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The Importance of Intellectual Capital in Driving Firm Performance

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ABSTRACT

Purpose : The study explores the structure of intellectual capital and how it influences firm performance of Kompas 100 Index companies using the VAIC model.
Method : As research samples, 29 companies from the Kompas 100 index that were listed on the Indonesian Stock Exchange were employed. The data came from annual reports that were released between 2017 and 2021. A multiple regression analysis was used to create the regression model for this study.
Findings : It can be observed that VAIC has a significant positive effect on both ROA and ROE. Based on each component of VAIC, it is clear that HCE, SCE, and CEE have a positive and significant impact on firm performance. By setting spesific targets and regularly monitoring these neasures, businesses can identify areas for improvement and make informed decisions to enhance their firm performance.
Novelty : The findings are especially significant for policymakers that want to emphasize the value of Intellectual Capital and create a system for disclosing Intellectual Capital. This study also offers up new paths for future research that will take into consideration the dynamic nature of the relationship between Intellectual Capital and Firm Performance and account for endogeneity.

INTRODUCTION

In today's knowledge-based economy, intellectual capital is increasingly recognized as a key driver of profitability. In today's competitive and dynamic business environment, companies are constantly seeking ways to gain a competitive edge and increase their profitability. Companies that possess strong intellectual capital are more likely to have a competitive advantage in the business world. This is because intellectual capital includes both the company's proprietary intellectual property and the knowledge, abilities, and expertize of its employes. Moreover, intellectual capital is not limited to knowledge within the organization but can also include external partnerships and collaborations that contribute to the company's overall intellectual assets. For instance, technological advancements and research investments made by the company can enhance its intellectual capital and subsequently lead to improved financial performance.The dynamic and evolving nature of the business landscape necessitates that organisations explore different approaches to address challenges and optimise the utilisation of their resources (Sumedrea, 2013). Intellectual capital is a resource that a corporation owns in the form of expertise, knowledge, and abilities of its personnel. On occasion, intellectual capital takes the form of information systems, patents, regulations, processes, and company systems. In addition to these two factors, intellectual capital can be defined as the company's ability to manage its funds. All of these factors, if managed properly by the company, have the potential to improve the organization's performance. Furthermore, the company's intellectual capital will be used to develop added value, which will increase financial performance. The increase in financial performance is a profitable indicator for investors so as to increase interest in increasing their investment in the company.

Intellectual capital is one type of intangible asset. However, it is important to note that traditional accounting systems do not include intangible assets in financial reports, making the company 's financial statements incapable of adequately reflecting its actual worth (Kasoga, 2020; Dinu, 2022). Therefore, it is critical to evaluate these intangible assets to improve the informativeness of financial statements, assuring thorough reporting of all corporate values by businesses whose assets predominantly consist of intellectual capital. Businesses can quickly adapt to changes and maintain their competitiveness in markets through intellectual capital (Abdulaali, 2018). By effectively

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managing intellectual capital, companies can enhance their profitability and attract the interest of investors.

The value-added intellectual capital model created by (Pulic, 2000) and (Chen et al., 2004) has been used in most recent studies that examine the link between intellectual capital and business performance. Three factors; human capital, structural capital, and capital employed are used in this paradigm to measure intellectual capital. The results of this research indicate that a company's performance may be enhanced by properly and efficiently managing intellectual capital. Organisations are more likely to experience increases in their general performance and profitability when they prioritize the growth and use of their human capital through tactics such as ongoing training, staff development programs and information exchange platforms.

Furthermore, the proper management of structural capital, which includes organizational processes, procedures, and systems, can also lead to increased efficiency and effectiveness within the company, ultimately contributing to improved profitability. According to pulic. The presence of capital employed is a prerequisite for the effective use of intellectual capital tools in performing their functions. The capital employed refers to a considerable portion of capital, including both tangible and intangible assets, such as physical property and financial resources.

The value added intellectual coefficients (VAIC) are used in the majority of recent studies examining the relationship between intellectual capital and firm performance. According to (Baron & Armstrong, 2008), It is imperative for firms to prioritize intangible assets in order to enhance value creation, as opposed to solely focusing on tangible resources.The results of previous studies emphasize the importance of intellectual capital as a strategic asset for businesses (Obeidat et al., 2016; Ozkan et al., 2017; Sardo et al., 2018). The findings of research (Sumedrea, 2013) investigating the relationship between organizational performance and intellectual capital reveal a positive correlation between these variables.

