

**Original Research Article**  
**The Effect of ESG Scores towards Firm  
Financial Performance: The Moderating Role of  
Intellectual Capital Components**

**Commented [U1]:** Suggested amendment on the topic: Moderating Effect of ESG Scores on the relationship between Intellectual Capital Components and Firm Financial Performance. The reason is that independent variable is the variable to be decomposed not moderator variable.

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**ABSTRACT**

**Aims:** This study aims to determine the relationship between ESG Scores, Human Capital Efficiency (hereinafter referred to as HCE), Structural Capital Efficiency (hereinafter referred to as SCE), and Capital Employed Efficiency (hereinafter referred to as CEE) with Firm Financial Performance (hereinafter referred to as FFP). The role of HCE, SCE, and CEE as moderation between ESG Scores and FFP is also examined. This study uses Firm Size as a control variable.

**Study design:** Quantitative, Correlation, Panel data regression on time series data.

**Place and Duration of Study:** Sample: With a purposive sampling approach, a total of 122 consisting of 58 companies listed on the Indonesian Stock Exchange in 2020-2023 and have ESG Scores from Morningstar Sustainalytics.

**Methodology:** This study utilized the Fixed Effect Regression Model based on the preliminary test results for panel data regression.

**Results:** The results of this study indicate that ESG Scores, HCE, and CEE have a positive effect on FFP, SCE doesn't affect FFP, HCE cannot moderate the relationship between ESG Scores and FFP, SCE weakens the relationship between ESG Scores and FFP, and CEE strengthens the relationship between ESG Scores and FFP.

**Conclusion:** This research concludes that the company's increasing FFP is influenced by several factors, including ESG Scores and Intellectual Capital (hereinafter referred to as IC) Component. The results of this study can be taken into consideration by companies and external parties such as potential investors and can influence stakeholders' decision-making regarding the FFP which is influenced by ESG reflected by ESG Scores and knowledge-based corporate resources reflected by the IC Component.

*Keywords: ESG Scores, Intellectual Capital, Human Capital Efficiency, Structural Capital Efficiency, Capital Employed Efficiency, Firm Financial Performance*

## 1. INTRODUCTION

Improving the firm's financial performance in the era of globalization has always been the demand and attention of stakeholders including investors and the general public. Obtaining

maximum profit and profit by the company's target is an important ultimate goal for the Company to compete competitively with other companies (Febiyanti & Hersugondo, 2022). Li et al., (2021) state that the 2020 post-COVID-19 stock market crash globally caused challenges to economic development, especially in sustainable development. The United Nations Global Compact in its research found that 62% of CEOs from 1,230 Managers in 113 nations with 21 businesses realize how important it is to accelerate the move to a sustainable business model era (Accenture, 2021). Investment based on sustainable business, especially in the capital market, continues to grow. Sustainable business pertains to Environmental (E), Social (S), and Governance (G) issues that have caused global concern. Stakeholders are becoming increasingly convinced and aware of business sustainability, especially after the global warming events, market crashes, and economic crises in recent decades (Setiani, 2023).

ESG scores are a contributing aspect that can influence FFP (Makhdalena et al., 2023). ESG Scores are one of the non-financial components used as a reference for companies, potential investors, academics, and financial markets to evaluate corporate sustainability (Gillan et al., 2021). As global growth continues to increase, managers and stakeholders believe that ESG performance is a crucial element for corporate reputation and success (Singh & Gaur, 2013). According to Singh & Gaur (2013), companies and other stakeholders still urgently need indicators to assess environmental and social activities and mechanisms to process them. Morningstar Sustainalytics, in partnership with IDX, has provided extensive coverage of over 16,000 firms, offering the most comprehensive analyst-based ESG risk ratings available in the industry. ESG provides insight into how corporations and investors incorporate environmental, social, and governance concerns into their business strategies.



**Chart 1. Number of ESG Scores Companies listed on the IDX in 2020-2023**  
 Source: Morningstar Sustainalytics 2020-2023

In ESG performance, rating agencies conduct sustainability and business performance research using their version of indicators and methods. Previous research conducted by Setiani (2023) they used ESG Scores published by IDX in collaboration with Morningstar Sustainalytics. They have conducted ESG ratings which are divided into five categories, namely; Negligible, Low, Medium, High, and Severe. Supported by quantitative and

qualitative analysis, Sustainalytics explains why companies are vulnerable to certain particular ESG challenges and evaluates the effectiveness of companies in managing these ESG issues. The 122 samples in this study have different ESG scores, in the range of 2020 to 2023 showing an average Negligible of 0 companies, Low 8 companies, Medium 18 companies, High 1 company, and Severe 1 company.

According to Freeman (1984), it shows that in stakeholder theory, companies are required to not only carry out their operations but also offer benefits to other stakeholders. For the market and decision-makers within the company, ESG Scores are very important to measure how the services provided to society at large can affect FFP. With the implementation and adoption of ESG guidelines, the FFP will improve (Sandberg et al., 2023). Companies can mitigate conflicts of interest between management and other stakeholders by effectively addressing issues. Additionally, engaging in social responsibility initiatives can generate relational assets and moral capital, which in turn can enhance company performance (Shahzad et al., 2022).

Every company must be able to make the best use of its tangible and intangible resources to increase maximum profits (Fauzia, 2016). According to Ardianto & Rivandi (2018), IC is an intangible asset that has a high value for the company, because IC can improve company performance. Companies around the world have recognized that intangible assets such as IC can help superior performance, especially in the new economic era (Karyani & Resa Perdiansyah, 2022). The development of IC in Indonesia has been seen, particularly following the introduction of PSAK Number 19 which addresses intangible assets. IC can be defined as the quantity produced by the three primary components of the organization, namely HCE, SCE, and CEE related to science and technology that can be used to improve FFP and competition (Sawarjuwono & Kadir, 2003).

