IJAMESC, Vol. 3 No. 02, April 2025
DOI: https://doi.org/10.61990/ijamesc.v3i2.478 e-ISSN 2986-8645

THE INFLUENCE OF GREEN INTELLECTUAL CAPITAL ON FINANCIAL PERFORMANCE: THE ROLE OF COMPETITIVE ADVANTAGE AS AN INTERVENING VARIABLE

Muhammad Sodri Alamsyah[1]*, Windu Mulyasari[2]
[1.2]Faculty Of Economics and Business Accounting, Sultan Ageng Tirtayasa University, Indonesia
*Corresponding Author:
sodrialamsyah01@gmail.com

Abstract
This study was conducted to examine the influence of Green Intellectual Capital (GIC) which is dimensioned into Green Human Capital (GHC), Green Structural Capital (GSC) and Green Relational Capital (GRC) on financial performance with competitive advantage as an intervening variable. The sample used in this study amounted to 201 data in the 2021-2023 observation year in energy sector companies listed on the Indonesia Stock Exchange as the research population. This study uses a quantitative method with data obtained from the official website of the Indonesia Stock Exchange. The research model uses regression analysis panel data with the best model chosen being the Random Effect Model (REM) and the mediating variable is tested with a sobel test using a sobel test calculator. From the tests carried out, the results of the study show that green human capital and green relational capital have a positive and significant effect on financial performance. Meanwhile, green structuralism has a negative and significant influence on financial performance. The competitive advantage in this study cannot mediate the relationship between green human capital, green structural capital and green relational capital and financial performance.

Keywords: Financial Performance, GIC Disclosure, Competitive Advantage

1. Introduction

This study aims to determine the influence of Green Intellectual Capital on financial performance with competitive advantage as an intervening variable. Financial performance is the main indicator in assessing the health and success of the company. A company's efforts to identify metrics to assess success in generating profits are focused on evaluating financial performance (Hidayah et al., 2023). This performance provides an explanation of the achievement of the work program, the implementation of the company and the company's policies. Therefore, financial performance serves as an analytical tool to evaluate whether the company has implemented financial rules correctly (Renaldo et al., 2022).

Good financial performance can be defined as a situation in which the company manages to maximize the use of resources to generate substantial profits. Good financial performance is inseparable from the role of intangible assets that the company has in its operational activities. Intangible assets in the form of intellectual capital are one of the factors that play a role in determining the company's performance. Intellectual capital contributes to increasing company value, supporting the production process, and strengthening competitiveness. (Hidayah et a., 2023) (Renaldo et al., 2022) (Mulyasari & Murwaningsari, 2019) Green intellectual capital (GIC) is a very important intangible asset for companies that have a focus on human resources and the environment developed

from intellectual capital (Bombiak, 2023) . Green intellectual capital functions as a knowledge asset by considering environmental aspects and is considered a corporate strategy to develop in an environmentally friendly manner (Susandya et al., 2019). Green human capital, green structural capital and green relational capital are dimensions developed from intellectual capital (Chen, 2008). The total value of intangible assets, knowledge, skills, and concern for the environment or innovation at the individual and corporate level is the definition of green intellectual capital. This is a long-term combination carried out by companies in an effort to care for the environment and the resources owned by the company (Sukirman et al., 2023).

With the intellectual capital owned, it is hoped that the company will be able to develop its environmentally friendly company. Operations in sector companies are in the center of attention because the energy sector also faces specific challenges related to intellectual capital, such as improving operational efficiency, developing new technologies, and increasing innovation capabilities to deal with climate change and sustainable energy policies (Munjin, 2023). Some companies in Indonesia in practice have not fully paid attention to the environment so that it has a bad impact on the environment (Novitasari & Agustia, 2023). (Renaldo et al., 2022)

In 2021, there were 58 cases of criminalization. The case occurred in the energy sector by 52%. PT Adaro Energi Tbk is one of the coal mining companies that carry out drilling and environmental destruction so that the company contributes greatly in the case of 24 people who died and 113,000 people were displaced due to the major flood disaster in South Kalimantan. In addition, there was a pipeline leak at the port of pier 4 owned by PT Chevron Pacific Indonesia (CPI) in Dumai, Riau, which resulted in an oil spill of 8.4 barrels. According to PT CPI, this incident occurred when the pier was not in use. Nevertheless, the company immediately took steps to deal with the leak and managed to clean up 99% of the crude oil spilled at the CPI Pier. (Jatmiko, 2022) (Umah, 2022)

According to data from the official website of PT Bukit Asam Tbk (PTBA), the company has shown a strong commitment to the development of renewable energy and diversification of energy sources during the period 2021 to 2023. In 2021, the company achieved significant growth thanks to rising global coal prices, which boosted revenue and net profit. However, in 2022, even though coal prices remain high, PTBA began to face challenges due to environmental pressures and government policies that encourage the transition to clean energy. To overcome this challenge, PTBA has started developing renewable energy projects such as solar power plants (PLTS) and utilizing coal waste to produce energy. Entering 2023, PTBA's financial performance showed stability despite fluctuations in the coal market, with the company continuing to strengthen its renewable energy portfolio and improve its operational efficiency. These measures reflect PTBA's adaptation to market changes and government support for the use of clean energy.

