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## Article

# Green intellectual capital and financial performance: The moderate of family ownership

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## ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

# Green intellectual capital and financial performance: The moderate of family ownership

Anna Sutrisna Sukirman<sup>1,2</sup> and Wiwiek Dianawati<sup>1\*</sup>

**Abstract:** This study aims to determine the effect of green intellectual capital disclosure on the company's financial performance, which is then moderated by family ownership. The concept of green intellectual capital disclosure consists of three dimensions: green human capital, green structural capital, and green relational capital. While the company's financial performance is obtained from the company's return on equity. The study uses secondary data for companies listed on the Indonesia Stock Exchange for three financial reporting periods starting from 2019 to 2021 in mining sector companies and basic and chemical industry sector companies, totaling 92 companies. The reason for choosing these companies is because these two sectors have a fairly high level of influence and sensitivity to the environment. The findings of this study's statistical analysis demonstrate that disclosure of a company's green intellectual capital has no direct impact on its financial success. The relationship between company financial success and disclosure of green intellectual capital can be strengthened by family ownership, which acts as a moderating variable. This study has limitations that can be an opportunity for future research, namely not testing all company sectors (except the banking sector) listed on the Indonesia Stock Exchange, so that green intellectual capital disclosure is still limited to companies that have a level of influence or sensitivity to the environment. More testing still needs to be done by increasing the number of company samples and research observation years. This research has practical implications, namely for the government to pay more attention to the environmental interests of the company's operational activities so that the company's financial performance is better but does not damage the environment, and for many investors who care about the environment (commonly known as the green concept"). This study has limitations, namely only testing two company sectors; it is hoped that future research will test more company sectors except the banking sector. This research has never been conducted in previous studies that develop concepts, test the relationship between green intellectual capital disclosure and financial performance directly, and make family ownership a moderator.

**Subjects:** Environmental Economics; Financial Accounting; Management Accounting; Human Resource Management; Industry & Industrial Studies

| **Keywords:** Green intellectual capital disclosure; financial performance; family ownership

## 1. Introduction

The term “Green Intellectual Capital” (GIC) refers to a new paradigm derived from Intellectual Capital. Along with the level of environmental concern expressed by businesses, improving performance is critical, demonstrating the importance of intangible assets in financial reporting. Aside from profits, environmental concern has become one of the company’s primary focuses (Chang & Chen, 2012). Environmental concerns are also part of the competitive advantage that businesses must consider (Yusoff et al., 2019). This type of corporate environmental concern is more commonly referred to as “corporate social responsibility.” The combination of intellectual capital and environmental concern has become the starting point for GIC research development. Increased environmental consciousness can assist businesses in developing positive relationships between CSR and the three dimensions of GIC, namely green human capital, green structural capital, and green relational capital (Jirakraisiri et al., 2021). Companies must innovate not only for internal purposes, but also for the sake of the environment (Chen, 2008; Yusoff et al., 2019). GIC is defined as the total value of intangible assets, knowledge, skills, and environmental concern or innovation at the individual and corporate levels.

Green human capital, green structural capital, and green relational capital are the three dimensions of GIC (Chen, 2008). GIC is a long-term combination of employee concern, intelligence, knowledge, experience, and information (H. Ullah et al., 2022). GIC can not only meet stringent international environmental regulations and increase the environmental awareness of consumers but also gain a competitive advantage (Chen, 2008). Green human capital represents the capabilities possessed by employees in the form of creativity, attitude, experience, and employee competence towards environmental sustainability, which will encourage the company’s business sustainability (H. Ullah et al., 2022; Jirakraisiri et al., 2021). For green organizations, structural capital includes all non-human assets of the organization, such as intangible assets such as organizational charts, manual processes, routines, and technological characteristics (H. Ullah et al., 2022). While the definition of “green relational capital” is an asset that is assessed from the perspectives of customers, suppliers, investors, and suppliers (Xi et al., 2022).

GIC provides an opportunity for companies to focus on sustainable product development along with green manufacturing practices so that, in this way, companies can improve business performance with the help of environmental preservation (Yusliza et al., 2020). Business sustainability is important in measuring company performance. Based on this, there are several performance measurements that can be used to assess the effect of GIC on business sustainability, namely economic performance, environmental performance, and social performance (Yong et al., 2022). The results of several studies on this matter (Boso et al., 2022; Mensah & Tang, 2021; S. H. Ullah et al., 2022; Yong et al., 2022).

