The Influence of Intellectual Capital, Environmental Costs, and Environmental Performance on The Value of Manufacturing Companies Listed on The Indonesian Stock Exchange

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ABSTRACT
This study aims to determine the influence of intellectual capital, environmental costs, and environmental performance on the value of manufacturing companies. The research method used in this study is multiple linear regression analysis. The population of this study consists of manufacturing companies in the basic materials industry sub-sector listed on the Indonesia Stock Exchange (IDX) from 2021 to 2023. The research type used secondary data obtained from the official website of the Indonesia Stock Exchange and the official websites of the companies. The sample was selected using purposive sampling, resulting in a final sample of 20 companies that met the criteria. This study utilized the statistical data analysis program SPSS 27. The results of the hypothesis testing indicate that intellectual capital has a positive and significant effect on company value, environmental costs do not affect company value, and environmental performance has a positive and significant effect on company value.

Keywords: Environmental costs; Environmental performance; Firm value; Intellectual capital

INTRODUCTION

The current business competition forces companies to be more creative and improve their competitive abilities. Competitive abilities are not only based on advanced technology or tangible assets, but also on intangible assets such as knowledge and human resources (HR), enabling companies to face the challenges of economic changes (Herdani & Kurniawati, 2022). Thus, companies will gain recognition from external parties for having good management. Companies with good management are able to increase their value (Fauzia, 2023). Increasing company value is a long-term goal of a company, because a successful company can be seen through its value (Putri & Susanti, 2023). Company value is one of the factors considered when making investment decisions, so managers must consider various financial and non-financial aspects. An increase in company value will attract investor confidence to invest in the company (Nugroho, 2022).

Companies may experience a decline in value due to social issues and intense business competition, so companies must be able to maintain their performance in order to achieve their goals and maximize profits (Widiyaningsih & Jati, 2024). The greater the profit generated, the stronger the company's competitiveness in the market (Aulia et al., 2020). Thus, companies prioritize profit without considering the surrounding environment, such as soil and water pollution from irresponsible company activities (Utomo et al., 2020). Environmental issues in the business world have become increasingly widespread, and their negative impacts have reached the community, causing stakeholders and the public to become concerned about the contribution of companies to environmental damage caused by their activities (Duffin, 2023).

Many manufacturing companies face environmental issues due to production processes that transform raw materials into finished products, resulting in waste that can harm the environment. PT Kamarga Kurnia was sued by the Ministry of Environment and Forestry (KLHK) for waste management and hazardous waste (B3) as well as river water pollution caused by factory waste in 2020, and the case of PT United Colour Indonesia, which caused environmental pollution in the Citarum River (Nurudin et al., 2024). A similar case occurred in 2021 involving PT Toba Pulp Lestari Tbk, which was sanctioned by the Ministry of Environment and Forestry (KLHK) on August 3, 2021, for causing waste pollution in Lake Toba (Utami, 2021).

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Companies will allocate environmental costs as preventive measures against environmental pollution, thereby attracting investor attention. Therefore, environmental costs represent a form of long-term investment (Herriott, 2018). The allocated environmental costs aim to improve a company's environmental performance (Zainab & Burhany, 2020). The Environmental Performance Rating (PROPER) consists of five colors, ranging from the highest rating (gold) to the lowest (black). In 2021-2022, many manufacturing companies in Indonesia still received low ratings, indicating that manufacturing companies in Indonesia have not yet implemented environmental management in accordance with government policies.

Based on the PROPER ranking assessment, there were 51 companies with a gold rating, 170 companies with a green rating, 2,031 companies with a blue rating, 887 companies with a red rating, and 2 companies with a black rating ( ) (Rion, 2022). As a result, the price-to-book value of manufacturing companies in the basic materials industry subsector decreased over a four-year period. In 2022, the average company value decreased by 2.06% from 3.25%. This was caused by a decline in industrial activity, such as companies that still have low environmental performance, thereby causing environmental pollution.

Based on the above background, the research questions that can be posed in this study include: (1) Does intellectual capital influence company value? (2) Do environmental costs influence company value? (3) Does environmental performance influence company value? The objectives of this study are: (1) to determine the influence of intellectual capital on company value, (2) to determine the influence of environmental costs on company value, (3) to determine the influence of environmental performance on company value.