The difference from the previous study lies in the approach to intellectual capital and the object of this research on energy sector companies. Green intellectual capital is proxied into green human capital, green structural capital and green relational capital. In addition, this study uses mediation variables to determine the relationship between GIC disclosure and financial performance. The mediating variable in this study is a competitive advantage that connects the independent variable with the bound variable. Competitive advantage is the value that a company provides to its customers that exceeds the cost of creating it (Porter, 1985). Distinctive expertise and assets are considered key factors in creating a competitive advantage. Special expertise allows companies to make employees a crucial element in achieving such excellence. If the company is able to

develop the skills of its employees optimally, then the company will be more superior, and the human resource-based strategy implemented will be difficult for competitors to imitate. Meanwhile, unique assets or resources are a tangible element that a company needs to support its competitive strategy. (Nurhayati et al., 2019)

This research is important because GIC, which includes green human capital, green structural capital, and green relational capital, not only supports environmental sustainability but also improves the competitiveness and performance of companies. GIC enables companies to reduce operational costs, increase green innovation, and meet regulatory demands as well as consumers who are increasingly environmentally conscious (Renaldo et al., 2022). In addition, this study was carried out because there were still inconsistencies in the results of previous studies related to the variables studied. The findings of the results of and supported by the results of the study stated that GIC had a positive effect on financial performance but contradicted the research that concluded that GIC did not have a significant impact on financial performance. This indicates that only a small percentage of companies in Indonesia have integrated environmental awareness into the Green Idrus et al., (2023) Agustina et al., (2024) Ghofur et al., 2024) Hermawan et al., (2024) Sukirman et al., (2023) Intellectual Capital dimension. Thus, it becomes difficult to relate these dimensions to business performance. As a result, the business world must be subject to strict regulations that require the application of environmentally friendly concepts in all company operations. In addition, the study Arizqa Setiadi et al., (2022) states that GIC has an influence on competitive advantage and is inversely proportional to the research that states that GIC has no influence on competitive advantage Susandya et al., (2019) . As well as research from Wijayanto et al., (2019) suggesting that financial performance is influenced by competitive advantage, the results are positive. However, the results of the study show a different perspective that states that competitive advantage has no influence on financial performance. Tan et al., (2022) This difference is due to different contexts within each company.

2. Theoretical Background

2.1 Resource-based View Theory

Wernefelt in 1984 introduced the resource-based theory in his publication entitled "A Resource-based View of the Firm". The RBV theory focuses on the urgency of resources that can create a competitive advantage. In this view, unique and imitable capital by competitors can be the basis for creating a sustainable competitive advantage. The resource-based theory introduced by Wernerfelt (1984) changed the way companies look at designing strategies. Companies should not only focus on external factors such as market conditions and competition, companies must also look inward, evaluate, and utilize the company's internal resources (Barney, 1986). This approach emphasizes the importance of understanding the mechanisms that allow companies to maintain a competitive advantage over a long period of time (Barney and Hesterly., 2006). This theory is in line with green intellectual capital, where the optimal application of environment-based intellectual resources will have a positive influence on the company's overall excellence (Barney, 1990).

2.2 Financial Performance

Financial performance is the performance of a company in carrying out its business activities which is measured using financial indicators (Yoon & Chung, 2018). Fariyana (2009) stated that a company's ability to generate net profit can be measured through

Return on Assets (ROA), which considers the company's assets after deducting the cost of funding the asset. ROA is obtained by dividing EAT by the company's total assets. (Novitasari & Agustia, 2023)

$$ROA = \frac{EAT}{Total\ Asset}$$

2.3 Green Intellectual Capital (GIC)

Intellectual capital is defined as the total amount of knowledge, information, technology, intellectual property rights, team communication systems, customer relationships, and trademarks capable of creating value for a company. Green intellectual capital refers to the knowledge, skills, and environmental awareness possessed by employees, enabling them to contribute to sustainable and environmentally friendly business practices (Chen, 2008). GHC refers to the insights, skills, abilities, and environment-related values possessed by employees, which enable them to work more environmentally friendly (Chen, 2008). GSC covers various aspects in the company related to environmental protection and green innovation. These include management systems, organizational capabilities, commitment to sustainability, knowledge, managerial philosophy, corporate culture, corporate image, as well as intellectual assets including trademarks, patents and copyrights (Chen, 2008). GRC encompasses a company's interactive relationships with various parties, including customers, distributors, network members, and partners, all of which focus on environmental protection and green innovation (Chen, 2008).