The need for information for the public, particularly for public companies whose activities are more environmentally related, necessitates disclosure. Companies are also recognizing the importance of managing communications with external parties in a systematic manner while adhering to GIC. In general, companies, investors, and analysts want trustworthy information, especially when it comes to environmental sustainability. Mining companies, the pharmaceutical industry sector, and industries related to chemical raw materials are among those that are particularly sensitive to environmental concerns. Several studies on intellectual capital disclosure have been conducted, with the results indicating that companies that do so significantly increase the value of the company (Abdolmohammadi, 2005; Ulum, 2005). Although research that directly examines the effect of intellectual capital (IC) on company financial performance yields positive and influential results (M. S. Chen et al., 2005; Mavridis, 2004; Soewarno & Tjahjadi, 2020; Tan et al., 2002; Weqar et al., 2020), there are several studies that show no effect of IC on financial performance, namely research conducted in South Africa (Firer & Williams, 2003).

Research on green intellectual capital disclosure is still very limited (Bozzolan et al., 2003), as is research that only discusses intellectual capital disclosure (Cuozzo et al., 2017; Mubarik et al., 2019; Muttakin et al., 2015). Meanwhile, the company certainly hopes that the GIC information disclosed in the annual report will be well received by investors and the public as consumers who certainly care about the environment. However, the company's hopes will be proven if the GIC/GIC disclosure in the company's annual report has an effect on improving company performance. In addition, some characteristics of company ownership are divided into two categories: family ownership and non-family ownership.

Several studies have been conducted to examine the relationship between intellectual capital and financial performance moderated by family ownership, including finding that there is no influence that strengthens the relationship between intellectual capital and financial performance (Cinintya Pratama & Wibowo, 2017), but there are results that show that there is an increase in company performance in companies that have family ownership characters (Alrawashedh et al., 2021; Pratama & Innayah, 2019), as well as the results of research conducted related to the quality of financial statements which show that companies that have family ownership characters have better quality financial statements (Shiri et al., 2018) as well as research that shows that family ownership has a positive effect on intellectual capital (Forte et al., 2018; Ginesti & Oss, 2018; Forte et al., 2018; Shiri et al. (2018 Shiri et al. Research conducted with family ownership directly linked to intellectual capital disclosure shows a negative relationship (Forte et al., 2017; Ginesti & Oss, 2018; Ginesti & Oss, 2018; Forte et al., 2018; Shiri et al. (2018 Shiri et al. Research conducted with family ownership directly linked to intellectual capital disclosure shows a negative relationship (Mubarik et al., 2019). Based on this, this article moderates the relationship between green intellectual capital disclosure and financial performance. This study explores the relationship between green intellectual capital disclosure and financial performance with moderation of family ownership in two company sectors, namely the mining sector and the basic and chemical industry sector, which have a high level of sensitivity to the environment.

The research has the following novelties: First, the effect of green intellectual capital disclosure on financial performance is still very rare in previous studies. Second, this is the first study to examine the effect of green intellectual capital disclosure on financial performance by using family ownership as a moderation.

## 2. Theoretical background and hypotheses development

### 2.1. Intellectual capital—based view theory

This study uses the Intellectual Capital-Based View (ICB) theory, which focuses on intangible assets or measuring intellectual resources by classifying them into three categories: human capital, structural capital, and relational capital (Yusoff et al., 2019). ICV theory is a development and improvement of the RBV (Resources-Based View), which is considered empirically unable to define a company's competitive advantage and is very general. Resource-Based Theory, abbreviated as RBT, is one of the most widely accepted theories in the field of strategic management (Ulum, 2005).

RBT states that the company has resources that can help it become competitive and be able to guide it to achieve good and sustainable company performance. The resources owned by the company are very valuable and rare things that can become a competitive advantage that will last a long time and are not easy to imitate (Ulum et al., 2016). The resources owned must have the attributes of RBT, namely value, rarity, inimitability, and no substitute resources. RBT is very appropriate to explain research on intellectual capital, especially in the context of the relationship between intellectual capital performance. The IC perspective is classified in three main categories: human capital, structural capital, and relational capital (Pulic, 2004). However, along with the development of IC, the RBV theory is no longer able to explain empirically the exact specification of

IC and its relationship with the company's competitive advantage, so that the ICV theory is considered more appropriate to explain the internal and external advantages of the company .