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According to Resource-Based Theory, the use of IC can enhance the competitive advantage of organizations (Jay Barney, 1991), because their business activities make them more likely to invest in assets in the form of IC. Pulic (2000, 2004) developed by Ulum et al., (2014) states that IC in the VAIC (Value Added Intellectual Capital) model consists of three components, namely HCE, SCE, and CEE. Previous research conducted by (Destania & Puspitasari, 2021; Haris et al., 2019; Nurul Amalia & Rahadian, 2019) showed that there is a significant positive relationship between HCE and FFP. Then in research conducted (Akmala & Rohman, 2021; Destania & Puspitasari, 2021; Sukmana & Fitria, 2019) shows that there is a significant positive relationship between SCE and FFP. As well as in research (Akmala & Rohman, 2021; Aprilyani et al., 2020; Sukmana & Fitria, 2019) shows that there is a significant positive relationship between CEE and FFP.

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Unlike before the pandemic, consumers and investors now expect companies to apply ESG principles in operations, supply chain management, talent management, and other critical business areas. In addition to ESG principles, the concepts of HCE, SCE, and CEE in IC are often the basis of competitive advantage. Together with finance, IC can complete the set of resources and organizational performance (Marr, 2018). In research Song (2024) shows that there is a relationship between ESG and HCE, in research Martiny et al., (2024) state that ESG is determined by non-financial determinants such as SCE, CEE, and IC, then in research (Akmala & Rohman, 2021; Haris et al., 2019) shows that IC Components can improve FFP. Therefore, this study contributes to the literature by examining the effect of ESG Scores and IC Components such as HCE, SCE, and CEE on FFP and examining the moderating role of HCE, SCE, and CEE in the relationship between ESG Scores and FFP in companies that have ESG Scores from IDX Morningstar Sustainalytics in 2020-2023 as a study both for further research purposes and for companies and stakeholders in their interests in making decisions on the company's financial performance.

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

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### 2.1 Literature Review

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#### 2.1.1. Stakeholder Theory

The term "stakeholder" was first coined by the Stanford Research Institute (SRI) in 1984 (Riandy et al., 2023). Stakeholders exist within the organization, which means that some individuals and communities can affect or be influenced by the organization's goals, executives must consider various stakeholder groups if the organization is to be successful in the current and future environment (Freeman, 1984). Stakeholders are requesting increased transparency about environmental, social, and governance sustainability in the process of making business decisions (Hassan et al., 2021). Companies can reduce risk, enhance reputation, and improve financial performance in the future by considering the needs and desires of everyone involved.

Stakeholder Theory studies the relationship between environmental, social, and governance disclosures and FFP conducted by Velte (2017); Whelan et al., (2015) have illustrated that companies are not only responsible to their shareholders but also to others such as employees, customers, suppliers, creditors, and society, especially related to environmental, social, and governance impacts. This theory supports ESG Scores, because the disclosure of environmental, social, and governance activities is needed by many parties including the general public. Stakeholders are categorized into two, namely internal parties and external parties, internal parties include employee staff, management, and shareholders, while external parties include consumers, suppliers, creditors, investors, and the government (Yulianita et al., 2019).

The component of IC in the view of this theory is how much the company can be responsible for monitoring, creating, and conveying knowledge to all resources owned such as human resources (HCE), tangible assets, physical capital (CEE), and structural capital (SCE). Not only that, this theory also considers corporate accountability by reporting financial and non-financial reports (Riandy et al., 2023). In the financial statements, there are types of information submitted, namely mandatory and voluntary information, one of which is voluntary is IC information (Innayah et al., 2020). Therefore, this study supports stakeholder theory as the basis for the results of the influence of ESG Scores and IC components in improving the FFP.

#### 2.1.2. Resource-Based Theory

Resource-based theory explains that a firm's capacity to retain important, scarce, and irreversible resources and allocate and use resources efficiently is key to maintaining a sustainable competitive advantage (J. Barney, 1991). The resource-based theory believes that a firm's competitive advantage stems from its assets and abilities, as well as its social and environmental responsibilities (J. B. Barney & Mackey, 2005). Although not explicitly expressed, its ideas lay the foundation for understanding the role of resources and capabilities in a firm's growth and competitiveness. The theory assumes that firms can use and manage their resources to compete with other firms for competitive advantage.

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Resource-based theory studies that examine the correlation between ESG, IC Components, and FFP conducted by Kurniawati et al., (2020); Reboredo & Sowaity (2022) prove that companies can achieve competitive advantage through valuable resources such as IC and also ESG values that can improve FFP. RBT strongly supports the influence of ESG Scores

in improving business performance and financial performance. Theoretically, exploring corporate value in the correlation between ESG and financial performance is a participation and familiarity capability in social and environmental activities.

Companies can analyze their competitive advantage through the internal environment (Pratama & Wibowo, 2017). In this case, the IC component is a human resource that can help make companies with high-competitive strategies, through the management of knowledge-based resources, IC in Resource-Based Theory supports being able to create business strategies, especially in terms of internal environmental resources. Therefore, this study supports Resource-Based Theory because it can be used as a basis for the test results of the effect of ESG Scores and IC Components on FFP

## 2.2 Hypothesis Development

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### 2.2.1. The Effect of ESG Scores on FFP

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ESG Scores are non-financial aspects used to assess company performance derived from environmental, social, and governance aspects. Prior studies investigating the impact of ESG factors on FFP have yielded inconclusive findings. In research (Duque-Grisales & Aguilera-Caracuel, 2021) shows that there is a negative influence between ESG Scores and the FFP. However, research (De Lucia et al., 2020) shows that good ESG will result in better FFP.