$$GIC = \frac{n}{k}$$

Information:

GIC = Green intellectual capital
n = Number of items disclosed by the company
k = Number of items listed in Green intellectual capital

2.4 Competitive Advantage

Competitive advantage is the ability of a company to create sustainable added value for customers that cannot be imitated by competitors in a short period of time (Porter, 1985). A high ROIC also indicates that the company has a strategic advantage, such as operational efficiency, cost advantage, superior products, or a strong brand, which is difficult for competitors to imitate (Koller et al., 2010). ROIC provides a clear picture of how efficient and effective a company is in generating profits through invested capital. This indicator assesses a company's ability to convert invested capital into net operating profit after tax, thus reflecting actual operational performance without being affected by capital structure or financial leverage. Ahmar, (2023)

$$ROIC = \frac{NOPAT}{IC}$$

2.5 Hypothesis development

Based on the theoretical review and the results of previous research that have been described, the researcher can formulate several development hypotheses in this study. The hypothesis is as follows.

2.5.1 The Influence of Green Intellectual Capital on Financial Performance

The RBV theory explains that resources will affect a company through financial performance. The resource-based theory introduced by Wernerfelt (1984) changed the way companies look at designing strategies. Companies should not only focus on external factors such as market conditions and competition, companies must also look inward, evaluate, and utilize the company's internal resources (Barney, 1986). According to Barney and Hesterly (2006), a company's resources can be in the form of tangible or intangible assets, which are used in the process of designing and implementing strategies. Therefore, the resources owned by the company will have an impact on its financial performance. Based on this concept, this study develops an environmentally friendly dimension of intellectual capital to test its influence on financial performance, as follows:

2.5.2 The Relationship between Green Human Capital and Financial Performance

Idrus et al., (2023) stated in its research that GHC has a positive impact on the company's financial performance. The research shows that employees' creativity, experience, and commitment to environmental sustainability make a significant contribution to the company's sustainability. In other words, the ability of employees in these aspects plays an important role in improving financial performance. Companies that invest in the development of green human capital tend to experience improved financial performance. It was also found that investment in qualified and skilled human resources in the environmental sector has a positive influence on financial performance. This is because employees who understand and have skills in environmental practices can help companies implement effective environmental strategies. Based on previous research, it can be concluded that environmentally friendly human capital that has the ability and knowledge in terms of the environment can affect the financial performance of the company. Therefore, the author formulates the following hypothesis. Renaldo et al ., (2022)

H1a : GHC has a positive effect on financial performance

2.5.3 The relationship between Green Structural Capital and Financial Performance

Renaldo et al ., (2022) In his research, he concluded that investment in intellectual capital, including green structural capital, has the potential to influence financial performance to increase further. This is because green structural capital can improve operational efficiency, reduce costs, and create a sustainable competitive advantage. Based on the previous research, green structural capital has a positive influence on financial performance by paying attention to management systems that support environmentally friendly practices as well as organizational infrastructure and culture. Therefore, the author formulates the following hypothesis.

H1b : GSC has a positive effect on financial performance

2.5.4 The relationship between green relational capital and Financial Performance

Renaldo et al., (2022) In his research, he concluded that environmentally friendly relational capital has a positive effect on financial performance. The results of the study revealed that GRC, through a strong network with suppliers, customers, communities, and government agencies, helps companies in more effective environmental risk management, improves corporate image, and creates cooperation opportunities that can reduce operational costs and increase efficiency. Based on the previous research, green relational capital has a positive impact on financial performance with strong relationships

between suppliers, customers and other stakeholders, so that with this positive impact, the company is expected to improve its financial performance. Therefore, the author formulates the following hypothesis.

H1c : GRC has a positive effect on financial performance

2.5.5 Competitive Advantage mediates Green Intellectual Capital's relationship to Financial Performance

Green intellectual capital is a company's concept and effort in carrying out the sustainability of an environmentally friendly company. So that green intellectual capital will have a direct impact on the company's financial performance through the dimensions of intellectual capital, namely environmentally friendly human capital, environmentally friendly structure capital, and environmentally friendly relationship capital (Renaldo et al., 2022). The company's success in generating profits is reviewed from its financial performance (Hidayah et al., 2023). According to Hastuti (2005), evaluating financial performance provides great benefits for the company. By conducting this assessment, companies can manage their resources more effectively and efficiently. This is crucial to facing challenges that are constantly changing over time. Through the right assessment, companies can adjust their strategies and operations to ensure sustainability and growth in the midst of the dynamics of the times. This is also the case that companies must pay attention to intellectual capital so that the company has a competitive advantage.