This study use ROA and ROE as metrics for assessing firm performance. The metric provide insights into the company's capacity to create profits from its assets and shareholders' equity (Abaidoo & Agyapong, 2021). They can be utilised to assess the long-term performance and potential growth prospects of an entity. (Adnan et al., 2018) assert that within the realm of economic and management research, the metrics of Return on Assets (ROA) and Return on Equity (ROE) are employed as evaluative tools to ascertain a company's level of profitability or its competitive advantage. According to (Nadeem et al., 2018), the implementation of this measure has the potential to influence investors' projections due to the impact of real-world events and corporate tactics.

This study aim to address the existing research gap in the field of intellectual capital. This work contributes to the existing body of research on intellectual capital and firm performance. Previous studies by (Mavridis & Vatalis, 2012; Hejazi et al., 2016; Faruq et al., 2023) have also explored these topics. Additionally, the results of this study underscore the significant significance of intellectual capital in emerging economies, as it demonstrates the value of IC as a strategic resource capable of enhancing enterprises' profitability and performance.

The resource-based theory is a fundamental idea in the field of strategic management, emphasizing the significance of effectively using intellectual resources to attain a competitive advantage and enhance value creation (Frączkiewicz-Wronka & Szymaniec, 2012). Investors are likely to demonstrate increased appreciation for the company by allocating further investments, owing to its competitive edge and enhanced value proposition. The resource-based view provides managers with a framework for understanding the importance of competences as a company's primary asset and how these assets may be leveraged to enhance business performance. The resource-based view provides managers with a framework for understanding the importance of competences as a company's most valuable asset and how these assets may be leveraged to enhance business performance (Peteraf, 2018). When a company's level of profitability surpasses the mean profitability of all firms within its industry, it is perceived as possessing a competitive advantage over its competitors (Barney & Hesterly, 2015). The resource-based approach posits that an organization's competitiveness and subsequent profitability are contingent upon its internal components and resources.

The theory of Value Creation explains the value creation process that businesses employ effectively to produce profits. This theory emphasizes that companies should focus on creating value for their customers by offering products or services that meet their needs and preferences (Fuller, 2001). By doing so, companies can attract more customers, increase sales, and ultimately generate higher profits. This value creation process involves identifying and understanding the needs and preferences of customers, and then designing and delivering products or services that meet those needs effectively (Rezende et al., 2017). It highlights that when businesses prioritize customer satisfaction and stakeholder engagement, they contribute to the overall well-being of society by fostering economic growth (Windsor, 2017). Companies also create value by effectively managing their resources, such as human capital, technology, and financial assets, to maximize productivity and profitability.

Firm performance can be examined based on financial ratios because these ratios make it easier for managers, investors, and policymakers to classify and predict future income and costs (Yousaf & Dey, 2022). Financial ratios that can be used to measure the firm's performance arereturn on assets (ROA) and return on Equity (ROE). ROA measures the profitability of a company by evaluating how efficiently it utilizes its assets to generate profits. On the other hand, ROE assesses the profitability of a company from the perspective of its shareholders by analyzing how effectively it generates returns on their invested capital. These ratios provide valuable insights into a company's financial health and can assist in making informed decisions regarding investment strategies and resource allocation (Wang & Wang, 2012).

There is an increasing consensus among scholars and professionals that intellectual capital plays a crucial role in enhancing organizational success (Chen et al., 2004; Gogan et al., 2016; Abdulaali, 2018). Intellectual capital refers to the intangible assets of an organization, such as knowledge, skills, and expertise possessed by its employees. It is widely recognized that effectively managing and leveraging intellectual capital can lead to competitive advantage and innovation within an organization. Furthermore, studies have shown that organizations that invest in developing and nurturing their intellectual capital are more likely to achieve long-term success and sustainability in today's knowledge-based economy (Marcin, 2013).

Human capital refers to the aggregate knowledge possessed by the personnel of a business, encompassing their abilities, skills, knowledge, and attitudes towards their professional responsibilities. It is a valuable asset that contributes to the overall success and growth of an organization (Yarovaya et al., 2021). It encompasses not only the technical expertise and qualifications of employees but also their ability to collaborate, innovate, and adapt to changing circumstances. By nurturing and investing in Human Capital, organizations can enhance productivity, foster a positive work culture, and gain a competitive edge in the market (Baron & Armstrong, 2008).