When companies invest in environmental innovation, productivity, and sustainable development policies, it will affect the company's ROA (Return on Asset) value (Vlavorine & Widianingsih, 2023). Similarly, research Gillan et al., (2021) also indicates a direct correlation between ESG Scores and FFP. By stakeholder theory, this will involve stakeholders to be able to consider each other's needs and interests. So that the first hypothesis can be formulated, namely:

**H1: ESG Scores have a positive effect on FFP**

Commented [U11]: Return on assets (ROA)

### 2.2.2. The Effect of HCE on FFP

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Based on Resource-Based Theory, FFP might impact company resources such as assets, knowledge, and information, because companies can control their resources including intellectual capital to increase efficiency and effectiveness in obtaining profits and competitive advantage. According to Wang & Chang (2005), IC Components is divided into four namely; human, customer, innovation, and process. However, VAIC was developed by Pulic (2000) is the most widely accepted methodology for measuring IC performance, VAIC classifies IC into three namely; HCE, SCE, and CEE.

HCE according to the VAIC model is one of the components of IC. This relationship supports Resource-Based Theory as a company's competitive advantage in improving financial performance. Previous research conducted by (Destania & Puspitasari, 2021; Haris et al., 2019; Nurul Amalia & Rahadian, 2019; Pitaloka, 2017) indicates that there is a significant positive correlation between HCE and FFP. So that the second hypothesis can be formulated, namely:

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**H2: HCE has a positive effect on FFP**

Commented [U16]: Return on assets (ROA)

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### 2.2.3. The Effect of SCE on FFP

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In a company or organization, SCE refers to what remains when human resources and physical resources are excluded. According to Sveiby (1997), a holistic view of IC is the distinction between internal and external structures. Therefore, SCE is related to Intangible Assets set up by organizations to facilitate the development of business structures and drive performance (Edvinsson, 1997). This relationship supports Resource-Based Theory because efficient management and utilization of structural capital can make a positive contribution to the company's financial performance. Proven by research conducted (Akmala & Rohman, 2021; Destania & Puspitasari, 2021; Sukmana & Fitria, 2019) which shows that there is a significant positive relationship between SCE and FFP. So, the third hypothesis can be formulated, namely:

**H3: SCE has a positive effect on FFP**

#### 2.2.4. The Effect of CEE on FFP

CEE is an indicator of the company using all its resources in the form of physical and financial capital (Ulum et al., 2014). Corporations can optimize their physical capital to realize high returns (Pulic, 2004). Companies that can optimize CEE will be able to realize and increase market value, company growth, and financial performance (Akmala & Rohman, 2021). If companies can use CEE well, they can reduce operational costs and optimize the added value generated by their intellectual capabilities.

In line with Resource-Based Theory, IC consisting of HCE, SCE, and CEE is the best category that causes a company to achieve competitive and sustainable advantages (Kurniawati et al., 2020). Companies use tangible and intangible resources to achieve their performance (Haris et al., 2019). In this case, CEE is also important in improving performance (Pulic, 2004). A similar opinion was conveyed by Firer & Mitchell Williams (2003), that CEE is the most significant source of financial performance. this is supported and proven by (Akmala & Rohman, 2021; Aprilyani et al., 2020; Sukmana & Fitria, 2019) which shows that there is a significant positive relationship between CEE and FFP. So that the second hypothesis can be formulated, namely:

**H4: CEE has a positive effect on FFP**

#### 2.2.5. The moderating role of HCE on the relationship between ESG Scores and FFP

Song (2024) states that to improve the company's reputation, ESG performance catalyzes increased efficiency in human capital investment, in addition, with good human capital, it will create asset value with a high beta value through ESG performance. company investment in human resources can effectively improve its performance and competitiveness. So wise investment in human capital can increase productivity and grow the company's performance capabilities (Słomka-Golebiowska et al., 2023).

Based on Stakeholder theory, ESG performance is needed and demanded by stakeholders as a business decision-making process (Hassan et al., 2021). Therefore, companies with good ESG performance and disclosure will be preferred by investors because they can increase the efficiency of human resource investment (Bang et al., 2023). With the relationship between ESG and financial performance conducted by (Ahmad et al., 2021; Makhdalena et al., 2023; Setiani, 2023) and the relationship between ESG Scores and HCE by Song (2024), so the fifth hypothesis can be formulated, namely:

**H5: HCE moderates the effect of ESG Scores on FFP**

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**Commented [U24]:** Return on assets (ROA)

**Commented [U25]:** Moderating effect of SSG Scores on the relationship between Human Capital Efficiency (HCE) and Firm Financial Performance (FFP)

**Commented [U26]:** ESG Scores moderates the effect of Human Capital Efficiency (HCE) and Return on Assets (ROA)

### 2.2.6. The moderating role of SCE on the relationship between ESG Scores and FFP

The debate about ESG performance is rooted in historical debates about internal and external characteristics, this explains when and why the performance of certain companies over time has shown higher levels of performance than others (Crace & Gehman, 2023). According to Martiny et al., (2024), ESG performance can be assessed based on various variables, including non-financial features such as organizational structure, corporate culture, reputation, knowledge, decision-making, attributes, actions, resources, assets, attitude, and human resources, an IC. SCE in this case can determine ESG performance as an asset owned by the company.

Stakeholder Theory about ESG performance with Structural Capital can adopt an explicit sustainability strategy with stakeholder interest orientation and when there is a CSR or sustainability committee or management system (Martiny et al., 2024). With the positive relationship between ESG Scores and FFP conducted by (Ahmad et al., 2021; Makhdalena et al., 2023; Setiani, 2023) and the relationship between the determinants of SCE and ESG Performance by (Martiny et al., 2024). So, the sixth hypothesis can be formulated, namely:

**H6: SCE moderates the influence of ESG Scores on FFP**

### 2.2.7. The moderating role of CEE on the relationship between ESG Scores and FFP

CEE is one of the components of IC in the VAIC method developed by (Pulic, 2000). According to (Crace & Gehman, 2023; Martiny et al., 2024; Rothenberg et al., 2017), ESG performance is determined by financial and non-financial factors which include assets, physical capital, and IC. CEE in this case can determine ESG performance as an asset owned by the company so that it can improve the company's reputation and financial performance.