The ICV theory distinguishes intellectual capital into three categories: human capital, structural capital, and relational capital. From a strategic point of view, intellectual capital can be the key to profit and long-term performance (sustainability performance) based on knowledge.

## 2.2. Intellectual capital

Recognition of intellectual capital (IC) is an effort to increase firm value and competitive advantage (M. S. Chen et al., 2005). The term IC is a combination of intellectual and capital that shows the importance of knowledge (Lev & Zarowin, 1999; Serenko & Bontis, 2013). Because companies usually only focus on their management activities for tangible and financial assets, However, along with the development and needs of the company, intangible assets have become a new focus for improving company activities. IC is not an ordinary accounting concept, and the definition of IC is the difference between the market value and book value of the company caused by IC owned by the company (Mouritsen & Thorbjørnsen, 2004).

The components of IC have been described by several researchers, including Edvinsson (1997), who states that the IC of a company is the total of human capital and the company's own capital structure, while states that the value of the company's IC is obtained from the total of capital structure, human capital, and customer capital (Williams, 2001), but is generally drawn into three components namely human capital (HC), structural capital (SC), and customer capital/relationships which is finally known as relational capital, abbreviated as RC (Bontis, 1998). Green intellectual capital (GIC) is the development of intellectual capital that harmonizes national and international regulations regarding environmental protection and increases public awareness of the importance of protecting the environment. So that the concept of green inherent in intellectual capital becomes a new paradigm.

The first component is Green Human Capital (GHC), the scope of which consists of knowledge, wisdom, skills, expertise, information, and experience of employees related to safety and environmental protection (Chen, 2008), but the form of human action related to environmental concern can include innovation to control pollution by saving energy and protecting the ecosystem around the company (Yusliza et al., 2020). The second component is green structural capital, the total sum of capabilities, commitments, knowledge management systems, reward systems, information technology systems, databases, managerial mechanisms, operating processes, managerial philosophies, organizational cultures, corporate images, patents, copyrights, trademarks, etc. about environmental protection or green innovation in an enterprise (Chen, 2008). For the third component, Green Relational Capital is the total of the firm's interactions with customers, suppliers, membership networks, and partners about the firm's environmental management and green innovation (Ghosh & Haque, 2022). This research is also related to resource-based theory, which is abbreviated as RBT, including one of the most widely accepted theories in the field of strategic management (Ulum, 2005).

RBT states that the company has resources that can help it become competitive and be able to guide it to achieve good and sustainable company performance. The resources owned by the company are very valuable and rare things that can be a competitive advantage that will last a long time and are not easy to imitate (Ulum et al., 2016). The resources owned must have the attributes of RBT, namely value and rarity; they cannot be imitated, and there are no substitute resources. RBT is very appropriate to explain research on intellectual capital, especially in the context of the relationship between intellectual capital performance. The IC perspective is classified into three main categories: human capital, structural capital, and relational capital (Pulic, 2004). Signaling theory is concerned with reducing information asymmetry between two parties arising in social settings. A signal can be an observable action or an observed structure that is used to indicate an invisible characteristic of the signaler. The sending of a signal is usually based on the

assumption that it should be advantageous to the signaler by demonstrating better quality when compared to its competitors. Signaling theory emphasizes the importance of information released by the company on the investment decisions of parties outside the company that present information, records, or descriptions of the past and the company's future survival (Ulum, 2005). The information presented to investors is in the annual report. Voluntary disclosure of green intellectual capital will be one of the most effective media for companies to signal the quality of the company's environmental concern, which is the main focus of the company's competitive advantage.

Disclosure of intellectual capital information in the company's financial statements is a signal to potential investors about the intangible assets owned by the company, and Spence (1973) defines a signal as an activity or attribute, either intentional or unintentional, that is able to change beliefs or convey information to others. Legitimacy theory relies on the premise that there is a "social contract" between the company and the community in which it operates. The social contract is part of the community's expectations of the company on how it should act and requires the company to respond to the environment (Ulum, 2005). Based on this, legitimacy theory will encourage companies to show their intellectual capital capabilities, especially in this study, namely green intellectual capital, in the company's annual financial statements to gain legitimacy from the community for the wealth and financial performance of the company.