Structural capital refers to a corporation's organizational capacity to effectively execute routine procedures and provide robust frameworks that aid personnel in attaining optimal intellectual performance and overall commercial success (Castro et al., 2021). Structural capital plays a crucial role in enhancing efficiency, fostering creativity, and enabling seamless knowledge sharing within the organization. This type of capital encompasses various elements such as the company's infrastructure, technology systems, and knowledge management systems. It also includes the organization's culture, values, and formal processes that support collaboration and innovation among employees (Li et al., 2019).

Capital employed consists of all physical and financial assets possessed by a business (Berzkalne & Zelgalve, 2014). This shows the amount of investment required by a company to operate and how the company uses this investment. Capital employed is an important metric for investors and analysts as it provides insights into the efficiency and profitability of a company's operations. By analyzing the composition of capital employed, stakeholders can assess whether the company is utilizing its resources effectively and generating satisfactory returns on its investments (Łataś & Walasek, 2016). Additionally, capital employed helps in evaluating the financial health and stability of a business, as it represents the long-term commitment of funds towards supporting its operations and growth.

The sales growth ratio is a control variable that measures the average percentage increase in a company's total sales in comparison to prior years (Farooq et al., 2022). In addition, it illustrates the expansion of a company in relation to its rising sales figures. Investors and analysts frequently use this ratio to gauge a company's performance over time and assess its capacity for revenue generation. By tracking the sales growth ratio, stakeholders can gain insights into the company's market position and its ability to attract and retain customers.

The total assets turnover (TATO) is a control variable that can be calculated by dividing the income by the total assets. This metric is used to evaluate a company's effectiveness in generating money from its assets. This statement offers valuable insights regarding the efficiency with which a corporation leverages its resources to generate revenue (Oppong & Pattanayak, 2019). Through the process of comparing the TATO of several companies operating within the same industry, investors and analysts are able to assess their relative performance and discern prospective avenues for enhancement.

According to the resource-based view, effective management of intellectual capital has the potential to generate a competitive edge for a company, so impacting its overall performance. The efficacy of a company's management and utilization of intellectual capital directly correlates with the generation of distinctive skills, which in turn enhances the company's capacity to fulfill consumer requirements. When a corporation possesses a competitive advantage relative to its competitors, it is afforded the potential to augment its net profit. This can be achieved through various means such as leveraging unique knowledge, expertise, and innovation to create superior products or services. Additionally, a company with a competitive advantage may also be able to command higher prices or gain a larger market share, further contributing to increased profitability. Research conducted by (Chen et al., 2004; Nadeem et al., 2018; Acuña-Opazo & González, 2021; Faruq et al., 2023) shows that intellectual capital has a positive influence on firm performance. The proposed hypothesis is as follows:

H_{1a}: Intellectual capital efficiency influences ROA positively

H_{1b}: Intellectual capital efficiency influences ROE positively

The company views employee knowledge as an asset capable of generating competitive advantages and enhancing company performance. Human capital will benefit the organization if it is able to effectively manage knowledge. This motivation can lead to the creation of innovative products or services, providing the business with a competitive advantage in the market. Additionally, when employees feel valued for their knowledge and contributions, they are more likely to remain with the company and continue to contribute their expertise, thereby enhancing the competitive advantage of the business. The study results of (Nadeem et al., 2018) and (Castro et al., 2021) asserts that an increase in human capital efficiency (HCE) results in an increase in firm performance. On the other side, it has been proposed that HCE is the most influential variable on company performance (Tran & Vo, 2020). Based on the description above, the hypothesis proposed is as follow:

H_{2a}: Human capital efficiency influences ROA positively

H_{2b}: Human capital efficiency influences ROE positively

Companies with effective organizational resource management will have an impact on efficient production processes and be able to reduce unused production costs, thereby increasing the company's profit from assets. Therefore, efficient management of structural capital efficiency (SCE) will increase the firm performance. In addition, effective management of structural capital can also lead to improved innovation and creativity within the company. By properly allocating resources and fostering a culture of knowledge sharing, companies can tap into their intellectual capital and drive continuous improvement and development. As a result, they are more likely to stay ahead of competitors and adapt to changing market demands, further enhancing their competitive advantages. According to research conducted by (Mavridis & Vatalis, 2012) and (Kasoga, 2020), structural capital efficiency (SCE) positively impacts firm performance. Based on the description above, the hypothesis proposed is as follow:

H_{3a}: Structural capital efficiency influences ROA positively

H_{3b}: Structural capital efficiency influences ROE positively

By combining the physical and financial capital of employees (CE), the company is able to create a competitive advantage through capital employed efficiency management. This integration enables the organization to optimize its resources and generate greater returns on investment. By effectively utilizing physical and financial capital, as well as the skills and expertise of its employees, the company can increase its productivity and profitability, thereby obtaining a market advantage. This is consistent with the research-based theory that emphasizes the use of tangible and ethereal resources for competitive advantage. This not only increases the company's adaptability to shifting market conditions, but also its overall resilience and long-term viability. Moreover, the previous studies bt (Ozkan et al., 2017) and (Oppong & Pattanayak, 2019) have reported a significant positive relationship between capital emplyed and firm performance. Based on the description above, the hypothesis proposed is as follow:

H_{4a}: Capital employed efficiency influences ROA positively

H_{4b}: Capital employed efficiency influences ROE positively

RESEARCH METHODS

The objective of this study is to conduct an empirical examination of the relationship between intellectual capital and firm performance. To this purpose, a dataset containing the financial data of 100 companies listed on the Indonesian Stock Exchange's Kompas 100 Index for 2017-2021 has been compiled. This study employed 29 samples chosen using the method of purposive sampling. This investigation utilized information obtained from the Indonesian Stock Exchange (Table 1).

This study employs two dependent variables, ROA and ROE. These are ratios that demonstrate management's ability to use assets and equity to enhance the performance of a company. The independent variable used is value-added intellectual capital (VAIC) and its components, consisting of human capital, structural capital, and capital employed.These variables are presented in Table 2. Using regression models, the following formula (Model 1-4) are used to implement the described factors. Figure 1 depicts the conceptual framework derived from the literature review and hypothesis.

$$ROA_{it} = \alpha + \beta_1 VAIC_{it} + \beta_2 Growth_{it} + \beta_3 TATO_{it} + €_{it} \quad \text{.....(Model 1)}$$

$$ROA_{it} = \alpha + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 Growth_{it} + \beta_5 TATO_{it} + €_{it} \quad \text{.....(Model 2)}$$

$$ROE_{it} = \alpha + \beta_1 VAIC_{it} + \beta_2 Growth_{it} + \beta_3 TATOit + €_{it} \quad \text{.....(Model 3)}$$

$$ROE_{it} = \alpha + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 Growth_{it} + \beta_5 TATO_{it} + €_{it} \quad \text{.....(Model 4)}$$

Table 1. Sample Selection Criteria

No	Sample Criteria	Number of Samples
1	The Kompas 100 Index companies	100
2	Companies that are not included in the Kompas 100 Index from 2017 – 2021, respectively.	(35)
3	Companies with incomplete annual reports	(36)
Companies in the Compass 100 Index that met the criteria during the research period.		29
Number of Observations		145

Source: Processed Data, 2023

Table 2. Variabel Measurements

Variables	Measurements	Acronyms
Dependent Variables		
Return On Assets	Net Income/Total Assets	ROA
Return Om Equities	Net Income/Total Equity	ROE
Independent Variables		
Human Capital Efficiency	VA/HC	HCE
	VA = OP+EC+D+A	
	OP = Operating Profit	
	EC = Employee costs	
	D = Depreciation	
	A = Amortization	
	HC= Total Salaries and Wages	
Structural Capital Efficiency	SC/VA	SCE
	SC = VA - HC	
Capital Employed Efficiency	VA/CE	CEE
	CE = Book Value of The Net Asset	
Value Added Intellectual Capital Coefficient	HCE+SCE+CEE	VAIC
Control Variables		
Sales Growth	$(Sales_t\text{-}Sales_{t-1})/Sales_{t-1}$	Growth
Total Assets Turnover	Total Sales/Total Assets	TATO

Source: Processed Data, 2023

RESULTS AND DISCUSSIONS

The correlation coefficient depicted in Table 4 demonstrates the association between variables. Overall, ROA and ROE positively correlated with VAIC, HCE, SCE, and CEE. All coefficients in the model exhibit statistical significance at the 0.05 level. Among the independent variables examined, it is observed that the variable added intellectual coefficient (VAIC) exhibits the strongest correlation with ROA, with a correlation coefficient of 0.7640. Meanwhile, the HCE variable has the strongest correlation with ROE, with a coefficient value of 0.7310. Furthermore, it is worth noting that there are no issues with multicollinearity.