In Resource-Based Theory, CEE is a category among the components of IC assets owned by the company and can cause a company to achieve competitive and sustainable advantages (Karyani & Resa Perdiansyah, 2022). Research conducted by (Ahmad et al., 2021; Makhdalena et al., 2023; Setiani, 2023) proves that there is a positive relationship between ESG Scores and FFP in the company, and CEE is one of the determinants of ESG performance (Martiny et al., 2024). So, the seventh hypothesis can be formulated, namely:

**H7: CEE moderates the influence of ESG Scores on FFP**

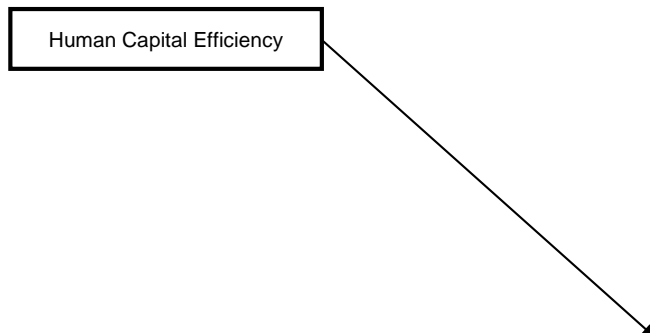
**Commented [U27]:** Moderating effect of SSG Scores on the relationship between Structural Capital Efficiency (SCE) and Firm Financial Performance (FFP)

**Commented [U28]:** ESG Scores moderates the effect of Structural Capital Efficiency (SCE) and Return on Assets (ROA)

**Commented [U29]:** Moderating effect of SSG Scores on the relationship between Capital Employed Efficiency (CEE) and Firm Financial Performance (FFP)

**Commented [U30]:** ESG Scores moderates the effect of Capital Employed Efficiency (CEE) and Return on Assets (ROA)

Based on the description above, the conceptual model of this research can be described as follows:



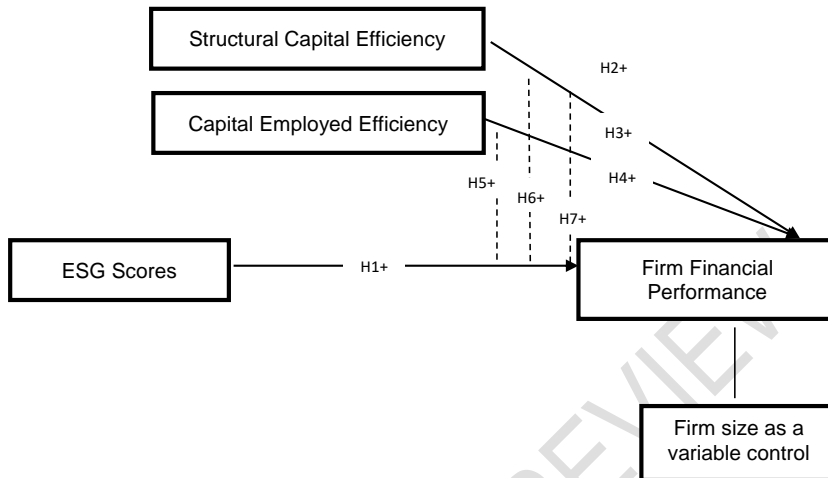


Fig. 1. Conceptual framework

### 3. DATA AND METHODS

#### 3.1 Data and Collection

The study utilizes secondary data sourced from the company's official website and the Indonesia Stock Exchange, specifically from the company's annual report and financial statements. The analysis uses a panel data regression model and is processed with the statistical tool Stata 17. With a purposive sampling approach. According to Chandrarin (2017), Purposive sampling is a sampling method based on certain. The criteria in this study were determined by the researcher, a total of 122 consisting of 58 companies listed on the Indonesian Stock Exchange in 2020-2023 have ESG Scores from Morningstar Sustainalytics and have made their financial statements or annual reports public.

#### 3.2 Operational Definition and Measurement of Variables

##### 3.2.1 ESG Scores

According to Manita et al., (2018), ESG information can be obtained through annual reports, financial reports, sustainability reports, official company websites, external data providers, and other data sources. Morningstar Sustainalytics reveals that managing ESG issues is an important part of investment decision-making, which is why the top investors in the world continuously assess ESG problems to support long-term performance (Morningstar, 2024). Environmental, Social, and Governance Scores are one of the non-financial components used as a reference for companies, potential investors, academics, and financial markets in evaluating corporate sustainability (Gillan et al., 2021). Meanwhile, Srikehati (2021) states that evaluating a company's ESG features involves considering indicators. (1) Environmental: Focuses on sustainable products and innovation, efficient use of natural resources, energy conservation, reduction of greenhouse gases, proper management of emissions, and effective waste management. (2) Social: Concentrates on employee training

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and development, fair employment practices, occupational health and safety measures, taking responsibility for products and clients, and assessing the social impact on the environment. (3) Governance: Ensures the protection of shareholder rights, emphasizes the competence of the board of commissioners and directors, emphasizes the quality and transparency of information, promotes business ethics, and encourages sustainable management practices.

Risk decomposition is a concept used by Sustainabilitytics in their ESG risk assessment, which means that companies encounter two distinct aspects of ESG issues, management and exposure. (Setiani, 2023). The company's real actions in handling ESG issues through various work programs and policies as well as the ESG risk material faced can affect the ESG risk assessment. Furthermore, based on the evaluation of ESG Scores, listed companies are grouped into 5 categories as follows:

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Tabel. 2 ESG Scores Category

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Risk Score	Category	Description
0-10	Negligible	Considered to have negligible ESG Risk
10-20	Low	Considered to have Low ESG Risk
20-30	Medium	Considered to have Moderate ESG Risk
30-40	High	Considered to have High ESG Risk
>40	Severe	Considered to have Severe ESG Risk