Chen (2008) found that there is a positive relationship between intellectual capital that is environmentally friendly and competitive advantage. The findings of the study show that the three main aspects of green intellectual capital, namely human resources that care about the environment, organizational structures that support the environment, and sustainable relationships with the environment, all have a positive impact on competitive advantage. Bombiak (2023) revealed that companies that invest in Green Intellectual Capital (GIC), especially in organizational aspects, can achieve a more significant competitive advantage. In this study, GIC is divided into 3 dimensions, namely GHC, GSC, and GRC. These findings provide important insights for managers on how important it is to develop and implement GIC practices to strengthen a company's competitive position in the market. Therefore, investing in green intellectual capital can be an effective strategy to achieve and maintain a long-term competitive advantage. The results of Hasyim et al., (2023), Yasrawan et al., (2023) and stated that competitive advantage has an influence on financial performance. From previous research, it was concluded that competitive advantage has an impact on the company's financial performance. The influence of financial performance is closely related to the role of green intellectual capital which can affect competitive advantage. As a result, the author formulates the following hypothesis. Novitasari et al., (2023)

H2a : Competitive advantage mediates the relationship between the influence of green human capital and financial performance

H2B : Competitive advantage mediates the relationship between the influence of green structural capital and financial performance

H2C : Competitive advantage mediates the relationship between the influence of green relational capital and financial performance

DOI: https://doi.org/10.61990/ijamesc.v3i2.478 e-ISSN 2986-8645

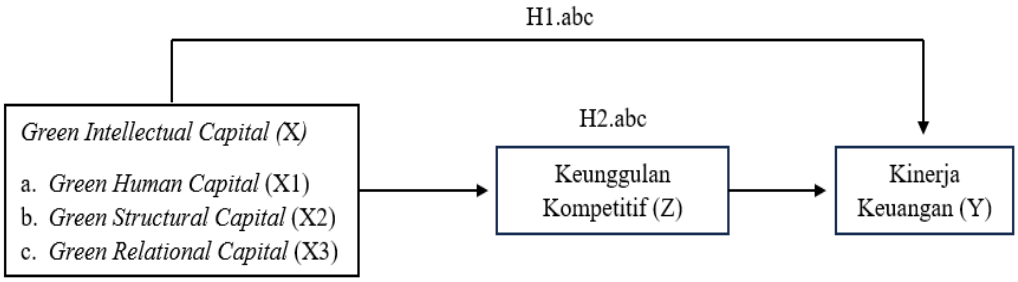

Figure 1. Research Model

3. Methods

This study uses the mediation variable, namely competitive advantage with the dependent variable of financial performance and the independent variable of green intellectual capital. Quantitative research is a type of research that can analyze numerical data through secondary data. The data used in this study comes from the financial statements of energy sector companies listed on the Indonesia Stock Exchange (IDX) for the period 2021-2023. The data was obtained through the official website of www.idx.co.id as well as other relevant websites to help collect data in this study. This study uses panel data in testing the influence of independent variables on dependent variables. The regression model is tested through model selection testing first to obtain optimal regression model results between the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The panel data regression model used in this study is as follows:

$$ROAit = a + \beta\ 1GHCit + \beta\ 1GSCit + \beta\ 1GRCit + \beta\ 2ROICit + e$$

Information:

ROA	: Return on Assets (a proxy of financial performance)
a	: Constant
β 1,2	: Regression coefficient
GHC	: Green Human Capital
GSC	: Green Structural Capital
GRC	: Green Relational Capital
ROIC	: Return on Invested Capital (a proxy of competitive advantage)
e	: Error

This study uses a sobel test by using an online sobel test calculator to determine the indirect influence between independent variables on dependent variables through mediating variables. The regression model used to test the prerequisites of intervening variables is as follows:

$$ROAi,t = a + \beta\ 1GHCit + \beta\ 1GSCit + \beta\ 1GRCit + \beta\ 2ROICi,t + e$$

$$ROICi,t = \alpha + \beta\ 1GHCit + \beta\ 1GSCit + \beta\ 1GRCit + e(2)$$

Information:

ROIC	: Return on Invested Capital (a proxy of competitive advantage)
a	: Constant
β 1,2	: Regression coefficient
GHC	: Green Human Capital
GSC	: Green Structural Capital
GRC	: Green Relational Capital
ROA	: Return on Assets (a proxy of financial performance)
e	: Error

DOI: https://doi.org/10.61990/ijamesc.v3i2.478 e-ISSN 2986-8645

4. Results and Discussion

4.1 Data Processing Results

The energy sector is listed on the Indonesia Stock Exchange (IDX) in 2021-2023. The list of companies in the energy sector is 87 companies consisting of 67 companies that are included in the research sample criteria for the period 2021-2023. So that the final research sample amounted to 201 companies.

