobin's Q

Num.	Stock Code	Company's Name	PROPER					TOBIN'S Q				
			2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
1	AMFG	Asahimas Flat Glass Tbk	3	3	3	4	3	0,7634	0,7801	0,7792	0,8154	0,8244
2	BRPT	Barito Pacific Tbk	4	5	4	4	4	2,8032	2,0299	1,5633	1,1449	1,0874
3	UNIC	Unggul Indah Cahaya Tbk	3	2	3	2	3	0,7331	0,6813	0,7070	1,3340	0,8996
4	ADMG	Polychem Indonesia Tbk	3	3	2	3	3	0,4752	0,3895	0,4929	0,4265	0,3726
5	KAEF	Kimia Farma Tbk	3	3	2	3	3	1,9086	0,9744	1,9394	1,3527	0,8372

Source: *Author's compilation*

The Effect of Environmental Cost on Firm Value

The results of this research were obtained from testing the Environmental Cost hypothesis on Firm Value in PROPER rated manufacturing companies in 2018 - 2022 with a P Value of 0.034, T Statistics 2.126, and a beta coefficient of -0.059 (negative). Hence, it can be concluded that Environmental Cost has a significant negative effect on Firm Value. These results are in accordance with the research results of Hapsoro & Adyaksana (2020).

Hapsoro & Adyaksana (2020) explain that this means that the higher environmental costs mean the company's cost efficiency is considered less good because the company's net profit also decreases. This is caused by maximizing company profits. Thus, environmental cost efficiency becomes a correlation between the results of environmental performance and the company's economic performance to obtain the highest profits which can increase the

interest of potential investors to invest their capital so that it will increase the share price and value of the company.

The following are companies that based on the calculation results are in accordance with the analysis results, namely the comparison of the calculation of the Environmental Cost ratio (EC%) which is getting higher while the Firm Value ratio (Tobin's Q) is getting lower from 2018 - 2022.

Table 10. Comparison of EC% with Tobin's Q

Num.	Stock Code	Company's Name	EC%					TOBIN'S Q				
			2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
1	IPOL	Indopoly Swakarsa Industry Tbk	0,0145	0,0268	0,0083	0,0003	0,0014	0,5821	0,5666	0,6335	0,6404	0,6169
2	CPIN	Charoen Pokphand Indonesia Tbk	0,0066	0,0093	0,0101	0,0124	0,0162	4,6044	3,9438	3,6845	3,0431	2,6644
3	CPRO	Central Proteina Prima Tbk	0,0000	-0,0027	0,0022	0,0003	0,0033	1,3506	1,4415	1,3567	1,4323	0,9964
4	JPFA	Japfa Comfeed Indonesia Tbk	0,0000	0,0016	0,0028	0,0027	0,1469	1,5819	1,2290	1,2222	1,2472	1,0468
5	INKP	Indah Kiat Pulp & Paper Tbk	0,0238	0,0532	0,0463	0,0295	0,0173	1,0677	0,8853	0,9749	0,8035	0,7333

Source: Author's compilation

The Effect of Green Intellectual Capital on Firm Value

The results of this research were obtained from testing the Green Intellectual Capital hypothesis on Company Value in PROPER rated manufacturing companies in 2018 - 2022 with a P Value of 0.000, T Statistics 6.953, and a beta coefficient of 0.342 (positive). So, it can be concluded that Green Intellectual Capital has a significant positive effect on Firm Value. These results are in accordance with the research results of Tonay & Murwaningsari (2022) and M. Lestari (2023).

This means that the higher the green intellectual capital as a company's competitive advantage, the higher the value of the company. In accordance with resource theory by Penrose (1959) where green intellectual capital is a strategy for managing resources by companies to gain competitiveness and added value compared to other companies. Thus, the trust of stakeholders, especially investors, becomes higher and they invest more capital in the company.

Tonay & Murwaningsari (2022) in their research explains that green intellectual capital is able to support and direct a company and its employees in achieving their goals. In terms of sustainability, green intellectual capital plays a crucial role in maintaining the company's focus through various mechanisms related to knowledge, technology and company initiatives so that it will be able to attract the interest of potential investors to invest their capital so that it will increase the share price and value of the company.