### 3.2.2. Components of Intellectual Capital

Intellectual capital (IC) refers to a collection of intangible assets, abilities, and skills that significantly impact the overall success of a business (Bontis, 1998). Then according to Mitchell Williams (2001), IC encompasses both knowledge and experience, which may be leveraged to generate income through the creation of intellectual property. And according to Sawarjuwono & Kadir (2003) define IC as the aggregate of the output generated by the three primary components of the organization, namely HCE, SCE, and CEE. So, it can be briefly defined that IC is the intangible resources and assets owned by the company to create wealth and company performance. Pulic (2000, 2004) uses IC measurement with the VAIC (Value Added Intellectual Capital) method. VAIC is a combination of CEE (Value Added Capital Employed), HCE (Value Added Human Capital), and SCE (Structural Capital Coefficient) developed by (Ulum et al., 2014). The following describes each IC Component:

1. HCE (Human Capital Efficiency)

HCE is capital consisting of the abilities, skills, capabilities, and expertise possessed by an employee when they work for an organization, this capital can change along with the employee's position in the company if they resign (Shahzad et al., 2022). Human Capital shows the contribution made by every dollar invested in human capital to the organization's value added.

$$HCE = \frac{VA}{HC}$$

Description:

VA (*Value Added*) : Difference between Output (Total sales and other income) and Input (Expenses and costs other than employee expenses)

HC (*Human Capital*) : Employee expenses

2. SCE (Structural Capital Efficiency)

SCE is the ability of a company to show how much its structural capital contributes to the added value it gets (Sukmana & Fitria, 2019). According to Akmalia & Rohman (2021), SCE serves to involve value creation such as organizational processes, procedures, technology, information resources, and intellectual property rights.

$$SCE = \frac{SC}{VA}$$

Description:

SC (*Structural Capital*) : Difference between *value added* and *human capital*

VA (*Value Added*) : Difference between Output and Input

3. CEE (Capital Employed Efficiency)

CEE is an index that shows how effectively the use of physical capital and financial capital of the company (Ulum et al., 2014). If the physical capital component of a company produces more profit than its competitors, then the company is better at managing the capital employed (Pulic, 2004).

$$CEE = \frac{VA}{CE}$$

Description:

VA (*Value Added*) : Difference between Output and Input

CE (*Capital Employed*) : Funds available in equity

### 3.2.3. Firm Financial Performance

According to Rahmatin & Kristanti (2020), financial performance is the part used to review financial information in financial reports so that it describes any economic results that the company can achieve over a certain period in its efforts to generate profits effectively and efficiently. FFP is the main thing in the company to fulfill its financial capabilities and obligations in generating profits for both the company and investors. The measure of company performance can be measured through several ratio proxies, namely liquidity, solvency, profitability, and company efficiency. Jensen & Jones (2019) use the asset ratio, namely ROA (Return on Assets) to show the company's ability to provide benefits.

Previous studies conducted by several researchers such as (Destania & Puspitasari, 2021; Duque-Grisales & Aguilera-Caracuel, 2021) used ROA as a measuring tool to assess the company's financial performance. FFP, especially for sustainable businesses, will strongly maintain strong performance by generating maximum profits and assets displayed. Thus, the calculation of the FFP variable in this study uses a proxy:

**ROA: Net Profit/Total of Asset**

Sources:(Putu et al., 2017)

### 3.2.4 Firm Size

This study uses Firm Size as a control variable, the proxy used to measure Firm size is the Natural Logarithm value of the company's total assets.

**Firm Size: Ln (Total Asset)**

Source: (Nur Utomo et al., 2020)

### 3.3 Data Analysis Technique

In this work, a panel data regression model is used for hypothesis testing. The association of ESG Scores, HCE, SCE, and CEE on FFP, as well as the moderating function of HCE, SCE, and CEE, are ascertained by panel data analysis. OLS (Ordinary Least Square), FE (Fixed Effect), and RE (Random Effect) models are used in panel data analysis to analyze time series and intercepts (Gujarati & Porter, 2009). To compare the fixed effect model and the ordinary least square model, apply the Chow test. On the other hand, the ordinary least square vs. random effect regression model is tested using the Breusch and Pagan Lagrangian Multiplier Test. The best panel data regression model between the fixed effect and random effect models is determined using the Hausman test.

In this study, two-equation models were used to evaluate the assumptions. This study uses Model (1) to examine the effect of ESG Scores, HCE, SCE, and CEE on FFP. And also using Model (2) to test the moderating effect of HCE, SCE, and CEE on the relationship between ESG Scores and FFP. The following is the regression equation model used in this study:

- (1)  $FFP = a + b_1ESG + b_2HCE + b_3SCE + b_4CEE + b_5SZ + e$
- (2)  $FFP = a + b_1ESG + b_2HCE + b_3SCE + b_4CEE + b_5ESG * HCE + b_6ESG * SCE + b_7ESG * CEE + b_8SZ + e$

Descriptions:

- FFP : Firm Financial Performance
- $\beta_1 - \beta_8$  : Regression coefficient in each independent variable
- ESG : ESG Scores
- HCE : Human Capital Efficiency
- SCE : Structural Capital Efficiency
- CEE : Capital Employed Efficiency
- SZ : Firm Size
- $\epsilon$  : Error term

## 4. RESULTS AND DISCUSSION

### 4.1 RESULTS

#### 4.1.1. Descriptive Statistical Analysis

To describe the distribution of the main values, this descriptive statistical analysis can be used. The standard deviation serves as a measure of how spread out the data is, and a smaller standard deviation implies that the data is more tightly clustered around the mean. The following table shows the descriptive statistics for the variables used in this study. The FFP variable has a mean value of 0.063, this means that on average the 122 sample companies tested have a net profit of 6.3% of their total assets as it corresponds to the calculation of Return on Asset. The ESG Scores variable has a mean value of 24.382, which means that on average the 122 companies tested have medium risk (20-30), which is considered to have moderate ESG Risk. IC components (HCE, SCE, and CEE) have a mean value of 2.997; 0.596; and 0.351 respectively. Overall, the descriptive statistics of each variable can be seen from the table below:

Table 1. Result of Descriptive Statistical

Commented [U34]: ESG Scores

Commented [U35]: Intellectual capital components on firm financial performance

Commented [U36]: ESG Scores on the relationship between Intellectual capital components and firm financial performance.