LITERATURE REVIEW

Stakeholder Theory

According to Edward & Evan (1990), stakeholders are groups, individuals, or organizations that can influence or be influenced by company activities in achieving their goals. Companies will attract the attention of stakeholders through their concern for the environment, so that the company's environmental management will be more efficient and able to meet the expectations of stakeholders (Safriani & Utomo, 2020). Thus, it will attract stakeholders to invest in the company and increase its value (Fauzia, 2023).

Legitimacy Theory

The Legitimacy Theory proposed by (Dowling & Pfeffer, 1975) states that companies will always strive to be consistent and responsible towards the surrounding environment and adapt to government regulations and community environmental norms. Legitimacy theory explains the relationship between companies and society. Generally, the sustainability of a company can be seen from how society perceives it (Harahap et al., 2019). In an effort to influence public perception, companies can prioritize social and environmental responsibility in their operational activities, thereby creating good relationships with the surrounding community.

There is a reciprocal relationship between companies and the environment, which makes legitimacy a potential resource for the sustainability of companies (Eku, 2024). When a company's activities do not comply with government regulations and social norms, the company will receive sanctions from the community (Sagala & Aprilia, 2023). However, when a company complies with existing regulations and norms, it gains the trust of the community, thereby increasing its value (Asyifa & Burhany, 2022).

Company Value

According to Okte & Hasanah (2023), company value is the condition of a company from its inception until it becomes prosperous, to determine whether the company is in good condition or not. Company value is one of the aspects that investors consider when deciding to invest in a company, because investors will look at the company's value through its financial statements (Nugroho, 2022).

For companies that have gone public, the value of the company can be seen from the value of its shares when the share price increases, the value of the company will increase. This increase in value

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reflects an increase in their welfare as shareholders. Shareholders are reflected in the share price, which reflects investment-related decisions (Sutrisno et al., 2024).

Intellectual Capital

According to Sari et al. (2021), intellectual capital is an intangible asset of a company, such as knowledge, information, and experience possessed by human resources (HR) in a company that can increase the value of the company. According to Stewart (1997), intellectual capital has several interconnected and interacting components that, when utilized effectively, can create value for the company in the form of human capital and structural capital.

According to Sowaity (2022), measuring intellectual capital using the value-added intellectual coefficient (VAIC™) method provides efficiency in creating company value as seen through a company's financial statements.

Environmental Costs

According to Santoso (2018), environmental costs are expenses incurred by a company to ensure the smooth running of its production activities. These costs arise from production activities that generate waste that can damage the environment, so companies allocate environmental costs during the production process. Environmental costs are an important component of corporate environmental management, aimed at preventing and reducing environmental damage caused by company activities (Wulaningrum & Kusrihandayani, 2020). Environmental costs incurred by companies are investments aimed at maintaining the sustainability of the environment around the company (Herriott 2018).

Environmental Performance.

Environmental performance, according to Sapulette & Limba (2021), is the impact or damage caused by a company's performance during its operational activities. The greater the environmental damage caused, the more negative the impact on the company, leading to a poor environmental performance rating (Chasbiandani et al., 2019). According to Asyifa & Burhany (2022), environmental performance measurement is based on a company's compliance with environmental laws and regulations by assessing and ranking the extent of a company's environmental compliance.

The PROPER ranking assessment assigns the highest rating in gold to companies that consistently comply with regulations, and the lowest rating in black to negligent companies that cause environmental damage. To improve its environmental performance, PT. . strives to minimize the environmental impact of its operational activities.

Intellectual Capital and Company Value

Intellectual capital is an intangible asset owned by a company that can enhance its value (Sari et al., 2021). According to Stewart (1997), intellectual capital comprises several interconnected and interdependent components that, when utilized effectively, can create value for the company in the form of physical capital, human capital, and structural capital. In line with the stakeholder theory, stakeholders are groups, individuals, or entities (companies or organizations) that can influence or be influenced by the sustainability of a company and achieve its objectives (Edward & Evan, 1990). In the research conducted by Gantino et al. (2023) and Nguyen & Doan (2020), it was found that intellectual capital has a significant influence on company value.