Variable		Mean	Std. Dev.	Min	Max
roa	overall	8.76801	15.48263	-61.72	61.76
	between		13.73191	-22.79667	49.16667
	within		7.282333	-30.15532	34.87801
ghc	overall	4.572139	5.094803	-2.87	12.62
	between		5.026456	-1.746667	10.85
	within		.9718086	.6188059	12.41881
gsc	overall	4.570149	5.138685	-1.88	12.13
	between		5.081557	-1.48	10.70333
	within		.9176512	.7268159	12.24682
grc	overall	-.2479104	.5538489	-1.92	1.02
	between		.3848822	-1.12	.76
	within		.4001196	-1.19791	.9554229
ca	overall	20.89642	35.83859	-147.12	206.55
	between		31.21802	-52.77	152.9567
	within		17.87696	-73.45358	109.9564

Figure 2. Descriptive Statistical Analysis

Figure 2 illustrates the results of the descriptive statistical analysis of the variables used in this study. The results showed significant variation in each variable analyzed. The financial performance variable (ROA) has a minimum value of -61.72 obtained from the company Capitalinc Investment Tbk in 2022, while the maximum value reaches 61.76 obtained by Golden Energy Mines Tbk in 2022. The average ROA value was 8.76801 with a standard deviation of 15.48263, which indicates a considerable variation in the financial performance of the sample companies. Furthermore, the green human capital variable shows a minimum value of -2.87 obtained from Ratu Prabu Energi Tbk in 2021, while the maximum value is 12.62 obtained from AKR Corporindo Tbk in 2022. The average value of green human capital in this study is 4.572139 with a standard deviation of 5.0948803 which reflects a fairly moderate data distribution.

Meanwhile, the variable green structural capital has a minimum value of -1.88 obtained from Semacom Integrated Tbk in 2022 and a maximum value of 12.13 obtained from Adaro Minerals Indonesia Tbk in the same year. The average value of green structural capital is 4.570149 with a standard deviation of 5.138685 which shows that the data distribution is relatively stable. In the green relational capital variable, the results of the descriptive test show that the minimum value is -1.92 obtained from Sumber Energi Andalan Tbk in 2021 and the maximum value is 1.02 obtained from Harum Energy Tbk in the same year. The average value of this variable is -0.2479104 with a standard deviation of 0.5538489 which indicates a considerable fluctuation in the distribution of data.

Finally, the competitive advantage variable has a minimum value of -147.12 Capitalinc Investment Tbk obtained in 2022 and has a maximum value of 206.55 obtained from Baramulti Suksessarana Tbk in 2021. The average competitive advantage value is 20.89642 with a standard deviation of 35.83859 which shows considerable data variation in the competitive advantage variable.

Table 1. Chow Test

F	(66,130) = 4.13
Prob > F	0,0000

Based on table 1, the results of the chow test obtained a probability value (Prob > F) of 0.0000 < 0.05, then H0 was rejected and H1 was accepted. This shows that in the chow test, the better regression model is the Fixed Effect Model.

Table 2. Hausman Test

Chi	(4) = 8.70
Prob > chi2	0,0692

Based on table 2, the results of the hausman test obtained a probability value (Prob > chi2) of 0.692 > 0.5 max H0 was accepted and H1 was rejected. This shows that in the hausman test, a better regression model is the Random Effect Model.

Table 3. Lagrange Multiplier Test

Chi	(1) = 45.73
Prob > chi2	0,0000

Based on table 3, the results of the lagrange multiplier test obtained a probability value (Prob > chi2) of 0.0000 < 0.05, then H0 was rejected and H1 was accepted. This shows that at the lagrange multiplier, the better regression model is the Random Effect Model. In this study, the researcher did not conduct a cleration assumption test because the best result in the selection of the panel data regression model was the Random Effect Model.

Source	SS	df	MS	Number of obs	=	201
				F(4, 196)	=	91.91
Model	31270.922	4	7817.73051	Prob > F	=	0.0000
Residual	16671.4694	196	85.0585171	R-squared	=	0.6523
				Adj R-squared	=	0.6452
Total	47942.3914	200	239.711957	Root MSE	=	9.2227

roa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ghc	1.385078	.5043569	2.75	0.007	.3904153	2.379741
gsc	-1.166798	.4994435	-2.34	0.020	-2.151771	-.1818252
grc	4.017905	1.182367	3.40	0.001	1.68611	6.3497
ca	.3295419	.01844	17.87	0.000	.2931756	.3659082
_cons	1.877516	.9757916	1.92	0.056	-.0468828	3.801915

Figure 3. Hypothesis Test Results

The decision-making provisions in this study are based on the t-table value and significance value. In this study, the t-table was obtained which was 1.97 and the significance value was 0.05. If the value of z > t-table, the H1 hypothesis is accepted, on the other hand, if the value of z < t-table, then the H1 hypothesis is rejected. Furthermore, if the value of (P>|z|) < alpha 0.05, the hypothetical result is significant, on the other hand, if the value of (P>|z|) > alpha 0.05, the hypothetical result is not significant.

