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Does intellectual capital determine the firm's investment efficiency? Evidence from Indonesia

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Abstract: Companies now recognize that success depends not only on physical assets but also on effectively utilizing intangible assets like intellectual capital to outperform competitors. In other hand, achieving the most effective investment decisions is a core concern in corporate finance and a primary objective for management in a company. However, uncertainty of outcome and a lack of measurement metrics often lead to inefficient investments. This study intends to assess the relationship between intellectual capital (IC) on investment efficiency (IE). The data is processed using panel data regression on non-financial public companies in Indonesia with an observation period of 2010-2023. Our analysis discovered that the human capital (HCE) of a firm statistically has a significant positive impact on investment efficiency. Second, the capital component (CEE) is negatively affecting investment efficiency. At the same time, no relationship was found between structural capital and investment efficiency.

Keyword: Capital Employed, Human Capital, Investment Efficiency, Structural Capital

INTRODUCTION

In today business climate to sustain a competitive edge, corporations not only focus on innovation but also allocate resources towards intangible assets, more often called intellectual capital. Intellectual capital (IC) is crucial in the current knowledge-based economy, where intangible assets are frequently more valuable than tangible ones. Intellectual capital encompasses the combined expertise, abilities, inventive ideas, and operational methods that enhance a company's competitive edge and overall worth (Edvinsson & Malone, 1997). This notion has attracted considerable attention in academic research and corporate strategy because it promotes innovation, improves organizational performance, and facilitates sustainable growth (Bontis, 1998). Strong intellectual capital resources enable firms to innovate, optimize processes, and respond effectively to changing market conditions (Teece et al., 1997). Moreover, intellectual capital contributes to enhanced customer satisfaction and loyalty, as well as stronger relationships with suppliers and partners (Nahapiet & Ghoshal,

1998). A well-managed intellectual capital framework can lead to sustainable competitive advantages, thereby boosting long-term profitability and growth (Grant, 1996).

Empirical studies have highlighted the positive impact of intellectual capital on organizational performance. For instance, a study by Chen et al. (2005) found that intellectual capital positively affects firm performance, particularly in industries where knowledge and innovation are key competitive factors. Additionally, Youndt et al. (2004) demonstrated that firms with higher levels of intellectual capital tend to exhibit superior financial performance and market valuation. Further evidence comes from a study by Pulic (2000) which introduced the Value-Added Intellectual Coefficient (VAIC) as a measure of intellectual capital efficiency and found a strong positive correlation between VAIC and firm profitability across various sectors (Pulic, 2000). This metric helps quantify the contribution of intellectual capital to value creation, highlighting its role in enhancing organizational performance. Moreover, a study by Pew Tan et al. (2007) explored the relationship between intellectual capital and financial performance in Malaysian companies, found that intellectual capital components such as human capital efficiency and structural capital efficiency significantly contributed to financial performance. This study underscores the importance of investing in human and structural capital to drive organizational success (Pew Tan et al., 2007).

It is believed that intellectual capital benefits the company to pertain the competitive advantages however, with a diverse range of intangible assets, one significant challenge is the lack of standardized metrics for assessing intellectual capital components (Petty & Guthrie, 2000), which are inherently difficult to quantify and evaluate uniformly. This lack of standardization makes it challenging to compare intellectual capital across firms and industries, hindering the ability to benchmark and assess the effectiveness of intellectual capital investments. Additionally, integrating intellectual capital into traditional financial reporting frameworks poses difficulties due to the intangible nature of these assets (Lev, 2001). Traditional financial reporting focuses primarily on tangible assets and financial metrics, such as revenue, expenses, and physical assets. However, intellectual capital does not fit neatly into these categories. Its value is often derived from non-physical elements like employee expertise, corporate culture, and brand reputation, which are not easily captured by conventional accounting practices. This discrepancy leads to an incomplete representation of a firm's true value and potential in financial statements, potentially undervaluing companies rich in intellectual capital (Lev, 2001).