H_1: Intellectual capital has a significant and positive influence on company value

Environmental Costs on Firm Value

Environmental costs are one of the aspects evaluated by the public to determine whether a company cares about the surrounding environment and addresses the impacts of its operational activities (Sagala & Aprilia, 2023). Environmental costs incurred are considered long-term investments because they can create a positive company image, thereby increasing company value (Herriott, 2018). In accordance with the legitimacy theory, companies that carry out production activities must pay attention to the environment surrounding the company. Positive legitimacy is the trust and positive image given by the community and stakeholders, and improving environmental performance will have an impact on increasing company value (Sagala & Aprilia, 2023).

H_2: Environmental costs have a significant and positive effect on company value

Environmental Performance on Company Value.

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According to Astini et al. (2022), good environmental performance can increase company value because it has a positive reputation and legitimacy. This aligns with the legitimacy theory, which emphasizes the importance of a company's responsibility toward its surrounding environment. This creates trust from the community toward the company, thereby increasing company value (Asyifa & Burhany, 2022).

In Duffin's (2023) study, environmental performance was found to have a significant and positive effect on company value. In the study by Sapulette & Limba (2021), significant results were obtained indicating that environmental performance affects company value.

H_3: Environmental performance has a significant and positive impact on company value

RESEARCH METHOD

The dependent variable in this study is company value. According to Okte & Hasanah (2023), company value is the condition of a company from its inception until it becomes prosperous, to determine whether the company is in good condition or not. Company value in this study is measured using the price to book value ratio (PBV), which is a ratio often used to determine company value.

Formula

$$\text{PBV} = \frac{\text{Market price per share}}{\text{Book value per share (NBVS)}}$$

$$\text{NBVS} = \frac{\text{Total equity}}{\text{JNumber of shares outstanding}}$$

Intellectual capital is an intangible asset owned by a company and plays an important role in helping the company achieve its goal of increasing company value (Herdani & Kurniawati, 2022). The appropriate measurement for intellectual capital is using the Value Added Intellectual Coefficient (VAIC^{TM}) concept with 3 components, namely VACA, VAHU, and STVA.

Formula:

$$\text{VAIC}^{\text{TM}} = \text{VACA} + \text{VAHU} + \text{STVA}$$

According to Santoso (2018), environmental costs are part of a company's expenditures for its production activities. These costs are incurred to address environmental issues caused by poor environmental quality resulting from company waste during production. Environmental costs are calculated using the formula CSR/net profit after tax.

Formula:

$$\text{Environmental costs} = \frac{\textit{Cost}\ \text{CSR}}{\text{lnet income after tax}}$$

Environmental performance, according to Sapulette & Limba (2021), refers to the impact or damage caused by a company's operational activities. It involves how a company disposes of and processes waste from its activities with the aim of reducing the environmental damage caused by its operations ( ). Environmental performance is measured using the PROPER ranking system, which uses a 5-point scale from the best to the worst color.

This study employs a quantitative research approach. The data used in this study are secondary data obtained indirectly through intermediary media, consisting of annual reports and sustainability reports from manufacturing companies in the basic materials industry sub-sector for the years 2021–2023. Annual reports and sustainability reports can be found on the companies' official websites. The data collection method used is the documentation method.

The population of this study consists of manufacturing companies in the basic materials industry sub-sector listed on the Indonesia Stock Exchange from 2021 to 2023. The method used for sample selection in this study is purposive sampling, which is based on certain criteria, resulting in 20 companies being selected as samples for the study.

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Table 1. Sample Selection

Criteria	Number
Manufacturing companies in the industrial and *basic materials* sub-sector that are listed on the Indonesia Stock Exchange (IDX).	166
Manufacturing companies in the *basic materials* industry sub-sector that have not published *annual reports* and *sustainability reports* regularly for three consecutive years from 2021 to 2023 on the IDX website in Indonesian rupiah (Rp).	(84
Manufacturing companies in the *basic materials* industry sub-sector that did not receive a PROPER rating for three consecutive years from 2021 to 2023.	(52
Manufacturing companies in the *basic materials* industry sub-sector that did not include CSR expenses in *their annual reports* for three consecutive years from 2021 to 2023.	(10
Total companies meeting the criteria	20
Research Sample (20x3)	6
Outlier data	(
Number of research sample data	5

Source: Processed data, 2024

The data analysis methods used in this study include descriptive statistical methods, classical assumption tests, model validity tests, and hypothesis testing. The aim is to ensure the accuracy of the results, making them unbiased and efficient. The analysis used to process the data in this study employs multiple linear regression analysis to determine and measure the magnitude of the influence of the independent variables , on the dependent variable (Priyastama, 2020). This study utilizes quantitative analysis techniques with the assistance of the statistical data processing program SPSS 27

RESULTS AND DISCUSSION

Descriptive statistical analysis explains the collected data as it is without intending to draw conclusions that apply to the general population. Data can be tested using mean, maximum, minimum, and standard deviation.