The following are companies that based on the calculation results are in accordance with the results of the analysis, a comparison of the calculation of the Green Intellectual Capital (GIC%) ratio with the Firm Value ratio (Tobin's Q) which shows a positive effect.

Table 11. Comparison of GIC% with Tobin's Q

Num.	Stock Code	Company's Name	GIC%				TOBIN'S Q					
			2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
1	GJTL	Gajah Tunggal Tbk	0,2857	0,2857	0,2857	0,7143	0,7143	0,8168	0,7774	0,7317	0,7376	0,7226
2	MYTX	PT Asia Pacific Investama Tbk	0,28571	0,28571	0,28571	0,42857	0,42857	0,97775	1,03311	1,09104	1,20601	1,14176
3	GOOD	PT Garudafood Putra Putri Jaya Tbk	0,42857	0,42857	0,42857	0,78571	0,78571	3,69378	2,65466	1,95991	3,4132	3,18632
4	ULTJ	PT Ultrajaya Milk Industry & Trading Company Tbk	0,21429	0,21429	0,21429	0,42857	0,42857	2,9479	3,0814	2,56542	2,75525	2,52091
5	CINT	PT Chitose Internasional Tbk	0,21429	0,35714	0,35714	0,35714	0,35714	0,78697	0,83188	0,70813	0,80208	0,78446

Source: Author's compilation

The Effect of Board Diversity Proxied by Gender on Firm Value

The results of this research were obtained from testing the Board Diversity hypothesis which was proxied by gender on Firm Value in PROPER rated manufacturing companies in 2018 - 2022 with a P Value of 0.001, T Statistics 3.402, and a beta coefficient of 0.240 (positive). So, it can be concluded that Board Diversity as proxied by gender has a significant positive effect on Firm Value. These results are in accordance with the research results of Pramesti & Nita (2022), Joevanty & Suzan (2022), and Sijaruddin & Mahardika (2023).

This means that gender diversity on the Board of Directors will be able to further increase and be assessed as a company that does not discriminate and provides equal opportunities for women in their careers. Apart from that, this statement is supported by the signal theory that gender diversity in a company provides a positive signal or good news to investors because the company is considered to have implemented good governance by not discriminating against anyone to join the Board of Directors.

Pramesti & Nita (2022) in their research explained that although the majority of those occupying the Board of Directors are dominated by men, a female Board of Directors can increase their broad understanding of the company's market and consumers, thereby leading to an increase in the company's reputation (legitimacy) and value. The existing diversity is intended to encourage objective and comprehensive decision making, because decisions can be taken from different perspectives which are supported by the characteristics of women who tend to be more careful, reluctant to take risks, and more thorough than men, which is an important factor in managerial decision making.

The following are companies that based on the results of calculations are in accordance with the results of the analysis, namely the comparison of the calculation of the Gender proxy Board Diversity ratio (GEN%) with the Firm Value ratio (Tobin's Q) which shows that there is a positive effect.

Table 12. Comparison of GEN% with Tobin's Q

Num.	Stock Code	Company's Name	GEN%					TOBIN'S Q				
			2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
1	ASII	Astra International Tbk	0,1000	0,0909	0,1111	0,1111	0,1000	1,4601	1,2659	1,1433	1,0412	0,9686
2	GJTL	Gajah Tunggal Tbk	0,2000	0,2000	0,1111	0,1250	0,0000	0,8168	0,7774	0,7317	0,7376	0,7226
3	ARGO	Argo Pantes Tbk	0,1667	0,2000	0,3333	0,0000	0,0000	2,1260	2,2467	2,6908	2,6359	2,5878
4	KBLI	KMI Wire and Cable Tbk	0,1667	0,2500	0,2500	0,2500	0,2000	0,7470	0,9216	0,7304	0,5116	0,5578

Source: Author's compilation

The Effect of Board Diversity Proxied by Age on Firm Value

The results of this research were obtained from testing the Board Diversity hypothesis which is proxied by age on Firm Value in PROPER rated manufacturing companies in 2018 - 2022 with a P Value of 0.715. So, it can be concluded that Board Diversity, which is proxied by age, has no effect on Firm Value. These results are in accordance with the research results of Pramesti & Nita (2022).