With uncertainty and a lack of measurement metrics, this often leads to inefficient investments. Investment efficiency encompassing the optimal allocation of resources and effective utilization of capital, holds significant relevance in the financial landscape (Richardson, 2006). Efficiently managed investments not only contribute to enhanced financial performance but also signal of competence and strategic foresight to investors. The correlation of IC and IE is a complex interplay that can lead to either over- or under-investment scenarios, depending on various factors (Hottenrott & Peters, 2009). Overinvestment occurs when resources are allocated excessively to certain projects or areas (Stein, 1996) and without sufficient strategic focus or effective resource allocation, may lead to diminishing returns and wastage of valuable resources. Conversely, underinvestment can hinder a firm's ability to develop new ideas and respond to changing market conditions, resulting in squandered growth opportunities and a weaker competitive position.

Researchers are increasingly focusing on factors that influence investment efficiency, recognizing its crucial role in a company's long-term success. Over time, approaches to determining optimal investment levels have evolved, but companies still struggle with investment inefficiency (Ahmed et al., 2020). Ongoing research aims to identify the key drivers of both efficient and inefficient investment.

While previous studies have explored various factors affecting optimal investment, the impact of efficiently using resources, particularly in terms of intellectual capital, hasn't been thoroughly examined. The resource-based view theory suggests that effective resource utilization is a primary source of competitive advantage and value for firms. Intellectual capital efficiency, often referred to as the "economy wealth production factor," reflects how well a company uses its resources (Bayraktaroglu et al., 2019). This study addresses a gap in existing research by exploring how intellectual capital influences a firm's investment efficiency.

LITERATURE REVIEW

Intellectual Capital

Intellectual capital efficiency is a complex notion that plays a crucial role in understanding how firms create value. Intellectual capital encompasses the intangible resources owned by an organization that enhance its worth and provide it with a competitive edge (Abdulsalam et al., 2011). According to Radjenović and Krstić (2017), intellectual capital is a valuable and intangible resource that promotes a company's growth and delivers exceptional value to stakeholders. Intellectual capital can be broken down into three main components: How well a company uses its people's skills and knowledge; How effectively it leverages its internal systems and processes; and How efficiently it employs its financial resources. This framework, introduced by Pulic in 1998, provides a way to measure and understand the different aspects of a company's non-physical assets.

As Pulic explained in more detail, human capital efficiency pertains to the optimal utilization of human resources, encompassing the skills, knowledge, and capabilities of employees to drive organizational performance and productivity. Second, Structural capital efficiency is about how well a company uses its internal framework, methods, and tools to boost innovation. It focuses on making the most of the organization's non-human assets to spark new ideas and improvements. It involves the codification and documentation of organizational knowledge, best practices, and intellectual assets to ensure their accessibility, transferability, and preservation over time (Huang & Huang, 2020).

Lastly, capital employed efficiency focuses on maximizing productivity and returns on invested capital across all facets of the organization (Sveiby, 1997). It employs the efficient allocation of financial resources and physical assets to generate value for stakeholders while minimizing waste and inefficiencies. Moreover, capital employed efficiency involves the strategic management of risk exposure and the optimization of capital structure to achieve a harmonious balance between current financial goals and long-term sustainability aims.

Investment Efficiency

Modigliani and Miller (1958) stated that investment efficiency refers to the ability of an investment portfolio to generate returns in relation to its risk level and the amount of capital deployed. This concept is crucial in assessing how well a portfolio is managed and whether it is achieving its objectives. The company obtains funding for the entire investment which has positive value and is continuous until the marginal profit of the investment is equal to the marginal cost. Consequently, investment efficiency exists when the company's actual capital costs and its anticipated benefits are equal.