The profitability ratio has been widely used as one of the company's performance measurements. Until now, the definition of measuring company performance, including the company's financial performance, is still quite diverse, but in general, it states that financial performance can be assessed from financial ratios that show the level of market returns on the company (Firer & Williams, 2003). The point of view that profitability is a measure of company performance becomes very rational when the performance of intellectual capital will affect profitability. Intellectual capital is an important asset for a company to have a competitive advantage (Pulic, 2004). The superior performance of intellectual capital owned by the company is believed to affect financial performance (profitability). The higher the performance of intellectual capital, the better the financial performance, and the company is believed to be able to manage all its resources efficiently.

A number of empirical studies have proven that the performance of intellectual capital affects profitability. The results of testing the relationship between intellectual capital performance and financial performance as measured by ROE, M/B, ROA, GR (growth in revenues), and employee productivity show that intellectual capital performance has a positive effect on the company's financial performance, both for the present and the future of the company (M. S. Chen et al., 2005). As well as research conducted using companies in Indonesia, which showed that the performance of intellectual capital has a positive effect on the company's financial performance (Basuki & Kusumawardhani, 2012).

In particular, intellectual capital disclosure (ICD) can be a very effective means for firms to signal quality excellence due to the importance of intellectual capital for future wealth creation (Guthrie & Petty, 2000). Especially for firms with a strong intellectual capital base, intellectual capital disclosure is able to differentiate low-quality firms (An et al., 2011).

The GIC component consists of three things in general: green human capital, green structural capital, and green relational capital. The hypotheses proposed in this study are as follows: The company's green human capital has a positive effect on the company's competitive advantage (Y. Chen et al., 2006), and employees who have knowledge, skills, abilities, experience, attitudes, wisdom, creativity, and commitment to environmental protection or green innovation can help companies gain competitive advantage (Anik & Sulistyo, 2021). There have been many studies related to the dimensions of green human capital that affect business sustainability, but the results show that GHC has no effect on business sustainability (H. Ullah et al., 2022), while GHC



is positively related to social innovation (Sheikh, 2021). GHC was found to have a positive effect on environmental performance (Mansoor et al., 2021). However, GHC will have a positive relationship with environmental performance if human resource management is the mediator. (Yong et al., 2022). Research on the influence and relationship of GHC on financial performance is still very limited, but the results still show that there is no direct influence between GHC and financial performance. (Maaz et al., 2022). However, research that only uses human capital has a significant effect on financial performance (Firer & Williams, 2003; M. S. Chen et al., 2005).

The dimensions of green structural capital (GSC) and green relational capital (GRC) are positively influenced by CSR (corporate social responsibility) (Chang & Chen, 2012). However, GSC and GRC have no effect on business sustainability (H. Ullah et al., 2022). Meanwhile, GSC and GRC also affect social innovation (Sheikh, 2021). Research on GSC and GRC on financial performance has not yet been tested directly, so the results of the relationship between GSC and financial performance cannot be shown, even though it has been moderated by social innovation (Mensah & Tang, 2021). Increased company performance in companies that have family ownership characters (Alrawashedh et al., 2021; Pratama & Innayah, 2019), as well as the results of research conducted related to the quality of financial statements, which show that companies that have family ownership characters have better quality financial statements (Shiri et al., 2018); research that shows that companies that have family ownership characters have better quality financial statements (Shiri et al. 2018); and research that shows family ownership has a positive effect on intellectual capital (Forte et al., 2017; Ginesti & Ossorio, 2021). Research conducted with family ownership directly linked to intellectual capital disclosure shows a negative relationship (Mubarik et al., 2019). Based on this, this article makes family ownership a moderating factor in the relationship between green intellectual capital disclosure and financial performance. For this reason, this study proposes the following hypothesis:

**H1:** Green intellectual capital disclosure has a positive effect on *financial performance*.

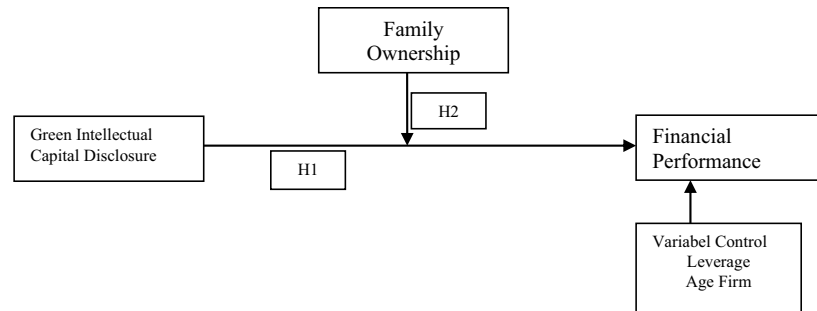
**H2:** Green intellectual capital disclosure has a positive effect on *financial performance*, which is moderated by *family ownership*.