The findings pertaining to models 1 and 2, as displayed in Table 5, demonstrate the relationship between VAIC, HCE, SCE, CEE, and ROA. The findings suggest the presence of a statistically significant positive correlation between VAIC, HCE, SCE, CEE, and ROA. The emperical findings obtained regarding the control variables show that sales growth has no effect on ROA, conversely TATO has a significant positive effect on ROA.

The findings from Model 3 and 4 suggest a statistically significant positive relationship between VAIC, HCE, CEE, and ROE. Conversely, there is a statistically significant negative relationship between SCE and ROE. As a control variable, sales growth has no effect on ROE in models 3 and 4. In Model 3, TATO has a significant positive relationship with ROE, whereas in Model 4, there is no relationship between TATO and ROE.

The F statistic demonstrates statistical significance for all regression models at a confidence level of 95%, indicating the validity of these models. The adjusted R2 values for models 2 and 4 (0.8093 and 0.8382, respectively) are higher than those for models 1 and 3 (0.6851 and 0.5070, respectively). This suggests that each component of

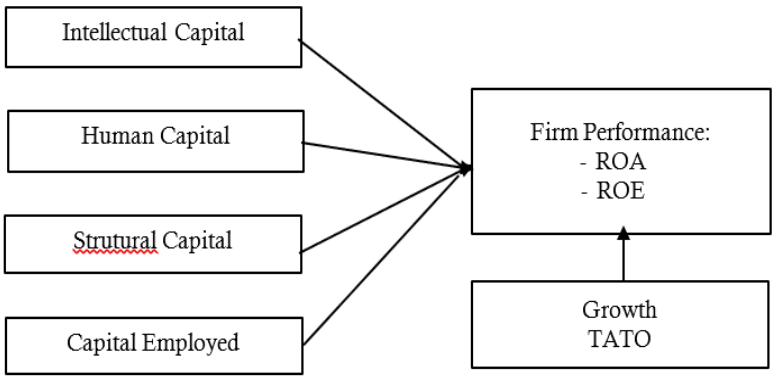

Figure 1. Conceptual Framework

Table 4. Correlation Analysis

	ROA	ROE	VAIC	HCE	SCE	CEE	Growth	TATO
ROA	1.0000							
ROE	0.8404**	1.0000						
VAIC	0.7640**	0.6909**	1.0000					
HCE	0.6804**	0.7310**	0.4547**	1.0000				
SCE	0.5257**	0.4040**	0.9165**	0.0833	1.0000			
CEE	0.5818**	0.5431**	0.8184**	0.0232	0.8375**	1.0000		
Growth	0.0588	-0.0748	0.1337	-0.1002	0.1719*	0.2348**	1.0000	
TATO	0.6792**	0.5325**	0.5251**	0.5849**	0.3373**	0.2729	0.0505	1.0000

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Source: Processed Data, 2023

the VAIC is more capable of explaining company performance than the VAIC as a whole.

Intellectual Capital and Firm Performance

The regression results show that VAIC has a significant positive effect on both ROA and ROE (model 1 and model 3). This result may support the idea of by (Chen et al., 2004), (Nadeem et al., 2018), (Acuña-Opazo & González, 2021), and (Faruq et al., 2023) who state that company should use their intellectual capital to increase their performance. The prevalence of a positive correlation between intellectual capital, as measured by VAIC, and firm performance suggests that companies can increase their profitability by leveraging their intellectual capital more effectively. The increase in productivity can be attributed to the allocation of funding towards intellectual capital. This finding demonstrates the significance of investing in intellectual capital as a means for firms to achieve their intended outcomes.