Investing in companies such as purchasing equipment, developing factories, and so on requires large capital. Occasionally, process of making investment decisions may give rise to a propensity for mistakes in investments that deviate from real expectations, resulting in underinvestment or overinvestment (Thien & Hung, 2023a). Overinvestment, also known as excess investment, refers to the potential for management to misuse its decision-making authority by approving projects that are overly risky or unprofitable in order to harm the

interests of capital providers and shareholders (Stulz, 1990). Underinvestment or debt overhang is an event when a company does not meet investment opportunities resulting in a lack of investment. This choice was taken because the company's decision-makers rejected investments with positive value (positive net present value) due to the formation of a high debt ratio (Myers, 1977). As a result, investment efficiency is used as a performance indicator for productivity evaluation in internal management processes.

Resource Based View Theory

The Resource-Based View (RBV) theory is an important viewpoint in strategic management literature that highlights the crucial role of internal resources and capabilities in determining business performance and maintaining a competitive advantage over time (Barney, 1991). At its core, RBV theory suggests that a company's distinct combination of tangible and intangible resources establishes the basis for its competitive advantage and long-term success (Wernerfelt, 1984a). Unlike traditional theories that focus primarily on external environmental factors, RBV theory shifts the analytical lens inward, highlighting the strategic significance of internal assets in shaping organizational outcomes. The RBV paradigm places significant importance on the concept of resource heterogeneity and immobility.

This concept emphasises that not all resources possess identical value, rarity, inimitability, or non-substitutability (Barney, 1991). Valuable resources allude to the elements that allow a company to take advantage of opportunities or counteract risks in its external surroundings, whereas rare resources are those that only a few competitors possess. Inimitable resources are challenging for competitors to imitate, either because of distinctive historical circumstances, ambiguous causality, intricate social dynamics, or legal safeguards. Non-substitutable resources are resources that do not have viable alternatives for accomplishing the same results (Barney, 1991).

RBV theory emphasizes the importance of dynamic capabilities, which refer to a firm's capacity to adjust, create new ideas, and reorganize its resources to fulfil the demands of evolving market conditions and strategic goals (Teece et al., 1997). This idea posits that companies possessing a wide range of valuable, unusual, difficult-to-imitate, and irreplaceable resources are more likely to attain long-term competitive advantage. The resources can be classified as tangible assets, including physical capital, financial resources, and technology, and intangible assets, such as organizational culture, expertise, reputation, and relationships. Barney (1991) argues that competitive advantage is not derived from just having resources, but rather from effectively using and combining them to provide value for consumers and stakeholders.

Hypotheses Development

Resource-based theory states that intangible resources are critical to the success of a company (Barney, 1991). The fundamental claim is that modern businesses should have a competitive advantage by utilizing both tangible and intangible assets. In other word, the firm's resource-based view maintains that variations in a company's resource portfolio and how those resources are expressed may account for variations in profitability among enterprises (Wernerfelt, 1984b). Cited from Wang and Wang (2024), the influence of human capital on company performance is unquestionable. Employees with specialized expertise and knowledge perform a crucial part in aiding organizations to enhance the competitiveness of their products and services (He et al., 2021). Companies can enhance staff productivity and motivation by implementing a reward system, team-building activities, and employee training. These measures contribute to improving the firm's production capacity (Chang et al., 2015), eventually leading to increased investment efficiency.

H1 : Human capital component is positively associated with investment efficiency

Companies that achieve high capital employed efficiency often prioritize operational effectiveness and short-term financial gains. This is achieved through cost-cutting measures, optimizing current processes, and improving asset utilization (Kaplan & Norton, 2004; Teece et al., 1997). By concentrating on short-term financial performance, these firms can report higher returns on capital employed, which is often a key metric for investors and stakeholders (Fama & French, 1993). Companies with high capital employed efficiency may exhibit a conservative approach to investment, focusing on projects with predictable and stable returns. This risk aversion behaviour however can limit their willingness to explore new ventures that might involve higher uncertainty but also have the potential for substantial long-term benefits (Barney, 1991). This conservative investment strategy can result in missed opportunities for growth and innovation, as firms may prefer to optimize existing operations rather than expanding into new areas (Dyer & Singh, 1998).