Commented [U37]: Equation 1: Equation without moderator variable.  
 $ROA_{it} = a + \beta_1HCE_{it} + \beta_2SCE_{it} + \beta_3CEE_{it} + \beta_4SZ_{it} + e$

Commented [U38]: Equation 2: Equation with moderator variable.  
 $ROA_{it} = a + \beta_1HCE_{it} * ESG_{it} + \beta_2SCE_{it} * ESG_{it} + \beta_3CEE_{it} * ESG_{it} + \beta_4SZ_{it} + e$

OR Combine both as  
 $ROA_{it} = a + \beta_1HCE_{it} + \beta_2SCE_{it} + \beta_3CEE_{it} + \beta_4HCE_{it} * ESG_{it} + \beta_5SCE_{it} * ESG_{it} + \beta_6CEE_{it} * ESG_{it} + \beta_7SZ_{it} + e$

Commented [U39]: ROA = Return on Assets  
 $\beta_0$  = Constant

Commented [U40]: 7

Variable	Mean	Std. Deviasi	Min.	Max.
FFP	0.0634597	0.1217123	-0,87615	0.3488514
ESG	24.38279	7.162484	11.31	53.1
HCE	2.99718	3.152465	-9.35963	18.22051
SCE	0.5961329	0.5421001	-0.5637424	5.176389
CEE	0.3519299	0.5531205	-1.706816	3.842934
SZ	30.76775	3.126308	14.59843	35.31545
Observation:	122			

#### 4.1.1. Preliminary Test Result

##### Chow Test

The Chow test serves as a comparison between the OLS regression model and the FE model. The hypothesis assumption is that if  $P > 0.05$ . If the p-value is less than 0.05, it is more appropriate to use the fixed effects (FE) model (H1). Otherwise, it is ideal to use the ordinary least squares (OLS) model (H0). The table below indicates that the FE model is the model that has been accepted.

**Table 2. Chow test (OLS vs FE)**

Chow Test	Prob>F	Result
Model 1	0.0000	FE
Model 2	0.0000	FE

##### Breusch and Pagan Lagrangian Multiplier Test

The Breusch and Pagan Lagrangian multiplier tests serve as a comparison between the OLS regression model and the RE model. The hypothesis assumes that if the p-value is greater than 0.05, it is more appropriate to use the Ordinary Least Squares (OLS) model (H0). Conversely, if the p-value is less than 0.05, it is more appropriate to use the Random Effects (RE) model. The table below indicates that the RE model is the model that has been accepted.

**Table 3. Breusch and Pagan Lagrangian Multiplier Test (OLS vs RE)**

Breusch and Pagan Test	Prob > Chibar2	Result
Model 1	0.0000	RE
Model 2	0.0000	RE

##### Hausman Test

The Hausman test is used to choose the appropriate panel regression model, specifically choosing between the random effects (RE) model and the fixed effects (FE) model. The hypothesis assumes that if the p-value is greater than 0.05, it is more appropriate to use the random effects (RE) model (H0), however, if the p-value is less than 0.05, it is more appropriate to use the fixed effects (FE) model. The table below indicates that the FE model is the model that has been accepted.

**Table 4. Hausman Test (RE vs FE)**

Hausman Test	Prob > Chibar2	Result
Model 1	0.0000	FE

Model 2	0.0000	FE
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#### 4.1.2. Heteroscedasticity and Serial Correlation Test Result

According to Baum & College (2001); Torres-reyna, (2010), the modified Wald test can be used to conduct heteroscedasticity testing in the fixed effect model. On the other hand, the random effect model employs the likelihood-ratio test. Model 1 in this study exhibits heteroscedasticity due to its P-value (Prop>X2) being below the significance level of 0.05, namely 0.0000. Similarly, model 2 also displays heteroscedasticity as indicated by its P-value of 0.0000. According to Drukker (2003), the presence of serial correlation can be assessed using the Wooldridge test. If the P value (Prob>F) is less than 0.05, it indicates the presence of serial correlation. Both model 1 and model 2 in this study exhibit significant serial correlation, as indicated by their respective P-values of 0.0185 and 0.0423, both of which are less than the threshold of 0.05.

**Table 5. Heteroscedasticity and Serial Correlation Test Result**

Model 1		Model 2	
Full Sampel	122	Full Sampel	122
<b>Heteroscedasticity</b>		<b>Heteroscedasticity</b>	
Chi2	-215.85	Chi2	-362.44
Prob > Chi2	1.000	Prob > Chi2	1.0000
<b>Serial Correlation</b>		<b>Serial Correlation</b>	
F	6.578	F	4.706
Prob > F	0.0185*	Prob > F	0.0423*

#### 4.1.3. Hypothesis Test Result

In the results of this hypothesis test, the Fixed Effect model was determined as the most suitable panel data model for this study after conducting three tests: Chow Test, Lagrange Multiplier Test, and Hausman Test.

**Table 6. Hypothesis test result (Model 1)**

Independent Variable	Dependent Variable			
	FFP			
	Coeff	Std. Err.	T	P> t
Const.	-3.472757	0.4229896	-8.21	0.000
ESG	0.0026258	0.0012003	2.19	0.033*
HCE	0.0114613	0.0049469	2.32	0.024*
SCE	-0.0065171	0.0159646	-0.41	0.685
CEE	0.0375625	0.0157484	2.39	0.020*
SZ	0.1114318	0.0139407	7.99	0.000
R-Squared	0.3870			
F	52.88			
Prob>F	0.0000*			
No. Observation	122			
*5% Significance				

Commented [U41]: ROA

Commented [U42]: Based on the suggested corrections, the result will not stand. So that candidate is advise to rerun the result to be inline with the first suggested model.