This means that a larger Board of Directors aged 40 years or more does not cause the company's value to change. Thus, having directors who are young or old will not affect performance which will impact the value of the company because ability cannot be seen from the age factor. Pramesti & Nita (2022) in their research also explained that young Board of Directors tend to be more critical and able to accept suggestions well, more quickly and

responsively, but this does not rule out the possibility that the performance of older Board of Directors also has the same motivation with more experience.

In accordance with agency theory, investors trust the Board of Directors to run the company well by always making the right decisions regardless of age, for the sake of the company's business continuity which will also have an influence on investors.

The following are companies that based on the calculation results are in accordance with the results of the analysis, namely a comparison of the calculation of the Age proxy Board Diversity ratio (AGE%) with the Firm Value ratio (Tobin's Q) which can show that there is no effect.

Table 13. Comparison of AGE% with Tobin's Q

Num.	Stock Code	Company's Name	AGE%					TOBIN'S Q				
			2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
1	INTP	Indocement Tunggal Prakarsa Tbk	1,0000	1,0000	1,0000	1,0000	1,0000	2,6085	2,6947	2,1377	1,9153	1,6565
2	SMGR	Semen Indonesia (Persero) Tbk	0,8571	0,8750	1,0000	1,0000	1,0000	0,0017	1,4421	1,3987	0,9798	0,9361
3	TPIA	Chandra Asri Petrochemical Tbk	0,8750	0,8571	0,8571	1,0000	1,0000	2,7396	4,3497	3,6920	2,6337	3,4519
4	MYTX	Asia Pacific Investama Tbk	0,6250	0,6667	0,6667	0,6667	0,5000	0,9778	1,0331	1,0910	1,2060	1,1418
5	SRIL	Sri Rejeki Isman Tbk	0,8571	0,7500	0,7500	0,7143	0,8750	0,9922	0,8652	0,8402	1,4853	2,2698

Source: Author's compilation

The Effect of Board Diversity Proxied by Education on Firm Value

The results of this research were obtained from testing the Board Diversity hypothesis which was proxied by education on Firm Value in PROPER rated manufacturing companies in 2018 - 2022 with a P Value of 0.253. So, it can be concluded that Board Diversity, which is proxied by education, has no effect on Firm Value. These results are in accordance with the research results of I. R. Nugroho et al. (2021) and Hayuti & Rosia (2024).

This means that a larger number of Board of Directors with economic or business educational backgrounds does not cause the company's value to change. Thus, the presence of directors with both economic and non-economic educational backgrounds will not affect performance which will impact the value of the company because ability cannot be seen from educational factors alone.

In this research, the educational diversity of the Board of Directors only defines economics and business. On the other hand, a Board of Directors with an educational background appropriate to the company's type of business is also needed to be able to assist in making decisions that can support the continuity of the company's business (Kadir, 2019). Apart from that, companies also need soft skills in running a business, while the formal education they receive is hard skills education. Research from Harvard University in the United States states that only 20% of success is determined by hard skills, the remaining 80% is determined by soft skills (Hayuti & Rosia, 2024).

In accordance with agency theory, investors trust the Board of Directors to run the company well by always making the right decisions regardless of educational background for the sustainability of the company which will also have an influence on investors.

The following are companies that based on the calculation results are in accordance with the results of the analysis, a comparison of the calculation of the Education proxy Board Diversity ratio (EDU%) with the Firm Value ratio (Tobin's Q) which can show that there is no effect.