H3 : Capital employed component is negatively associated with investment efficiency

According to Drucker and Alum (1986), in a volatile and competitive business environment, a company's structural capital plays a crucial role in enhancing its value. Establishing and maintaining a solid connection with suppliers is important for assuring the consistent amount and quality of a firm's products. It also helps to save the time and effort spent on seeking new suppliers and negotiating contracts (Krolikowski & Yuan, 2017). The decrease in transaction costs and supply potential risks provides a crucial guarantee for the seamless advancement of company innovation. (Teece, 1986). So that cost reductions resulting from effective structural capital will increase investment efficiency. Furthermore, structural capital encompasses systems and processes that facilitate the management and utilization of knowledge within an organization. Effective knowledge management systems ensure that valuable information is easily accessible and can be leveraged to enhance the effectiveness of high technology investments (Nonaka, 1994).

H4 : Structural capital component is positively associated with investment efficiency

METHOD

This study focuses on firms in Indonesia. The primary source of accounting data is firm's annual report retrieved from Indonesia Stock Exchange Database. All financial firms exclude from this study's initial sample. The final sample of this study contains 616 firms with 5,484 firm-year observations. Each sample firm is being observed for consecutive years over the 2010-2023 period. Since the regression include lagged variables, companies should provide at least two consecutive years of observation.

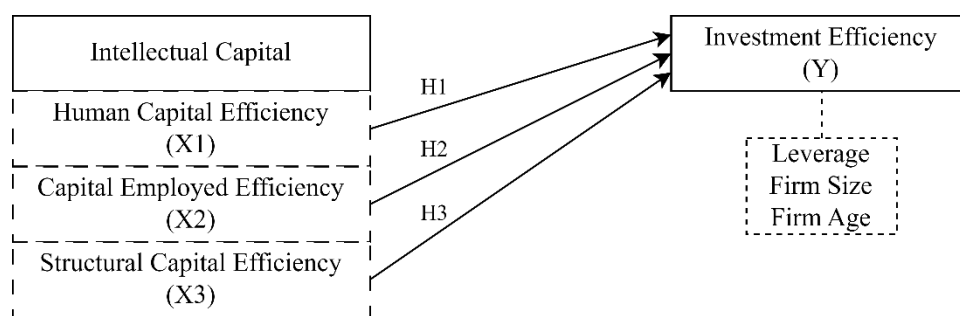


Figure 1. Research Model

$$INV_{i,t} = \alpha + \beta_1 HCE_{i,t} + \beta_2 CEE_{i,t} + \beta_3 SCE_{i,t} + \beta_4 Size_{i,t} + \beta_5 Lev_{i,t} + \beta_8 Age_{i,t} + \varepsilon$$

This study validated the hypotheses by utilizing a multiple regression model to estimate the relationship between investment efficiency and other variables. Table 2 and 3 show the descriptive statistics for the variables and their correlations. There is no significant problem of collinearity as the variance inflation factor (VIF) values were below 10. If the model is shown to exhibit heterogeneity and (or) autocorrelation, robust clustering will be employed to address these issues.

RESULTS AND DISCUSSION

Descriptive Statistic

Table 2. Descriptive Statistics

	Obs	Mean	Std. Dev.	Min	Max
INV	5,484	-6.046	0.823	-14.982	55.964
HCE	5,484	4.893	29.891	-189.806	1,153
CEE	5,484	0.692	50.667	-956.522	3,624
SCE	5,484	0.745	5.328	-103.867	225
LEV	5,484	0.518	0.362	0.000	3.968
SIZE	5,484	26.777	3.704	13.940	39.572
AGE	5,484	15.421	9.554	2	46

Table 1 reveal summary statistics for data collected from 5,484 company-years between 2010 and 2023. Table 2 presents an overview of the key variables studied. On average, companies in Indonesia had an investment efficiency of -6.05%. The sign of the average (whether it's positive or negative) indicates how companies tend to invest. In this case, the negative number suggests that companies generally invested efficiently. The standard deviation figure indicates that the level of investment efficiency fluctuates, but there is no substantial disparity. Regrettably, both the minimum and the maximum values reflect the presence of highly efficient organisations as well as a tendency towards excessive investment.