### 2.3. Research methods

This study considers taking research samples from mining sector companies and the basic and chemical industry sectors listed on the Indonesia Stock Exchange. The reason for selecting these samples is that these two sectors have companies that have a high level of sensitivity to the environment (Roberts, 1992), so it is deemed necessary to test their green intellectual capital disclosure. The annual reports were taken during the period 2019–2021, totaling 92 companies. This research was conducted qualitatively and quantitatively. The form of qualitative data is obtained by conducting content analysis on the company's financial statements on the dimensions of green intellectual capital, namely green human capital, green structural capital, and green relational capital. The next step is to calculate the Green Intellectual Capital Score adapted from (Alrawashedh et al., 2021; Chang & Chen, 2012) by obtaining the total percentage of the content analysis results. Then the source of quantitative data for the dependent variable, moderating variables, and research control variables, namely As for the dependent variable of this study, it is financial performance as measured by total ROE (return on equity). The moderating variable is family ownership using the level of company ownership presentation. There are two control variables in this study, namely: Leverage is defined as the use of debt or loan funds to finance company operations. Leverage is proxied in this study by the debt-to-asset ratio (DAR), which equals total debt divided by total assets. As well as the age of the company (firm age) in this study in connection with the perception of investment risk in the company, age is part of the documentation that shows what the company is and will achieve (Bukh & Johanson, 2003).



**Figure 1. Conceptual Framework**



The following Figure 1 shows the conceptual framework in this article as follows:

Because there are moderation variables in this research, Stata is used for the hypothesis testing process. Researchers can test each hypothesis in a single process using Stata. Based on the conceptual framework and hypotheses previously discussed, when discussing the indirect or mediation relationship approach in this research. The regression formula is as follows:

$$ROE_{it} = \alpha + \beta_1 GICD_{it} + \beta_2 GICD * F_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + e_{it}$$

Where ROE is the return on equity, the company's financial performance is GICD, which is the disclosure of green intellectual capital in the company's financial statements, and GICD \* F is the level of moderation of the family ownership variable. Leverage is debt that reflects the ability of creditors to have control beyond their debtors. Specifically, we can say that debt is a contract in which the debtor raises funds from creditors and promises to provide a predetermined stream of payments to creditors. Age is the age of the company since it was founded to be the control variable of this study, and it is the error term.

#### 2.4. Variable measurement

The dependent variable in this study is financial performance. To measure ROE in this study, we used the total ROE in each company, which measures the company's ability to obtain returns for investors or shows the amount of profit that belongs to stockholders (Basuki & Kusumawardhani, 2012; Firer & Williams, 2003; M. S. Chen et al., 2005; Tan et al., 2002). The independent variable in this study is to see the effect of green intellectual capital disclosure in this study using content analysis tailored to this study (Alrawashedh et al., 2021; Chang & Chen, 2012). The control variables in this study are based on several financial characteristics that control financial performance from several previous studies, such as leverage, firm size, and firm age, but in this study only leverage and firm age are used. Leverage is measured using the ratio of total debt to shareholders' equity. As well as firm age, which is the number of years the company was formed, previous research states that there is no effect of company age on the capital market (Bukh & Johanson, 2003).

#### 2.5. Data analysis and result

The results of testing the hypothesis of this study use regression analysis, which examines quantitatively the multivariate relationship between the conceptual framework of this study, namely green intellectual capital disclosure and financial performance, family ownership as a moderating variable, and leverage and firm age as control variables. Table 1 shows the results of descriptive statistics.

Based on Table 1, the results of existing descriptive statistics show that of the 276 observations using the green intellectual capital disclosure variable, it is known that the average value of the family ownership variable during the period 2019–2021 is a mean of 30.20 with a deviation of 33.09%. There are no companies with the lowest family ownership, but there are companies that have the highest level of family ownership; the data distribution is 99.71%. For the green intellectual disclosure variable, the average value during the period 2019–2021 is a mean of 16.42 with

**Table 1. Descriptive statistical results of the variables used in this study**

Variable	Obs	Mean	Std. Dev.	Min	Max
FamilyOwn	276	30.203	33.094	0	99.711
GreenxF	276	16.424	19.08	0	86.749
FinPerformance	276	1.751	34.322	-289.56	110.02
LeverageDER	276	-1.372	45.541	-753.358	24.849
AGE	276	36.13	20.51	4	12

Source: output Stata (2023)

a deviation of 19.08%. There are no companies with the lowest or highest green intellectual capital disclosure of 86.74%. Meanwhile, the financial performance variable shows the average value during the period 2019–2021 as mean 1.75% with a deviation of 34.32%. For the leverage control variable, it has an average mean value of -1.372 with a deviation of 45.54%, as well as the control firm age variable, which has an average mean value of 36.13 with a deviation of 20.51% and a minimum company age data distribution of at least 4 years and a maximum of 12 years. Table 2 below shows the relationship between variables using pairwise correlations.