Table 14. Comparison of EDU% with Tobin's Q

Num.	Stock Code	Company's Name	EDU%					TOBIN'S Q				
			2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
1	INTP	Indocement Tunggal Prakarsa Tbk	0,6667	0,6667	0,6667	0,6667	0,6667	2,6085	2,6947	2,1377	1,9153	1,6565
2	SMCB	Solusi Bangun Indonesia Tbk	0,6364	0,6667	0,6667	0,6000	0,7500	1,4301	1,1053	1,1658	1,1882	1,0464
3	CTBN	Citra Tubindo Tbk	0,8333	0,6667	0,6000	0,6000	0,5000	1,8913	1,4647	1,6412	1,3285	0,9784
4	NIKL	Pelat Timah Nusantara Tbk	0,5000	0,5000	0,5000	0,5000	0,5000	4,9536	1,5069	2,5927	1,6276	1,2259
5	CPRO	Central Proteina Prima Tbk	0,8333	0,8333	0,6667	0,6667	0,8333	1,3506	1,4415	1,3567	1,4323	0,9964

Source: Author's compilation

The Effect of Board Diversity Proxied by Tenure on Firm Value

The results of this research were obtained from testing the Board Diversity hypothesis proxied by tenure on Company Value in PROPER rated manufacturing companies in 2018 – 2022 with a P Value of 0.165. So, it can be concluded that Board Diversity, which is proxied by tenure, has no effect on Firm Value. These results are in accordance with the results of Putri (2020).

This means that a larger number of members of the Board of Directors who have served as Board of Directors in the company for 5 years or more do not cause the company's value to change. Thus, the presence of a director who has served as a Board of Directors in the company for 5 years or more will not affect performance which will impact the value of the company because ability cannot be seen from the length of service alone.

Nurmala Sari et al. (2023) argue that there are several factors in the absence of influence on the length of the Board of Directors' term of office on firm value:

1. Boards of Directors who have served for a long time tend not to change the strategies they have implemented so far because they are already comfortable.
2. Boards of Directors who have a long tenure tend to be risk averse and prefer stability to change.
3. Each Board of Directors has an equal position in improving company performance, not based on length of time.

In accordance with agency theory, investors trust the Board of Directors to run the company well by always making the right decisions regardless of how long they have been in office for the sustainability of the company which will also have an influence on investors.

The following are companies that based on the calculation results are in accordance with the results of the analysis, a comparison of the calculation of the Tenure proxy Board Diversity ratio (TNR%) with the Firm Value ratio (Tobin's Q) which can show that there is no effect.

Table 15. Comparison of TNR% with Tobin's Q

No	Kode Saham	Nama Perusahaan	TNR%					PERHITUNGAN TOBIN'S Q				
			2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
1	INTP	Indocement Tunggal Prakarsa Tbk	0,5556	0,6667	0,8889	0,8889	1,0000	2,6085	2,6947	2,1377	1,9153	1,6565
2	SMCB	Solusi Bangun Indonesia Tbk	0,1818	0,0000	0,0000	0,0000	0,2500	1,4301	1,1053	1,1658	1,1882	1,0464
3	SMGR	Semen Indonesia (Persero) Tbk	0,0000	0,0000	0,0000	0,7500	0,8750	0,0017	1,4421	1,3987	0,9798	0,9361
4	CTBN	Citra Tubindo Tbk	0,0000	0,0000	0,0000	0,0000	0,0000	1,8913	1,4647	1,6412	1,3285	0,9784
5	INAI	Indal Aluminium Industry Tbk	0,0000	0,0000	0,0000	0,6000	1,0000	0,9685	0,9666	0,9214	0,8694	0,9163

Source: Author's compilation

CONCLUSION

Green accounting, board diversity proxied by age, education, and tenure had no effect on firm value partially. Meanwhile, environmental cost had significant negative effect on firm value. Whereas green intellectual capital and board diversity proxied by gender had significant positive effect on firm value partially.

Regarding the result of this research, it would be good if companies started paying attention to environmental performance, especially in terms of the application of green intellectual capital and environmental cost efficiency because it has been proven in this research that good application of green intellectual capital coupled with environmental cost efficiency can increase firm value. Apart from that, companies can also pay attention to corporate governance, especially regarding the culture of gender discrimination within the company's Board of Directors because it has been proven in this research that the existence of gender diversity on the Board of Directors can increase firm value.

Moreover, this research will be useful for investors as study material so that in the future they will be more careful and conservative in various aspects before investing in a company. Then, for the next researchers, it would be best to make further considerations in selecting data collection methods because the majority of the variables used in this research are content analysis to be prone to data collection errors. In addition, it is hoped that next researchers can add other variables related to environmental performance besides those used in this research.

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