The human capital variable exhibits a mean value of 4.9% and demonstrates significant variation across different companies, as indicated by a standard deviation of 29.9%. The range of values indicates significant variations in the efficiency of organisations in utilizing their human resources. Some firms demonstrating high proficiency in allocating human capital, while others exhibit limited ability in this area. Similar to human capital, the capital component variable has a mean value of 0.7% and a significantly high level of variation of 50.7%.

This illustrates that certain corporations are willing to allocate substantial amounts of capital for investment, while others may exercise greater caution in the allocation of their funds. Moreover, the structural capital variable exhibits a mean value of 0.75%, which is relatively low. The standard deviation value of structural capital exhibits more moderate fluctuations in comparison to the capital component, even though the minimum and maximum values exhibit a substantial range.

Regarding the control variables, the size of firms is generally uniform, with a range of 27 and a low discrepancy of only 3.7%. The leverage variable (LEV) indicates that most Indonesian companies had a leverage ratio of 50%. However, a few firms had leverage exceeding 100% of their total assets. On average, these companies are likewise in the growth phase towards maturity, with a mean score of 15.4%, indicating the company's ability to further expand its market share.

Table 3 presents how the different variables in the study relate to each other. Among all the relationships examined, the only noteworthy connection found was between INV and LEV. These two variables have a strong positive relationship with each other. Nevertheless, it

does not show any correlations with HCE, CEE, and SCE. No correlation between INV and intellectual capital (IC) is in line with Thien and Hung (2023b), where it was discovered that without effective strategic management accounting practices, the direct impact of intellectual capital on investment efficiency may not be significant in Vietnam, suggesting conditions under which IC may not correlate strongly with investment efficiency. However, the significant and positive correlation between HCE and CEE suggests that the capital component acts as a stimulant for the efficient of utilization of human resource.

Effect of Intellectual Capital on Investment Efficiency

Table 4. The Effect of Intellectual Capital on Investment Efficiency

	Coefficient	P (value)
HCE	0.0018	0.000***
CEE	-0.1703	0.000***
SCE	0.0063	0.000***
LEV	-0.0000	0.127
SIZE	0.0015	0.000***
AGE	0.0011	0.000***
Adjusted R2		
Observation		5,484
Industry Effect		Yes

The findings indicate that human capital exerts a favourable and substantial impact on investment efficiency. Indicates that increasing the utilization of human resources might enhance investment efficiency. Human capital emphasizes that investment in education and training improves worker productivity, which in turn enhances the efficiency of resource utilization within firms. Highly skilled employees can identify and implement more efficient processes, leading to better investment outcomes. Employees with higher levels of education and training are better equipped to analyze and interpret complex information, facilitating more informed and strategic decision-making. This capability is crucial for identifying profitable investment opportunities and avoiding unproductive expenditures. For example, Schultz (1961) posited that human capital plays a critical role in improving economic decision-making, thereby increasing the efficiency of investments. Another study by Romer (1986) highlighted that human capital is a fundamental component of endogenous growth, driving technological advancements and productivity improvements that enhance investment efficiency.

Moreover, the capital component has a negative and significant effect on investment efficiency due to several factors. Firms with high capital intensity often have significant fixed costs associated with maintaining and operating their capital assets. These fixed costs can reduce operational flexibility and make it difficult for firms to adjust quickly to changing market conditions. As a result, such firms may struggle to allocate resources efficiently, leading to lower investment efficiency (Lev, 1983). This argument supported by Abel (1983) when firms invest heavily in capital assets, they may experience diminishing returns on these investments. Beyond a certain point, additional capital investments do not yield proportional increases in productivity or returns, thereby reducing overall investment efficiency (Abel, 1983). In the same manner, Fazzari et al. (1998) found that capital-intensive firms may face greater financial constraints, as maintaining and upgrading capital assets requires substantial funding. These constraints can limit the firm's ability to invest in other profitable opportunities, thus negatively impacting investment efficiency (Fazzari et al., 1998).