The correlation between the green intellectual capital disclosure variable and financial performance is -0.093, meaning that there is no relationship between the two variables. Meanwhile, the correlation between the green intellectual capital disclosure variable and the family ownership variable is -0.138, meaning that there is no relationship between the two variables. For the correlation of family ownership variables as moderation, it shows a value of 0.932 between green intellectual capital disclosure and financial performance, which means that there is a relationship if moderated by family ownership. The correlation of the leverage variable as a control variable on green intellectual capital disclosure is -0.090; there is no relationship. As for firm age as a control variable, its correlation is -0.943, which means that there is no relationship between the firm age variable and the green intellectual capital disclosure variable on financial performance.

Based on 256 years observation of company data, the results of our first hypothesis shown in Table 3 in column 1 state that green intellectual capital disclosure has no effect on financial performance, but if moderated by family ownership, shows a positive and significant effect, which can be seen in Table 3 column 4, while the control variable has no effect on the dependent variable on company performance; however, the company's track record continues to be of concern to capital market players (Bukh & Johanson, 2003).

The following are the results of the regression equation after hypothesis testing with the following equation:

$$ROE_{it} = \alpha + \beta_1 GIC_{it} + \beta_2 GIC_{it} * F_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + e_{it}$$

$$ROE_{it} = -1.233 - 0.657 GIC_{it} + 0.184 GIC_{it} * F_{it} - 0.028 Leverage_{it} + 0.008 Age_{it} + e_{it}$$

Based on the regression results and the results of the equation, when GIC increases by one unit, ROE will decrease by 0.657, with a constant value of -1.233. When the moderating variable, namely family ownership, increases by one unit, ROE will increase by 0.184, with a constant value of -1.233. Meanwhile, the leverage control variable shows that an increase of one unit will reduce ROE by 0.028, with a constant value of -1.233. If the firm age control variable increases by one unit, it will increase ROE by 0.008 with a constant value of -1.233.

Discussion of the research findings on the hypothesis of this study shows the probability results of the t-statistic, which tests the significance level of each independent variable, indicating that, at

**Table 2. Relationship between variables**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) GICD	1.000					
(2) FamilyOwn		1.000				
	(0.138)					
(3) GreenxF	0.154*	0.932*	1.000			
	(0.010)	(0.000)				
(4) FinPerformance		0.116	0.101	1.000		
	(0.876)	(0.055)	(0.093)			
(5) LeverageDER	0.102				1.000	
	(0.090)	(0.767)	(0.821)	(0.548)		
(6) AGE						1.000
	(0.175)	(0.881)	(0.904)	(0.943)	(0.841)	

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

Source: Data processed (2023)

the 5 percent significance level, the independent variable green intellectual capital disclosure has a significant effect on the dependent variable financial performance. The probability result of ProbF has a value of 0.96, which indicates that together the regression coefficients have an insignificant value, meaning that the independent variables have no influence on the dependent variable. The R2 value has a value of 0.157, which indicates that the level of determination of the independent variable on the dependent variable is 15.7 percent. In general, the conclusion is that green intellectual capital disclosure does not simultaneously affect financial performance. Statistically, green intellectual capital disclosure has a p-value of  $0.962 > 0.05$ , which means it shows that there is no influence on the company's financial performance.