Table 2. Results of Descriptive Statistical Analysis

Variable	N	Minimum	Maximum	Mean	Standard Deviation
Intellectual Capital	5	0.120	10.872	3.84949	1.883830
Environmental Costs	51	0.001	0.805	0.03729	0.111003
Environmental Performance	51	3	5	3,570	0.781
Company Value	51	0.010	3.120	1.06884	0.680227
Valid N (listwise)	51				

Source: SPSS Output 27

Intellectual capital has a minimum value of 0.120 from PT Timah Tbk in 2023. The maximum value is 10.872 from PT Golden Eagle Energy Tbk in 2022. The mean value is 3.84949 and the standard deviation is 1.883830. The minimum value of the environmental cost variable is 0.001 from PT Ifishdeco Tbk in 2022 and PT Indal Aluminium Industry Tbk in 2021. The maximum value is 0.805 from PT Gunawan Dianjaya Steel Tbk in 2022. The mean value is 0.03729 and the standard deviation is 0.111003. The minimum value of the environmental performance variable at score 3 is for companies that received a PROPER blue rating. The maximum value at score 5 is for companies that received a PROPER gold

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rating. The mean value is 3.57 and the standard deviation is 0.781. The minimum value for the company value variable is 0.010 from PT United Tractors Tbk in 2023. The maximum value is 3.120 from PT Aneka Tambang in 2023. The mean value is 1.06884 and the standard deviation is 0.680227.

Tabel 3 indicates that the dependent variable, company value, has an Asymp. Sig. (2-tailed) value of 0.000 < 0.05. Therefore, it can be concluded that the residual data is not normally distributed. Thus, the regression model can be concluded to be unsuitable, and extreme data (outliers) need to be removed to produce normally distributed residual data.

Table 3. Normality Test Results before outliers

One-Sample Kolmogorov-Smirnov Test			
			Unstandardized Residual
N			6
Normal Parameters[a,b]	Mean		.000
Most Extreme Differences	Std. Deviation		1.42831229
	Absolute		.210
	Positive		.210
	Negative		-.155
Test Statistic			.210
Asymp. Sig. (2-tailed)[c]			.000
Monte Carlo Sig. (2-tailed)[d]	Sig.		.000
	99% Confidence Interval	Lower Bound	.000
		Upper Bound	.000

Source: SPSS Output 27

Table 4. Results of Normality Test after outlier removal

One-Sample Kolmogorov-Smirnov Test			
			Unstandardized Residual
N			5
Normal Parameters[a,b]	Mean		0.000000
Most Extreme Differences	Std. Deviation		0.62087939
	Absolute		0
	Positive		0.116
	Negative		-0.096
Test Statistic			0.116
Asymp. Sig. (2-tailed)[c]			0.084
Monte Carlo Sig. (2-tailed)[d]	Sig.		0.079
	99% Confidence Interval	Lower Bound	0.072
		Upper Bound	0.086

Source: SPSS 27 Output

The data shows a significance value of 0.084 > 0.05, which means the significance value is greater than 0.05. Therefore, it can be concluded that the residual data in this study is normally distributed because it has an Asymp. Sig > 0.05.

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Table 5. Results of Multicollinearity Test.

Coefficients[a]		
Variable	Collinearity Statistics	
	Tolerance	VIF
Intellectual Capital	0.860	1.163
Environmental Costs	0.964	1.037
Environmental Performance	0.881	1.135

Source: SPSS 27 Output

The results indicate that the tolerance values for each independent variable are greater than 0.1 (> 0.1) and the VIF values are less than 10. Therefore, it can be concluded that there is no multicollinearity among the independent variables in the regression model.