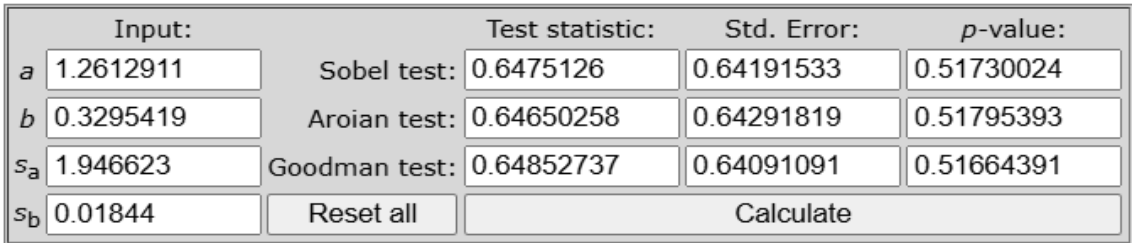

Figure 4. Results of the Sobel Test of Competitive Advantage Mediating Green Human Capital on Financial Performance

DOI: https://doi.org/10.61990/ijamesc.v3i2.478 e-ISSN 2986-8645

	Input:		Test statistic:	Std. Error:	*p*-value:
a	0.2613641	Sobel test:	0.13544445	0.63590956	0.89226048
b	0.3295419	Aroian test:	0.13523291	0.63690429	0.89242773
s_a	1.929622	Goodman test:	0.13565699	0.63491328	0.89209245
s_b	0.01844	Reset all	Calculate		

Figure 5. Results of the Sobel Test of Competitive Advantage Mediating Green Structural Capital on Financial Performance

	Input:		Test statistic:	Std. Error:	*p*-value:
a	5.123794	Sobel test:	1.12296233	1.50361661	0.26145349
b	0.3295419	Aroian test:	1.12121529	1.5059595	0.26219623
s_a	4.553731	Goodman test:	1.12471756	1.50127007	0.26070874
s_b	0.01844	Reset all	Calculate		

Figure 6. Results of the Sobel Test of Competitive Advantage Mediating Green Relational Capital on Financial Performance

4.2 Discussion

4.2.1 The Influence of Green Intellectual Capital on Financial Performance

1) The Relationship between Green Human Capital and Financial Performance

Hypothesis The study suspects that green human capital has a positive effect on financial performance. Based on the results of the regression test of the green human capital indicator, a t-value of 2.75 > t-table 1.97 and a significance value of 0.0007 < 0.05 were obtained. The results of this study prove that green human capital indicators have a positive and significant effect on financial performance. These findings indicate that companies that invest in the development of green human capital tend to experience improved financial performance. Some of the factors that contribute to this include better operational efficiency, innovation in environmentally friendly products and services, improved company reputation, and better compliance with environmental regulations. This is in line with several previous studies (Idrus et al., 2023) Agustina et al., (2024) , and which show that Idrus et al., (2023) Hermawan et al., (2024) green human capital has a positive and significant effect on financial performance.

2) The Relationship between Green Human Capital and Financial Performance

The research hypothesis suspects that green structural capital has a positive effect on financial performance. Based on the results of the regression test of the green structural capital indicator, a t-value of -2.34 > t-table 1.97 and a significance value of 0.0200 < 0.05 were obtained. The results of this study prove that the green structural capital indicator has a negative and significant effect on financial performance. Thus, green structural capital can improve operational efficiency, reduce costs, and create a sustainable competitive advantage. In addition, companies that adopt a green structural capital strategy tend to be better at meeting environmental regulations and gaining a positive reputation in the eyes of investors and consumers, resulting in improved financial performance. This research is in line with (Renaldo et al., 2022) Renaldo et al., (2022) and Agustina et al., (2024) shows the influence of green structural capital on financial performance.

3) The Relationship between Green Relational Capital and Financial Performance

The research hypothesis suspects that green relational capital has a positive effect on financial performance. Based on the results of the regression test of the green relational capital indicator, a t-table value of 3.40 > t-table 1.97 and a significance value of 0.0001 < 0.05 were obtained. The results of this study show that the green relational capital indicator has a positive and significant effect on financial performance. Thus, companies that have green relational capital tend to receive greater support from related parties and achieve a higher level of compliance with environmental regulations, which ultimately contributes positively to financial performance. This study is in line with previous research (Renaldo et al., 2022) Agustina et al., (2024) , and which shows the influence of Idrus et al., (2023) Hermawan et al., (2024) Renaldo et al., (2022) green relational capital on financial performance.