However, statistically, family ownership shows a value of 0.095 0.05, which means that it has a significant effect and strengthens the relationship between green intellectual capital disclosure and corporate financial performance. Referring to the coefficient column, which shows the direction of the causal effect between the green intellectual capital disclosure variable and the company's financial performance, The coefficient column is negative, which means that green intellectual capital disclosure will have a negative effect on the company's financial performance, meaning that the higher the green intellectual capital disclosure, the lower the company's financial performance. However, the control variables, namely leverage and firm age, have no effect on the relationship between variables. This is contrary to previous research, which states that leverage and firm age affect the disclosure of intellectual capital (White et al., 2007). Based on this, it can be concluded that hypothesis 1 proposed in this study is rejected. As for hypothesis 1, namely that green intellectual capital disclosure affects financial performance, the results of this study contradict the results of research conducted by Chang and Chen (2012). However, the moderating variable shown in hypothesis 2 in this study is accepted, as hypothesis 2 states that green intellectual capital will relate to financial performance if moderated by family ownership. The results of this study are in line with research conducted by Shiri et al. (2018).

### 3. Discussion

The results of this study statistically show that green intellectual capital disclosure has no direct influence on the company's financial performance. However, family ownership as a moderating variable has an influence and is able to strengthen the relationship between green intellectual capital disclosure and corporate financial performance. In recent decades, companies have begun to realize the importance of managing external communication systematically and to appreciate the existence of intellectual capital. Various studies on investor and financial analyst demand for

Table 3. Hypothesis testing							
ROEEAT	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Green ICD	-.657	13.877	-0.05	.962	-27.855	26.541	
GreenxF	.184	.11	1.67	.095	-.032	.399	*
LeverageDER	-.028	.046	-0.61	.539	-.118	.062	
AGE	.008	.101	0.08	.936	-.191	.207	
Constant	-1.233	8.5	-0.15	.885	-17.892	15.426	
Mean dependent var		1.751		SD dependent var		34.322	
Overall r-squared		0.012		Number of obs		276	
Chi-square		3.204		Prob > chi2		0.524	
R-squared within		0.012		R-squared between		0.157	

\*\*\* $p<.01$ , \*\* $p<.05$ , \* $p<.1$   
Source: Data processed (2022)

information indicate that there is a substantial difference between the type of information found in the company's annual financial statements and the type of information expected by the market. Currently, the world market has realized the importance of information about corporate environmental concerns ranging from the company's operational activities to the products produced by the company before they reach consumers. In general, companies, investors, and financial analysts expect reliable information, for example, managerial quality, which includes human resources that have sufficient and unique skills and experience and integrity towards the company and the environment. Relationships with consumers are also very important information to be disclosed by companies today, in addition to financial statements.

Research on green intellectual capital disclosure is still very little done, but based on previous research that examines intellectual capital disclosure, which tends to focus on the value relevance of more specific intellectual capital indicators including the cost of research, development, advertising, patents, brands, customer satisfaction, the competence of human resources owned by the company, and how to capitalize on intellectual capital as an intangible asset owned by the company. Although research on green intellectual capital disclosure is still very limited, this study uses financial statements as a data source because they are easy to obtain, all companies report annual financial statements, and the public as investors and the government as policy-makers can access these financial statements publicly.

Content analysis is almost always used to measure the level of intellectual capital disclosure. The procedure involves codifying qualitative and quantitative information into predefined categories in order to obtain patterns in the presentation and reporting of information. The method is considered systematic, objective, and reliable in determining the factors that influence the content of published reports and can be used in drawing appropriate conclusions (Guthrie & Petty, 2000). One of the disadvantages of qualitative information on intellectual capital is that there are very few explanations for its measurement. In addition, no research has been conducted on the causes of differences in the level of intellectual capital disclosure between companies, but research has been conducted between industry types in applying intellectual capital. This research has the advantage of being the basis for future research on the development of research on green intellectual capital.

Research conducted on 58 companies included in the Fortune 500 on intellectual capital disclosure practices in the company's annual report for 5 years showed that the frequency of disclosure of information about brands and proprietary processes has increased during the observation period (Abdolmohammadi, 2005). In the research examined, the factors that trigger intellectual capital disclosure are board independence, firm age, leverage, and firm size, all of which are significantly related to intellectual capital. Research that shows intellectual capital disclosure is triggered by board independence and leverage in large companies and small companies does not show the relationship (White et al., 2007).

This article uses the perspective of green intellectual capital disclosure, "in which there are dimensions of green human capital, green structural capital," and green relational capital," to find its relationship to financial performance moderated by family ownership. The findings of this study state that green intellectual capital disclosure has no direct effect on the company's financial performance, but family ownership strongly moderates the relationship between green intellectual capital disclosure and the company's financial performance. In particular, this study found that green intellectual capital disclosure has no effect on financial performance, so hypothesis 1 of this study is not supported.