The heteroscedasticity test was conducted to determine whether there are differences in the variance of residuals between one observation and another. The test in this study was observed through a plot of the predicted values of the dependent variable, namely ZPRED, with its residuals SRESID

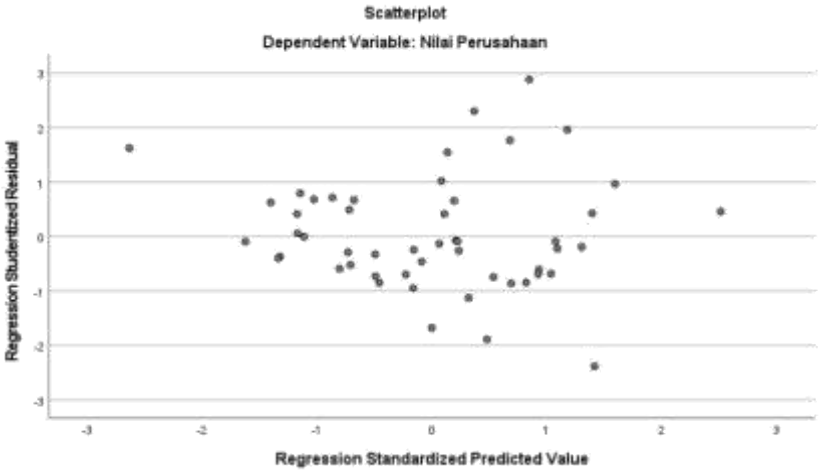

Figure 1. Heterocedastisity

Based on Figure 1, it can be seen that there is no clear pattern and the points are scattered above and below the number 0 on the Y-axis. Thus, this regression model does not exhibit heteroscedasticity.

The autocorrelation test in this study was used to determine the regression model where there is a relationship between the residuals in period t and the residuals in the previous period.

Table 6. Autocorrelation Test Results

Runs Test	
	Unstandardized Residual
Test Value[a]	-.08411
Cases < Test Value	2
Cases ≥ Test Value	26
Total Cases	51
Number of Runs	20
Z	-1.837
Asymp. Sig. (2-tailed)	.066

Source: SPSS Output 27

The table above shows that the Asympt. Sig. (2-tailed) value of 0.066 is greater than 0.05. Therefore, it can be concluded that the regression model does not exhibit autocorrelation.

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Table 7. Multiple Linear Regression Analysis

Coefficients[a]

Model	*Unstandardized Coefficients B*	*Std. Error*	*Standardized Coefficients Beta*	t	*Sig.*
(Constant)	-0.406	0.556		-0.731	0.468
Intellectual Capital	0.12	0.052	0.334	2.323	0.025
Environmental	-0.526	0.831	-0.086	-0.633	0.530
Costs	0.289	0.124	0.332	2.339	0.024
Environmental Performance					

Source: SPSS 27 output

The results of the regression equation testing formed from this study are as follows:

$Y = \alpha + ß_1X_1 + ß_2X_2 + ß_3X_3 + e$……..……*4.1*

$Y = -0.406 + 0.120X_1 - 0.526X_2 + 0.289X_3 + e$……..……*4.2*

Explanation:

Y	: Company value
α	: Constant
$ß_1$, $ß_2$, $ß_3$	: Regression coefficients
X	: Intellectual capital
X	: Environmental costs
X	: Environmental performance
e	: *Error term*

The interpretation of the results of the multiple linear regression equation above is as follows:

1. Constant (α)
   The constant value (α) is -0.406 with a negative direction, indicating that if all independent variables, namely intellectual capital, environmental costs, and environmental performance, are equal to 0, the predicted value of the company is -0.406.
2. Intellectual Capital on Firm Value
   The regression coefficient value of X_1 is 0.120, indicating a positive direction, meaning that for every 1 increase in intellectual capital, the company value will increase by 0.120, assuming that the other independent variables remain constant.
3. Environmental Costs on Firm Value
   The regression coefficient of X_2 is -0.526 and is negative, indicating that for every 1 increase in environmental costs, the company value will decrease by -0.526, assuming that other independent variables remain constant.
4. Environmental Performance on Firm Value
   The regression coefficient of X_3 is 0.289 and is positive, indicating that for every 1 increase in environmental performance, the company value will increase by 0.289, assuming that other independent variables remain constant.

