A new decade for social changes
Why Green IC does not Influence Firm Value?

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Abstract. The study’s objective is to examine the effects of green intellectual capital on Tobin's Q in relation to firm value calculations. The study took place during the period from 2019 to 2022. It focused on companies in Energy, Transportation and Logistics, and Industry listed on the Indonesia Stock Exchange’s main board. Secondary information from corporate financial statements and sustainability reports or annual reports are used in this research. A purposive sampling method was used for sample selection to obtain 183 observations and the test using multiple regression analysis. The study result shows that green human capital, green structural capital, and green relational capital do not influence firm value simultaneously. Companies must fully manage their intellectual capital with maximum attention to the environment to influence firm value.

Keywords. Firm Value, Green Human Capital, Green Relational Capital, Green Structural Capital

1. Introduction
On November 21, 2022, KSEI or PT Kustodian Sentral Efek Indonesia issued a press release stating that the number of capital market investors had reached 10,000,628 investors based on Single Investor Identification (SID) with data cut off as of November 3, 2022. Of these, 9,945,347 investors, or 99.78%, are domestic individual investors. The trend of an increasing number of investors has been seen since 2019, when there were still 2,484,354 investors at that time. The increase was due to the simplification of procedures for creating securities accounts online, the development of protection infrastructure for investors such as AKSES and EASY, as well as the Covid-19 pandemic, which has given people awareness of the importance of investing, one of which is through investing in the capital market. The increase in these investors allows the company to maximise the number of investors and funding.

Investors will evaluate the target company before making their investment decisions. The high firm value will enhance investor confidence. Firm value is the asking price that interested purchasers are prepared and ready to pay when the corporation is sold. The stock price, which constantly fluctuates based on activities on the stock exchange, can be used to determine the firm value (Ainunnisa et al., 2021). Companies with high stock prices have the potential to provide prosperity for their investors so that investors have more faith in the company's managers in handling their investment funds (Hermanto et al., 2021).
If the company wants to increase its value, it must effectively manage its resources. Companies must consider these developments when managing their resource allocation since the present emphasis of the global economy is on being green (Khanlarov et al., 2020). The company's inventory of resources also includes tangible and intangible resources. These resources, or what is often referred to as intellectual capital, will support the company’s business activities and impact its performance. When resources or intellectual property are managed by the law and a company’s dedication to the environment, it is considered green intellectual capital. Chen (2008) defined all intangible assets possessed by companies engaged in environmental challenges, including connections, knowledge, and competencies, as “green intellectual capital”. According to Meidijati and Augustine (2022), "green intellectual capital" is firms' knowledge of environmental management. They may use this information to practice corporate responsibility for the environment, abide by environmental regulations, spread the word about the importance of environmental protection, and perhaps even grow their company in the future. The management, disclosure, and reporting of green intellectual capital are still optional for companies, even though it is possible that doing so might speed the development of resources that impact corporate sustainability (Setyawan et al., 2022). Three categories are defined for green intellectual capital. The three classifications are green human capital, green structural capital, and green relational capital (Chen, 2008).

Renaldo and Augustine (2022) stated that green intellectual capital boosts company value but does not improve environmental performance. In the expansion test, green human capital positively impacts environmental performance but does not influence financial performance, unlike green structural capital. Besides that, green relational capital did not affect economic or environmental performance. Khanlarov et al. (2020) concluded that green human and structural capital improves company value. The green communication channel lowers firm value. Yusoff et al. (2019) found that green structural and relational capital improved corporate sustainability, but green human capital had no effect. Green structural and human capital improved a company's sustainability, but green relational capital did not, according to Setyawan et al. (2022). Lastanti and Augustine (2022) argue that green relational capital and green human capital increase firm value, while green structural capital and green intellectual capital do not affect firm value.

Green intellectual capital and firm value have yet to be adequately studied. This study explored the link between green intellectual capital and firm value by looking at each classification. Using secondary information, tests were conducted on the Energy, Transportation and Logistics, and Industrial Sectors during 2019 – 2022.

2. Literature Review and Hypothesis Development
2.1 Stakeholder Theory
Stakeholder theory describes the existence of a company influenced by the company's stakeholders. Some of the stakeholders of a company are investors, employees, suppliers, customers, communities, governments, associations, and groups with political interests in the company (Deegan, 2014; Rankin et al., 2018). Stakeholder theory suggests that companies must consider stakeholders' impact on company activities. According to Hasnas (1998), companies must balance the interests of each stakeholder. To minimise conflicts of interest, it is necessary to align interests between stakeholders. In addition, companies that try to fulfil the interests of their stakeholders will be more valuable than those that do not. The value is related to finance and includes everything considered essential and valuable for its stakeholders.
Stakeholders’ needs for a company can be met through reporting company information. Reporting of company information can be used to gain stakeholders' support, divert stakeholders' focus from negative company information, and provide information used as the basis for decision-making. According to Freeman, the company information can be delivered through integrated reporting, which presents information related to finance, social, environmental, and governance, to obtain overall information that generates value for stakeholders (Rankin et al., 2018).