This research has never been conducted in previous studies, especially from the point of view of green intellectual capital, but this research is almost the same as the results of previous studies, which state that intellectual capital disclosure has no effect on financial performance (Firer & Williams, 2003; Mensah & Tang, 2021). This is because there is no decision from the Indonesian government that mandatorily requires all companies to present financial reports and company operations for their concern for the environment, which is usually known as CSR (corporate social responsibility), especially for companies

listed on the Indonesia Stock Exchange, even though companies that have a very high level of sensitivity to the environment include mining sector companies and companies in the basic and chemical industry sectors. Based on research whose results show that CSR affects green intellectual capital (Chang & Chen, 2012).

However, the results of hypothesis 2 are supported; this is in line with research that presents that there is an increase in the company's financial performance if moderated by family ownership, as well as research that examines the positive effect of family ownership on intellectual capital (Alrawashedh et al., 2021; Forte et al., 2017; Ginesti & Ossorio, 2021; Shiri et al., 2018). However, research that directly connects intellectual capital disclosure to financial performance shows a negative relationship (Mubarik et al., 2019). The results of the study mean that the relationship between green intellectual capital disclosure and company financial performance does not show that there is a direct relationship, but the relationship between these variables will be strong if moderated by family ownership. Companies that have family-based ownership characteristics will have a good influence on the implementation of green intellectual capital disclosure in the companies they own; it is possible to fully implement green intellectual capital disclosure in each company.

#### 4. Implications, limitation and research future

Because studies on the disclosure of green intellectual capital are still incredibly uncommon, this study has both strengths and weaknesses. This study's asset is that it has significant theoretical ramifications. This demonstrates how the concept of intellectual capital has evolved within the organization. In particular, there is still a dearth of writing on the disclosure of green intellectual property. So that using secondary data from the Indonesia Stock Exchange, this study can serve as the foundation for the creation of green intellectual capital.

The findings of this research show that disclosure of green intellectual capital has no impact on financial performance. This demonstrates that, up to this point, few Indonesian businesses have integrated environmental concerns into their ownership of the human, structural, and relational capital dimensions of intellectual capital, making it difficult to link those dimensions to business performance. The consequence is that Indonesian businesses are subject to stringent rules requiring them to incorporate the "green" idea into all of their operations. Even today, a lot of people are concerned about how important the environment is, as well as how many natural disasters—from landslides to sudden floods to even health issues caused by the degraded environment—occur.

Because of how the changes in the global economy will affect Indonesian businesses, the government has been urged to move. The government should be required to act swiftly in order to boost competition, hasten the introduction of novel goods, and promote green innovation. This is in line with the belief that the role of the government is to improve the knowledge-based economy, encourage the commercialization of research, and foster an atmosphere that encourages business competition. (Guthrie & Petty, 2000).

Applying the idea of "green intellectual capital disclosure" to a company's operational activities will boost public confidence in businesses that can generate profits and have excellent and maximum financial performance because they are supported by human, economic, and natural resources. (Jirakraisiri et al., 2021). Statistics demonstrate that the company's ownership structure, specifically the presence of family ownership, can strengthen the link between intellectual capital disclosure and financial success.

This research also contributes to the accounting profession because accountants are actually responsible for providing knowledge about the importance of intangibles and for reporting the results to the accounting professional council. Previous research suggests that shareholders who do not understand the importance of a company's intangible assets will not know the true value of the company. As a result, these shareholders will sell their shares at a lower price than they should (Lev & Zarowin, 1999).



This study has limitations that can be an opportunity for future research, namely, not testing all company sectors (except the banking sector) listed on the Indonesia Stock Exchange, so that green intellectual capital disclosure is still limited to companies that have a level of influence or sensitivity to the environment. More testing needs to be done by increasing the number of company samples and research observation years. So it is necessary to do more observation periods in companies listed on the Indonesia Stock Exchange and also use corporate sustainability reports and compare with companies with good GRI levels. It is hoped that future research will use the sustainability report prepared by the company because, in the report, there is a detailed company accountability report reporting a form of environmental concern and in order to obtain a pattern in the presentation and reporting of information on green intellectual capital in the company so that the indicators become consistent. In order to become an index that can be generalized to all industrial sectors, In the opinion of the researcher, it is also necessary to first conduct a preliminary study on the readiness of companies to apply the concept of green intellectual capital in the organizations they manage in the form of interviews and questionnaires.

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#### Correction

This article has been corrected with minor changes. These changes do not impact the academic content of the article.

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