Table 8. Model Validity (F Test)

ANOVA[a]

Model	*Sum of Squares*	Df	*Mean Square*	F	*Sig.*
Regression	3.86	3	1,287	3,138	0.034
Residual	19,275	47	0.410		
Total	23,135	50			

Source: SPSS Output 27

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The F value obtained is 3.138 with a significance level of 0.034 < 0.05. Therefore, the research model is suitable for use, or in other words, intellectual capital, environmental costs, and environmental performance can analyze the influence on company value.

Determination Coefficient (R^2)

Table 9. Coefficient of Determination (R^2)

Model Summary[b]

Model	R	*R Square*	*Adjusted R-Squared*	*Standard Error of the Estimate*
1	0.409[a]	0.167	0.114	0.640388

Source: SPSS Output 27

The R Square value of 0.167 indicates that the independent variables intellectual capital, environmental costs, and environmental performance can explain 16.7% of the dependent variable, which is company value, while the remaining 83.6% can be explained by other variables outside the research model.

Table 10. Hypothesis Testing (t-test)

Coefficients[a]

Model	*Unstandardized Coefficients B*	*Std. Error*	*Standardized Coefficients Beta*	t	*Sig.*
(Constant)					
Intellectual Capital	-0.406	0.556		-0.731	0.468
Environmental	0.12	0.052	0.334	2.323	0.025
Costs	-0.526	0.831	-0.086	-0.633	0.530
Environmental Performance	0.289	0.124	0.332	2.339	0.024

Source: SPSS Output 27

1. The t-test results for the intellectual capital variable have a significance value of 0.025 < 0.05 and a regression coefficient (ß) of 0.120. The significance value for this variable is less than 0.05 and the regression coefficient is positive, so H_1 **is accepted.**
2. The t-test results for the environmental cost variable in this study have a significance value of 0.530 < 0.05 and a regression coefficient of -0.5260. The significance value for this variable is greater than 0.05 with a negative regression coefficient. Thus, environmental costs do not affect company value. H_2 **is rejected.**
3. Environmental performance has a significance level of 0.024 < 0.05 and a positive regression coefficient of 0.289. The significance value for this variable is less than 0.05 with a positive regression coefficient. Therefore, H_3 **is accepted.**

The t-test results show a significance level of 0.025, which is greater than 0.05. It also has a regression coefficient of 0.120, indicating a positive direction. The results of the descriptive statistical analysis show that intellectual capital has an average value of 3.849. This can be interpreted as the higher the level of information and experience possessed by human resources (HR), the more important it is for companies to maximize their intellectual capital. The results of this study are consistent with stakeholder theory and align with the findings of Nguyen & Doan (2020), Putri et al. (2023), and Gantino et al. (2023), who found that intellectual capital influences company value.

The t-test results showed a significance level of 0.530 and a regression coefficient of -0.526 with a negative direction. This means that environmental costs do not affect company value. Descriptive statistical analysis showed that environmental costs had an average value of 0.037, indicating that the

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company's environmental performance was not very good. The higher the environmental costs, the more the company value tends to decrease. Thus, high environmental costs will impact future cash flow and company profits. The results of this study are inconsistent with the theory of corporate legitimacy, which states that companies that care about the environment will gain legitimacy from external parties, leading to significant benefits for the company.

The t-test results have a significance level of 0.024 and a regression coefficient of 0.289, indicating a positive direction. Descriptive statistics show that environmental performance has an average value of 3.570. Effective implementation of environmental performance can increase company value by improving its positive image in the eyes of the public and complying with government regulations. This aligns with the legitimacy theory, which states that companies that are environmentally responsible and comply with societal norms can enhance their image and value, as well as attract investor interest. The findings of this study are consistent with the research by Aini & Faisal (2021) and Renaldi & Anis (2023), which state that environmental performance influences company value.

CONCLUSION

Based on the data analysis conducted, it can be concluded that intellectual capital has a positive and significant impact on the value of manufacturing companies, meaning that the higher the level of information and experiential knowledge ( ) of a company's human resources (HR), the higher the company's value. Environmental costs do not affect company value because the amount of environmental costs incurred by a company to manage waste related to the environment reflects the company's poor performance towards the environment. Thus, the higher the environmental costs, the lower the company value. Environmental performance has a positive and significant impact on company value, meaning that a high level of environmental performance implementation makes companies more aware of the importance of paying attention to environmental management, which can increase company value. By implementing environmental performance management, companies are expected to maintain environmental balance in all their operational activities.

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