2.2 Firm Value
Firm value can be interpreted as the price to be paid by interested parties once a company has been sold. The firm value can be reflected in the share prices (Susanti et al., 2020). Tobin's Q ratio calculates the market value of debt and shares outstanding compared to the replacement value of the company's assets. Investors use Tobin's Q ratio to calculate the marginal added value of Q in making investment decisions so that Tobin's Q ratio can illustrate how much a company is worth from an investor's point of view. Apart from being considered more rational in measuring firm value because it includes debt and all company assets, Tobin's Q ratio also has other advantages, including this ratio considering the development of shares prices, evaluating management's ability to manage the corporate's assets, and considering the investment potential that is constantly growing (Hermanto et al., 2021; Utomo, 2019). Companies with Tobin's Q value exceeding 1 indicate that company management can manage the company, has the potential to have high growth, and has better investment growth opportunities (Indrarini, 2019; Nguyen & Doan, 2020).

2.3 Green Intellectual Capital and Firm Value
Green intellectual capital can be broken down into green human, structural, and relational capital. The company's human capital is crucial to its long-term success (Setyawan et al., 2022). A company's "green human capital" consists of its employees' intangible skills and knowledge in environmental management and green innovation. Knowledge, abilities, experience, outlook, originality, and dedication are all examples of employees’ soft skills. Green human capital may be at risk if employees leave the company.

Structural capital is known as a company's facilities and infrastructure, as well as administrative processes, that play a role in obtaining products and services owned by companies (Setyawan et al., 2022). “Green structural capital” is the ability, commitment, information technology systems, organisational culture, managerial mechanisms, patents, copyrights, trademarks, and so on owned by companies related to environmental management and green innovation. Because the company owns it, if an employee walks away from it, green structural capital will not disappear (Chen, 2008).

Relationship capital helps organisations, stakeholders, and partners communicate to maintain business operations (Setyawan et al., 2022). "Green relational capital" is the firm's and its stakeholders' relationship regarding environmental management. The company can improve stakeholder relations by caring about the environment. Green intellectual capital must be managed to increase revenue, competitiveness, and reputation (Chen, 2008; Setyawan et al., 2022).

and Augustine (2022) stated that firm value can be increased through green relational capital and green human capital. The study's hypothesis is that:

H1: Green human capital has a positive effect on firm value
H2: Green structural capital has a positive effect on firm value
H3: Green relational capital has a positive effect on firm value

The research framework used is presented in Figure 1.

![Figure 1 Research Framework](image)

3. **Research Method**

3.1 **Data and Sample**

The link between the firm value and green intellectual capital is examined in this quantitative research. The research used a firm as its unit of analysis, and financial reports and sustainability reports or annual reports of companies listed on the Indonesia Stock Exchange (IDX) on the main board served as secondary data sources. Information was obtained from all organizations between 2019 and 2022, focusing on those in the Energy, Transportation and Logistics, and Industry sectors. The www.idx.co.id page or the company's website was used to collect reports. The sample is selected via purposive sampling. The results from the purposive sampling are shown in Table 1.

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Companies in the Energy, Transportation and Logistics, and Industry sectors listed on the main board on the IDX in 2019 – 2022</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>260</td>
</tr>
<tr>
<td>2</td>
<td>Companies that did not publish financial reports and sustainability reports or annual reports during 2019 – 2022</td>
<td>(7)</td>
<td>(6)</td>
<td>(1)</td>
<td>(4)</td>
<td>(18)</td>
</tr>
<tr>
<td>3</td>
<td>Companies with reporting periods that do not end on December 31</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(4)</td>
</tr>
<tr>
<td>4</td>
<td>Total sample</td>
<td>57</td>
<td>58</td>
<td>63</td>
<td>60</td>
<td>238</td>
</tr>
<tr>
<td>5</td>
<td>Total outliers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(55)</td>
</tr>
<tr>
<td>6</td>
<td>Total observations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>183</td>
</tr>
</tbody>
</table>

3.2 **Variable Measurement**

3.2.1 **Firm Value**

Firm value is the price to be paid by interested parties once a company has been sold. Firm value is determined using Tobin's Q ratio (Hermanto et al., 2021). Tobin's Q ratio calculates the market value of the corporation's outstanding shares and liabilities compared to the asset replacement cost. Tobin's Q’s formula is:
3.2.2 **Green Intellectual Capital**