**Table 7. Hypothesis test result (Model 2)**

Independent Variable	Dependent Variable			
	FFP			
	Coeff	Std. Err.	T	P> t
Const.	-3.361398	0.6449838	-5.21	0.000
ESG	0.0003792	0.0025559	0.15	0.883
HCE	-0.0072196	0.0142407	-0.51	0.614
SCE	0.2116847	0.0844183	2.51	0.015
CEE	-0.4528054	0.2251779	-2.01	0.049
SZ	0.1093484	0.0203107	5.38	0.000
ESG*HCE	0.0005648	0.00047	1.20	0.234
ESG*SCE	-0.0077993	0.0031038	-2.51	0.015*
ESG*CEE	0.0222489	0.0103337	2.15	0.036*
R-Squared	0.4538			
F	44.64			
Prob>F	0.0000*			
No. Observation	122			
*5% Significance				

Commented [U43]: ROA

Commented [U44]: Based on the suggested corrections, the result will not stand. So that candidate is advise to rerun the result to be inline with the second suggested model.

## 4.2 DISCUSSIONS

### 4.2.1. First Hypothesis Testing Results

Testing the first hypothesis shows that there is a significant positive relationship between ESG Scores and FFP with P values of 0.033 at the 5% significance level and a t value of 2.15. Previous studies that examine the relationship between ESG and FFP show inconsistent results, however, the results of this study are in line with those (Makhdalena et al., 2023; Sandberg et al., 2023; Setiani, 2023; Velte, 2017) which shows that ESG Scores can have a positive influence on financial performance. This relationship shows that the higher the ESG rating achieved by the company, the better the company's financial performance. Ahmad et al., (2021) also confirmed that companies with good ESG disclosures will show good financial performance. Meanwhile, studies conducted by (duque-ristles & aguilera-caracul, 2021; ningwati et al., 2022) resulted in a negative and significant relationship between ESG and business financial performance in Latin America, as well as research by Saygili et al., (2022) explains that disclosing ESG will cause the company to incur costs and can reduce the company's financial performance.

Based on Stakeholder Theory, this study explains that by considering the needs and interests of all stakeholders, the environmental, social, and governance performance disclosed by the company can help improve its reputation, reduce risk, and improve its financial performance in the long run. companies are not only responsible to their shareholders but also to others such as employees, customers, suppliers, creditors, and society especially related to environmental, social, and governance impacts (Velte, 2017; Winans et al., 2017). Thus, companies that have good ESG performance will not only improve their reputation, but investors and the general public will recognize the company as an organization and business that can have a good environmental and social impact.

The results of this study show how important ESG disclosures are for a company's financial performance, stakeholders use these ESG components in the process of making business decisions. By considering the needs and interests of stakeholders, this study supports the stakeholder interest theory which explains that ESG disclosure can help companies to create long-term performance for all stakeholders. In addition, investors will increase their

investment in companies that have ESG activities as expected. ESG activities are initially a difficult signal, but eventually, companies learn how to perform sustainably for the benefit of all stakeholders (Friske et al., 2022). Thus, it can be concluded that H1 is accepted in this study.

#### **4.2.2. Second Hypothesis Testing Results**

Testing the second hypothesis shows that there is a significant positive relationship between HCE and FFP with P values of 0.024 at the 5% significance level and a t value of 2.32. The results of this study are in line with (destania & puspitasari, 2021; haris et al., 2019; nurul amalia & rahadian, 2019; pitaloka, 2017) which shows that there is a significant positive relationship between HCE and FFP. According to capital theorists, increasing employee knowledge, skills, and abilities can affect organizational performance (Haris et al., 2019). Companies that capitalize intellectual wealth on their resources will improve the company's financial performance because with IC a business competitive strategy will be created in accordance with Resource-Based Theory.

This research supports the Resource-Based Theory, that the company will achieve a competitive advantage derived from the resources and capabilities of the company, as well as its social and environmental responsibilities (j. b. barney & mackey, 2005). financial performance will improve with investment in employee capabilities, furthermore, mavridis & kyrmizoglou (2005) HCE is more important than physical capital in its importance to improve competitive strategy and financial performance in the long run. Thus, it can be concluded that H2 is accepted in this study.

#### **4.2.3. Third Hypothesis Testing Results**

Testing the third hypothesis shows that there is no significant relationship between SCE and FFP with P values of 0.685 at the 5% significance level and a t value of -0.41. In line with research conducted by (andriana, 2014; nurul amalia & rahadian, 2019; salim & karyawati, 2013) shows that SCE does not affect FFP. The lack of effect of SCE on financial performance indicates that the sample companies cannot implement routine processes and structures that support business performance such as operational systems, organizational culture, and management philosophy. salim & mayawati (2013) stated that companies cannot develop structural capital that produces competitive advantages that can increase profitability because they cannot convert individual knowledge into non-human knowledge. Thus, it can be concluded that H3 is rejected in this study.

#### **4.2.4. Fourth Hypothesis Testing Results**

Testing the fourth hypothesis shows that there is a significant positive relationship between CEE and FFP with P values of 0.020 at the 5% significance level and a t value of 2.39. These results support research conducted by (akmala & rohman, 2021; aprilyani et al., 2020; sukmana & fitria, 2019) which shows that CEE can affect the company's financial performance. The results of this study indicate that companies that already have an ESG score from Morningstar Sustainalytics are also able to manage physical and financial capital optimally, to generate high returns from each unit of capital used. According to akmala & rohman (2021) the use of physical and financial capital has a significant impact on financial performance and can prove empirically that companies can utilize CEE well.

This study supports the resource-based theory which asserts that businesses can identify and implement strategies that can produce good financial performance and increase their profitability by utilizing the physical capital owned by the company or business entity.

Companies can analyze their competitive advantage through the internal environment (pratama & wibowo, 2017). One of these internal environments is the physical capital owned by the company. Thus, H4 is accepted in this study.