4.2.2 Competitive Advantage mediates Green Intellectual Capital's relationship to Financial Performance

The results of the study suspect that competitive advantage can mediate the relationship between green intellectual capital and financial performance. Based on the results of the green human capital sobel test, the sobel statistics figure is 0.6475. The results show 0.6475 < 1.97 which means that based on the sobel test, the competitive advantage variable does not mediate the relationship between green human capital and financial performance. The results of the green structural capital sobel test showed that the sobel statistics figure was 0.1354. The results show 0.1354 < 1.97 which means that the competitive advantage variable cannot mediate the relationship between green structural capital and financial performance. Furthermore, the results of the sobel green relational capital test showed that the sobel statistics figure was 1.1229. The results show 1.1229 < 1.97, which means that competitive advantage cannot mediate the relationship between green relational capital and financial performance. Based on the perspective of RBV theory, the resources owned by the company, both tangible and intangible, should be able to provide a competitive advantage for the company. However, the results of this study show that although the company has good intangible assets, in this case, green intellectual capital is not and can increase competitive advantages which then has an impact on the company's performance. This shows that other factors determine the increase in competitive advantage, the more concern for the environment, the greater the positive impact obtained on the competitive advantage of the company itself (Susandya et al., 2019). This study is in line with previous research Lastanti & Augustine, (2022) , which shows the results of the absence of the influence Sukirman & Dianawati, (2023) of green intellectual capital on financial performance. stated that Susandya et al., (2019) green relational capital has no effect on competitive advantage. Furthermore, competitive advantage has no effect on financial performance (Tan et al., 2022).

5. Conclusion

This study aims to measure green intellectual capital on financial performance with competitive advantages carried out in companies listed on the Indonesia Stock Exchange in 2021-2023. Based on the research that has been conducted, it can be concluded that green human capital and green relational capital have a positive and significant effect on financial performance and green structural capital has a negative and significant effect on financial performance. This result also means that the better the performance of green intellectual capital, the better its financial performance and with good commitment, the

company will be stable in its operational and financial activities. The results of this study are in line with the RBV theory which states that companies must integrate the ownership of their resources as a whole so that they can have a good impact on financial performance. The competitive advantage in this study did not show the mediation between green intellectual capital and financial performance according to the results of the prerequisite tests conducted.

The results of this study still have some limitations, including the number of samples, namely 201 companies out of a sample population of 261 companies in the energy sector listed on the Indonesia Stock Exchange in 2021-2023. This is because there are still many companies in the energy sector that have not reported information on sustainability reporting. This study is also limited to a coefficient value of determination (R2) of 65.05% which means that there are still other factors outside of this research variable that affect financial performance that are not explained in this study. In addition, this study does not use manual calculation of the sobel test, so the mediation results using the sobel test calculator are not strongly argued.

With the limitations of the research that has been submitted, there are improvements that can be made by researchers by adding observation periods or adding other company sectors that are not researched in this study. In addition, researchers can then use other measurements from each variable to get better results from this study, such as in financial performance variables, PBV measurements (Agustina et al., 2024) can be used or other measurements can be used. So that it can be known the factors that affect the disclosure of GIC itself. Furthermore, companies are expected to publish their sustainability reports, especially in the energy sector in accordance with OJK regulation No. 51 of 2017 concerning the Implementation of Sustainable Finance for Financial Services Institutions, Issuers, and Public Companies.

References

Agustina, S., Ruhiyat, E., & Sugiyanto, S. (2024). Green intellectual capital, Asset Growth on Stock Return: Role Financial Performance as Intervening. Asean International Journal of Business, 3(1), 36–49. https://doi.org/10.54099/aijb.v3i1.839

Ahmar, N. (2023). Competitive Advantage Based on Green intellectual capital and Green Innovation. Asian Journal of Engineering, Social and Health, 2(11), 1406–1414. https://doi.org/10.46799/ajesh.v2i11.169

Arizqa Setiadi, N., Saraswati, A., & Dwi Astuti, C. (2022). The Effect of Green intellectual capital On Competitive Advantage With Corporate Social Responsibility as A Mediating. Devotion : Journal of Research and Community Service, 3(12), 1110–1121. https://doi.org/10.36418/dev.v3i12.232

Bombiak, E. (2023). Effect of Green intellectual capital Practices on the Competitive Advantage of Companies: Evidence from Polish Companies. Sustainability (Switzerland), 15(5). https://doi.org/10.3390/su15054050

Bukit Asam. (2023). "Diversifikasi Bisnis PTBA Menjadi Perusahaan yang Berkelanjutan". https://www.ptba.co.id/. Diakses pada Selasa 07 Januari 2025. https://www.ptba.co.id/berita/berita-csr-lingkungan/diversifikasi-bisnis-ptba-menjadi-perusahaan-yang-berkelanjutan-1677

Chen, Y. S. (2008). The positive effect of green intellectual capital on competitive advantages of firms. Journal of Business Ethics, 77(3), 271–286. https://doi.org/10.1007/s10551-006-9349-1

Ghofur, M., Nofryanti, & Iin Rosini. (2024). Analysis Of The Effect Of Diversification And Intellectual Capital On Corporate Financial Performance With Good Corporate Governance As A Moderator. IJAMESC, 2(06), 243–255. https://doi.org/10.61990/ijamesc.v2i6.351