Green intellectual capital is known as a company's knowledge, expertise, system, and relationship gained through environmentally responsible business practices. To quantify Green Intellectual Capital, a content analysis approach is utilised. The measurement indicators presented in Table 2 were obtained from the research of Renaldo and Augustine (2022) and Chen and Hung (2014), which include 17 factors divided into three categories for disclosure by classification. When a company discloses information, it receives a 1, but when it does not, it gets a 0. The score is determined by combining all the reported items and dividing them by the number of criteria that need to be applied. The Green Human Capital Index, Green Structural Capital Index, and Green Relational Capital Index are defined based on a formula:

\[
GHC = \frac{\sum \text{Disclosure of GHC indicators}}{\text{Maximum total disclosure}}
\]

\[
GSC = \frac{\sum \text{Disclosure of GSC indicators}}{\text{Maximum total disclosure}}
\]

\[
GRC = \frac{\sum \text{Disclosure of GRC indicators}}{\text{Maximum total disclosure}}
\]

<table>
<thead>
<tr>
<th>No</th>
<th>Classification</th>
<th>Evaluation Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dimensions of green human capital (GHC)</td>
<td>There is productivity and employee participation in maintaining the environment in the company.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>There is the ability/skill of employees to maintain the environment in the company.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>The information shows that company employees produce goods and services related to environmental protection.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>There is teamwork in keeping the environment at a high level.</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>There is full support from company leaders for employees in achieving the goal of protecting the environment.</td>
</tr>
<tr>
<td>6</td>
<td>Dimensions of green structural capital (GSC)</td>
<td>There is a management system for environmental protection in the company.</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>There are profits that companies get from environmental protection activities.</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>There is information that the company has a good ratio of investment in environmental protection in research and development to sales of goods or services.</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>The company's innovation in environmental protection.</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>The company's investment in environmental protection.</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>There is a knowledge management system about the environment in the company that is beneficial for accumulating and sharing knowledge.</td>
</tr>
</tbody>
</table>

\[
Tobin's \ Q = \frac{(MVE + \text{Total Liabilities})}{\text{Total Assets}}
\]
4. Results and Discussion

4.1 Descriptive Statistics

Table 3 Result of Descriptive Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Means</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV</td>
<td>183</td>
<td>0.3863</td>
<td>1.4387</td>
<td>0.9006</td>
<td>0.2264</td>
</tr>
<tr>
<td>GHC</td>
<td>183</td>
<td>0.0000</td>
<td>1.0000</td>
<td>0.5956</td>
<td>0.3483</td>
</tr>
<tr>
<td>GSC</td>
<td>183</td>
<td>0.0000</td>
<td>0.8333</td>
<td>0.4290</td>
<td>0.2830</td>
</tr>
<tr>
<td>GRC</td>
<td>183</td>
<td>0.0000</td>
<td>0.6667</td>
<td>0.2168</td>
<td>0.2371</td>
</tr>
</tbody>
</table>

Source: SPSS

Table 3 displays the descriptive statistics results. Firm Value, as measured by descriptive statistics, has a mean of 0.9006, greater than a standard deviation of 0.2264. Tobin’s Q for the sample companies was 90.06%, based on the average firm value as a percentage of total assets, indicating that none of the companies were, on average, value creators. Green human capital has a mean value of 0.5956, greater than a standard deviation of 0.3483. Green structural capital has an average value of 0.4289, greater than a standard deviation of 0.2830. Green relational capital has a mean value of 0.2168, less than a standard deviation of 0.2371.

4.2 Classic Assumption Test

4.2.1 Normality Test

To ascertain whether the residual values were regularly distributed, the normality test was run. On unstandardised residual values from the results of the linear regression test with a significance level of more than 0.05 or 5%, the one-sample Kolmogorov-Smirnov method was used to test for normality. Due to the significance value of 0.200 in the test findings, the residual values are regularly distributed.

4.2.2 Multicollinearity and Heteroscedasticity Test

To examine the potential for correlation between the independent variables, a multicollinearity test was performed. Results of the multicollinearity test are displayed in terms of VIF and tolerance values. Multicollinearity-free regression models are those where the VIF and tolerance values are less than ten and greater than 0.1, respectively.

To find out if the variance of the residual values in a regression model varies from one observation to the next, one may apply the heteroscedasticity test. Heteroscedasticity testing
uses the Glejser Test. There are no signs of heteroscedasticity where the significance is greater than 0.05 or 5%. Table 4 displays the outcomes of the multicollinearity and heteroscedasticity analysis.

**Table 4 Result of Multicollinearity and Heteroscedasticity Test**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Multicollinearity Test</th>
<th>Heteroscedasticity Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tolerance</td>
<td>VIF</td>
</tr>
<tr>
<td>GHC</td>
<td>0.611</td>
<td>1.637</td>
</tr>
<tr>
<td>GSC</td>
<td>0.607</td>
<td>1.648</td>
</tr>
<tr>
<td>GRC</td>
<td>0.656</td>
<td>1.525</td>
</tr>
</tbody>
</table>

Source: SPSS

The results of the multicollinearity tests show that the VIF and tolerance values are less than ten and greater than 0.1. Thus, the regression model shows no evidence of multicollinearity, as the independent variables do not have any correlation. The heteroscedasticity test findings show that each variable's significance value is higher than 0.05. Therefore, the regression model is devoid of heteroscedasticity symptoms.