#### 4.2.5. Fifth Hypothesis Testing Results

Testing the fifth hypothesis shows that the role of HCE does not moderate the relationship between ESG Scores and FFP with a P value of 0.234 at a 5% significance level and a t value of 1.20. HCE refers to the competencies of employees of a company that contribute to its competitive advantage, such as human resources, organizational processes, and knowledge by the resource-based theory. However, in this study, HCE cannot moderate the relationship between ESG Scores and FFP. This could be due to the fact that the sample used in this study is an ESG-indexed sample from an external party, the utilization of human capital in the sample companies has not been maximally used about the ESG relationship and financial performance.

Resource-based theory states that a firm's competitive advantage comes from its unique resources and capabilities (Bempah, 2023). ESG can affect firm performance by influencing the availability and effectiveness of these resources. For example, firms with strong ESG performance may have better access to capital, a more engaged workforce, and a stronger reputation, which may contribute to better financial performance, but the relationship between ESG factors and financial performance is complex and can be influenced by a variety of factors, such as the industry, the specific ESG issues involved, and the firm's response to these issues. Therefore, although according to Song (2024), there is a relationship between ESG and Human Capital Investment, it cannot directly moderate the relationship between ESG factors and FFP. Stakeholder theory highlights the significance of taking into account the concerns and requirements of diverse stakeholders, including shareholders, employees, customers, and the environment. ESG factors. This is based on stakeholder theory and resource-based theory which makes ESG Scores a competitive strategy as well as the ability to disclose ESG information to all stakeholder interests, this indicates that the first hypothesis relationship is strong and the moderating role of HCE does not have a significant effect. Thus, H5 is rejected in this study.

#### 4.2.6. Sixth Hypothesis Testing Results

Testing the sixth hypothesis shows that the role of SCE can weaken the relationship between ESG Scores and FFP with P values of 0.015 at the 5% significance level and a t value of -2.15. SCE refers to the effective use of organizational infrastructure, processes, and databases that support company operations. According to akmala & rohman (2021), SCE facilitates the incorporation of value-generation elements such as organizational processes, procedures, technology, information resources, and intellectual property rights. SCE in this study can weaken the relationship between ESG Scores and FFP because it can be caused by spending costs on sample companies in improving the efficiency of high structural capital, this high cost can limit the company's ability to invest in sustainable and high-impact ESG programs so that it can weaken the relationship. This high cost is evidenced by the company's expenditure to pay employee expenses and the lack of post-COVID-19 profits which still have an impact in 2020.

The results of this study support the Resource-based Theory. According to Kozlenkova et al., (2014), there are two basic assumptions about firm resources consisting of resource differences even within the same industry, and the second is resource differences that will remain due to difficulties in exchanging resources between firms. SCE is the resources a firm possesses to generate sustainable competitive advantage and the reason it consistently

outperforms others. The results of this study have proven the research of Martiny et al., (2024) which states that SCE is one of the determinant factors that can affect ESG performance. Thus, H5 is accepted in this research, because SCE can moderate the relationship between ESG Scores and FFP.

#### 4.2.7. Seventh Hypothesis Testing Results

Testing the seventh hypothesis shows that the role of CEE can strengthen the relationship between ESG Scores and FFP with P values of 0.036 at a 5% significance level and a t value of 2.15. CEE or Corporate Physical Capital refers to assets such as plant, equipment, technology, and other infrastructure. According to Ulum et al., (2014) CEE is an index that shows how effectively the use of physical capital and financial capital of the company. CEE can strengthen the relationship between ESG Scores and financial performance because by increasing operational efficiencies such as ownership of technology and assets in environmentally friendly sample companies such as energy saving, and efficient waste management, it can improve the company's ESG factors, this is evidenced by sample companies that have an average ESG score of Medium (considered to have moderate ESG Risk) which means it does not have a high-risk impact on the environment and society (Morningstar, 2024).

The results of this study support the Resource-based Theory that sustainable innovation and risk reduction in sample companies can increase the company's competitive advantage. Sophisticated and environmentally friendly physical capital allows companies to innovate and create more sustainable products or services. Pulic (2004) states that if the physical capital component of a company produces more profit than its competitors, then the company is better at managing the capital employed. This study supports research that states that physical capital is one of the determinants of ESG performance which can certainly improve the company's financial performance. Thus, H7 is accepted in this study, because CEE can moderate the relationship between ESG Scores and FFP.

**Commented [U45]:** Adjust your discussions in line with the results after rerunning the results or data.

## 5. CONCLUSION AND RECOMMENDATIONS

The competitive advantage that the company has is a strategy that can be done to make a sustainable business. Stakeholders will also pay attention to the effects and influences produced by the company both from financial and non-financial factors such as disclosure of environmental, social, and governance activities. Many factors can affect the company's financial performance including ESG Scores and IC Components. This study has shown the results that there is a significant positive influence between ESG Scores, HCE, and CEE on FFP, SCE doesn't affect FFP, HCE cannot moderate the relationship between ESG Scores on FFP, SCE weakens the relationship between ESG Scores on FFP, and CEE strengthens the relationship between ESG Scores on FFP. This research can be used as a consideration for both companies and potential investors and the public as stakeholders to make financial decisions based on IC resources and disclosure of environmental, social, and governance activities. A good company is a company that can disclose all its business activities in the reports it makes for stakeholders such as annual reports to make business decisions. Activities that need to be disclosed include environmental, social, and governance activities, not only disclosing but also showing how the company can overcome the problems caused by these activities so that it can have a small risk. In addition, a good company should be able to prepare knowledgeable labor resources such as IC components to compete and create a sustainable competitive advantage.

Based on the results of this study, recommendations and suggestions for future research are to add more factors or variables to be able to find out and prove what influences can affect the company's financial performance, such as financial factors disclosure of financial statements, taxes, ability to generate profits, and so on. Proxy ESG Scores can also be done in other ways such as unit indexes for both environmental, social, and governance. Given the limitations of this study, it is impossible to draw definite conclusions about the effect of ESG Scores and IC Components on FFP, especially in the sample used, because it would be possible if using different populations and samples showed different results. Not only the samples used, but both of the proxies, variables, techniques, and methods of analysis can also allow different results.

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Also, remember that only authors cited in the study should be included in the references pages.

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