Hermawan, S., Tawfeeq, T., Alabdullah, Y., Sriyono, S., Sudarso, S., Utomo, P., Hermawan, S., Tawfeeq, T., Alabdullah, Y., & Sriyono, S. (2024). Green perspective on intellectual capital , corporate social responsibility , and competitive advantage : The role of firm performance. https://doi.org/10.21511/ee.15(1).2024.08

Hidayah, N., & Putriana, A. (2023). The Effect Of Good Corporate Governance On Financial Performance And Its Impact On Competitive Advantage (Empirical Study of Property and Real Estate Subsector Companies Listed on the IDX for the 2017 – 2020 period). International Journal Of Environmental Sustainibilty And Social Science, 4(1), 54–56. https://doi.org/10.38142/ijesss.v3i3.261

Huang, C. L., & Kung, F. H. (2011). Environmental consciousness and intellectual capital management: Evidence from Taiwan's manufacturing industry. Management Decision, 49(9), 1405–1425. https://doi.org/10.1108/00251741111173916

Idrus, M. I., & Hilalia, N. (2023). Green intellectual capital and Financial Performance Moderated Islamic Business Ethics (Vol. 2023). Atlantis Press SARL. https://doi.org/10.2991/978-2-38476-202-6_98

Jatmiko, H. (2022). Rekam Jejak Kasus Pertambangan di Indonesia. www.walhi.or.id/uploads/buku/Rekam Jejak Kasus Pertambangan.pdf

Lastanti, H. S., & Augustine, Y. (2022). the Strength of Good Corporate Governance in Moderating the Effects of Green intellectual capital on Green Competitive Advantage and Firm Performance. Jurnal Akuntansi Trisakti, 9(1), 85–98. https://doi.org/10.25105/jat.v9i1.13353

Mulyasari, W., & Murwaningsari, E. (2019). Intellectual Capital, Competitive Advantage, Financial Performance and Company Value Among Banking Industries in Indonesia. Advances in Social Sciences Research Journal, 6(4), 78–89. https://doi.org/10.14738/assrj.64.6419

Novitasari, M., & Agustia, D. (2023). Competitive advantage as a mediating effect in the impact of green innovation and firm performance. Business: Theory and Practice, 24(1), 216–226. https://doi.org/10.3846/btp.2023.15865

Nurhayati, E., Arifin, B., & Mulyasari, W. (2019). Pengaruh Intellectual Capital Terhadap Kinerja Keuangan Di Industri Perbankan Yang Terdaftar Di Bursa Efek Indonesia Dengan Competitive Advantage Sebagai Variabel Intervening. Tirtayasa Ekonomika, 14(1), 1. https://doi.org/10.35448/jte.v14i1.5424

Renaldo, N., & Augustine, Y. (2022). The Effect of Green Supply Chain Management, Green intellectual capital, and Green Information System on Environmental Performance and Financial Performance. Archives of Business Research, 10(10), 53–77. https://doi.org/10.14738/abr.1010.13254

Sukirman, A. S., & Dianawati, W. (2023). Green intellectual capital and financial performance: The moderate of family ownership. Cogent Business and Management, 10(1). https://doi.org/10.1080/23311975.2023.2200498

Susandya, A. A. P. G. B. A., Kumalasari, P. D., & Manuari, I. A. R. (2019). The Role of Green intellectual capital on Competitive Advantage: Evidence from Balinese Financial Institution. Sriwijaya International Journal of Dynamic Economics and Business, 3(August), 227–242. https://doi.org/10.29259/sijdeb.v3i3.227-242

Tan, K., Siddik, A. B., Sobhani, F. A., Hamayun, M., & Masukujjaman, M. (2022). Do Environmental Strategy and Awareness Improve Firms' Environmental and Financial Performance? The Role of Competitive Advantage. Sustainability (Switzerland), 14(17). https://doi.org/10.3390/su141710600

Umah, A. (2022). Kronologi Minyak Chevron Tumpah di Laut Dumai Riau. https://www.cnbcindonesia.com/news/20210302075812-4-227073/kronologi-minyak-chevron-tumpah-di-laut-dumai-riau

Wijayanto, A., Suhadak, Dzulkirom, M., & Nuzula, N. F. (2019). the Effect of Competitive Advantage on Financial Performance and Firm Value: Evidence From Indonesian Manufacturing Companies. Russian Journal of Agricultural and Socio-Economic Sciences, 85(1), 35–44. https://doi.org/10.18551/rjoas.2019-01.04

Yasrawan, K. T., Desak Nyoman Sri Werastuti, & Edy Sujana. (2023). Competitive Advantage as A Link Between the Influence of Intellectual Capital and CSR on Financial Performance. Jurnal Ilmiah Akuntansi, 8(1), 1–27. https://doi.org/10.23887/jia.v8i1.46981