### 4.2.3 Autocorrelation Test

The autocorrelation test has been performed to ascertain the link between the interfering errors during the study period and those during the prior period. The Durbin-Watson (DW) test was used to conduct the test. There is no autocorrelation if the DW value is more than dU and less than 4–dU. Table 5 displays the autocorrelation test results.

**Table 5 Result of Autocorrelation Test**

<table>
<thead>
<tr>
<th>k</th>
<th>N</th>
<th>dL</th>
<th>dU</th>
<th>DW</th>
<th>4-dU</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>183</td>
<td>1.7249</td>
<td>1.7915</td>
<td>1.934</td>
<td>2.207</td>
</tr>
</tbody>
</table>

Source: SPSS

The test results indicate that the DW value is more than dU and less than 4-dU. As a result, the regression model may be considered free from autocorrelation.

The regression model applied in this study is good and may be further examined because it passes all of the classic assumption tests.

### 4.3 Hypothesis Testing

Hypothesis tests have been conducted to establish the link between Green Intellectual Capital and Firm Value. The test results are presented in Table 6.

**Table 6 Result of Hypothesis Testing**

<table>
<thead>
<tr>
<th>Model</th>
<th>Adjusted R Square</th>
<th>F test</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F-stat</td>
<td>Sig</td>
</tr>
<tr>
<td>1</td>
<td>0.007</td>
<td>1.403</td>
<td>0.244b</td>
</tr>
</tbody>
</table>

Source: SPSS

Test results showed an adjusted R-square of 0.007. Green Relational, Structural, and Human Capital affect firm value by 0.7%. Factors outside the regression model affect the remaining 99.3%. For the F-test results, the significant value is 0.244. As the value is higher than 0.05, there is no correlation between Green Human Capital, Green Structural Capital, and Green Relational Capital on Firm Value simultaneously. Because the independent and dependent variables do not share a relationship simultaneously, H1, H2, and H3 are rejected, and the t-test is not followed.
4.4 Discussion

The tests showed that Green Human Capital, Green Structural Capital, and Green Relational Capital did not affect Firm Value simultaneously. These three independent variables do not impact firm value in companies in the Energy, Transportation and Logistics, and Industrial Sectors. Apart from the F-test results, the coefficient of determination test also shows that the influence of Green Structural, Human, and Relational Capital on Firm Value is only 0.7%. This research's results align with the tests conducted by Lastanti and Augustine (2022).

Disclosures made by companies are still relatively small, especially for green relational and structural capital. The mean value for green structural capital is 0.4290, and green relational capital is 0.2168, indicating that, on average, companies disclose indicators for these variables below 50%. These results show that the companies do not yet understand the importance of green intellectual capital, especially green relational and green structural capital—this lack of understanding makes the companies not fully disclose green intellectual capital disclosure indicators. This lack of understanding can be caused because the sample company sector does not require green intellectual capital. Apart from that, Indonesia is a developing country, so companies in Indonesia tend not to pay attention to environmental protection in their business activities. The results of this research are contrary to stakeholder theory because the disclosures made cannot increase firm value.

Even though the research provides results that do not affect firm value, managing green intellectual capital must still be a company's concern. Green human capital management is needed so that more innovations emerge from employees related to the environment by utilising their technology. Companies that invest in environmental protection can increase green structural capital and will get a good perception from the public. In managing green relational capital, companies must establish relationships with partners honestly and openly by paying attention to each other's confidentiality regarding the environment to provide stakeholder confidence. If a company can maximise the management of green intellectual capital, it is not impossible for the company to increase its value in the future.

5. Conclusion

Based on the test results, it can be concluded that green human capital, green structural capital, and green relational capital do not affect firm value simultaneously. According to this research, the managerial implications are:

a. Companies must focus more on managing green intellectual capital that they hold to influence firm value.

b. Investors more concerned about environmental protection can consider the company's efforts in managing its green intellectual capital.

c. The government, through OJK, issues regulations regarding the management and disclosure of the company’s green intellectual capital.

Limitations in this study are that green intellectual capital should be able to increase the firm value. Different results indicate that the company still needs to manage its intellectual capital with maximum attention to the environment. Besides that, not all companies publish sustainability reports and annual reports every year, thereby reducing the research sample. In addition, the measurement of secondary data using content analysis causes the measurement to be subjective, so there is a potential for bias in the measurement of variables. Suggestions for further research are to add the research sector and period and also develop new measurements by adding other variables related to the environment that affect firm value.
References