Human Capital and Firm Performance

The results of the hypothesis testing indicate a significant and positive relationship between human capital and ROA and ROE (model 2 and model 4). This study's findings are consistent with those of from (Nadeem et al., 2018) and (Castro et al., 2021). This demonstrates that the IDX companies, particularly the Indeks Kompas 100, prioritize the utilization of knowledge resources as a primary strategy for navigating the challenges of a knowledge-based economy. Even if it is not reflected in the financial statements, a corporation's ability to effectively translate

Table 5. Regression Results

Variables	**ROA**		**ROE**	
	Model 1	**Model 2**	**Model 3**	**Model 4**
C	-0.0909 (0.000)***	-0.0509 (0.000)***	-0.3853 (0.000)***	-0.1684 (0.000)***
VAIC	0.0446 (0.000)***		0.1538 (0.000)***	
HCE		0.1065 (0.000)***		0.5177 (0.000)***
SCE		-0.0084 (0.028)**		-0.1265 (0.000)***
CEE		0.1937 (0.000)***		0.9277 (0.000)***
Growth	-0.0153 (0.441)	-0.0090 (0.572)	-0.0138 (0.871)	0.0337 (0.504)
TATO	0.0628 (0.000)***	0.0391 (0.000)***	0.1322 (0.001)***	-0.0090 (0.719)
Adjusted R^2	0.6851	0.8093	0.507	0.8382
F-Statistics	105.44	123.25	50.36	150.17
P-value	0.0000	0.0000	0.0000	0.0000

***, **, and * represents statistical significance at 1%, 5%, and 10% levels, respectively.

Source: Processed Data, 2023

knowledge into actions that generate value can be considered an investment. It is anticipated that the firm's provision of this investment to the employee will increase employee commitment, leading to increased productivity and, ultimately, augmenting the company's financial success.

Structural Capital and Firm Performance

The research results showed that the component of SCE have a positive and significant influence on ROA and ROE (model 2 and model 4). This results presented align with the research conducted by (Mavridis & Vatalis, 2012) and (Kasoga, 2020). The findings suggest that allocating resources towards intangible assets, such as systems, procedures, processes, and routines that facilitate employee operations, can enhance the overall performance of a company (Sardo et al., 2018). This becomes particularly significant in enhancing the performance of manufacturing companies listed in the Kompas 100 index.

Capital Employed and Firm Performance

The empirical analysis of the hypothesis reveals that Capital Employed has a significant and positive effect on on ROA and ROE (model 2 and model 4). This is in accordance with the findings of (Ozkan et al., 2017) and (Oppong & Pattanayak, 2019). This demonstrates firms that are able to demonstrated capital employed properly will able to improve their financial performance. Capital Employed encompasses the entirety of a company's tangible assets. By effectively and efficiently managing Capital Employed, a company will be able to increase its productivity and, consequently, its financial performance. Management of the company's physical assets with skill demonstrates the company's proficiency.

CONCLUSIONS

In this modern era, businesses have sought competitive advantage from a variety of sources. These sources include not only efficient production factors, but also a significant transition from tangible to intangible assets. According to a number of studies, intellectual capital resources make a significant contribution to improving company performance.

The kompas 100 index is a widely recognized benchmark for the performance of top companies in Indonesia. By examining the relationship between intellectual capital and firm performance within these companies, this study will provide valuable insights into the impact of IC on their overall success. Additionally, understanding this relationship can help investors and stakeholders make informed decisions regarding their investments in the Indonesian stock market.

The test results confirm the importance of intellectual capital for firm performance are consistent with most existing studies in the literature on intellectual capital. The findings suggest that companies with higher levels of IC tend to have better financial performance. This indicates that effectively managing and leveraging intellectual capital can contribute to the overall success and competitiveness of companies in the kompas 100 index.

Testing of the statistical hypothesis revealed that HCE has a positive and significant impact on a company's performance. This finding suggests that investing in the development and retention of skilled and knowledgeable employees can lead to improved financial outcomes for the company. Additionally, it highlights the importance of effective management practices for harnessing the full potential of human capital to drive profitability. SCE was found positively impacts on ROA and ROE. By efficiently leveraging the resources and systems, they can enhance their financial performance and generate greater profitability. It is crucial for businesses to continuously invest in and optimize their structural capital to maximize these key financial metrics. The results of the CEE tests indicate that CEE has a positive impact on firm performance. This suggests that firms that implement CEE programmes are likely to experience improved financial outcomes and increased productivity.

The scope of this study is constrained since it only assesses business performance by utilising ROA and ROE metrics. In addition to this, it should be noted that the scope of the study analysis is confined to a certain group of organisations, specifically those listed in the 100-index of Kompas. It is expected that forthcoming researchers will be capable of overcoming this constraint.

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