The relationship between intellectual capital and performance is complex and can vary across different contexts. While this study didn't find a significant correlation, other research has shown more nuanced results. For instance, Ozkan et al. (2017) found that in the Turkish banking sector, when the VAIC was broken down, the efficient use of financial and physical capital (CEE) positively impacted banks' financial performance. They suggested that Turkish banks should focus on utilizing these resources effectively to increase profitability. Similarly, Clarke et al. (2011) discovered a positive correlation between CEE and various performance indicators such as ROA, ROE, and employee productivity. The variability in these findings across studies can be attributed to differences in management practices, market conditions, and regulatory environments, highlighting the contextual nature of the relationship between intellectual capital and firm performance.

The insignificant relationship between structural capital and investment efficiency can be attributed to the broader impacts of structural capital on firm performance and concludes that while structural capital can contribute to organizational processes and knowledge management (Clarke et al., 2011; Wernerfelt, 1984c), it does not necessarily translate into higher investment efficiency. For structural capital to enhance investment efficiency, it must align with the organization's strategic goals. Misalignment can result in resources being expended without achieving the desired efficiency gains. **The resource-based view theory emphasizes that value creation stems from the synergistic combination of various resources working in tandem.** If structural capital is not effectively integrated with other forms of capital, its individual contribution to investment efficiency may be negligible (Wernerfelt, 1984c).

Research on how organizational structures and processes (structural capital) affect a company's ability to invest wisely has produced varied findings. For instance, a study on insurance companies by Chen et al. (2014) highlighted that while structural capital contributes to overall firm performance by enhancing organizational processes, its direct impact on investment efficiency was not significant. Structural capital, which includes processes, databases, organizational culture, and intellectual property, primarily supports human and relational capital. Its main function is to provide an enabling environment that enhances the productivity and efficiency of these other forms of capital.

Structural capital alone might not be enough to directly and significantly improve how efficiently investments are made (Chen et al., 2014), leading a conclusion that structural capital should complement and enhance the capabilities of human and relational capital. If there is a mismatch between these components, the structural capital may not be effectively utilized, resulting in wasted investments as an Effective integration and alignment are essential to fully leverage the potential of structural capital.

Table 3. Correlation Matrix

Correlation	INV	HCE	CEE	SCE	LEV	SIZE	AGE
INV	1.000						
HCE	-0.003	1.000					
CEE	-0.009	0.136***	1.000				
SCE	0.003	0.002	0.000	1.000			
LEV	0.680***	-0.002	-0.121***	0.002	1.000		
SIZE	-0.009	-0.034**	-0.024*	-0.012	-0.041***	1.000	
AGE	-0.000	0.029**	0.005	-0.012	0.002	0.049***	1.000

Robustness Check

The previous analysis might have produced inaccurate findings due to an uneven distribution of investment residuals. To address this, the study categorizes firms into three investment efficiency groups based on Iftikhar et al.'s (2023) method, ensuring a balanced

sample for reliable results. Firms with average investment levels serve as a comparison point, while those under- or over-investing help understand how factors influence investment behavior. To examine the relationship between direct intellectual capital efficiency and investment, the study employs a Tobit regression model.

Table 5. Robustness for the Relationship between Intellectual Capital and Investment Efficiency

	Panel 1: Under-INV		Panel 2: Efficient-INV		Panel 3: Over-INV	
	Coefficient	p(value)	Coefficient	p(value)	Coefficient	p(value)
HCE	-0.0014	0.001***	0.0015	0.000***	-0.0000	0.615
CEE	0.0797	0.000***	-0.0492	0.000***	0.0108	0.182
SCE	-0.0036	0.203	-0.0000	0.979	0.0000	0.959
LEV	-0.0000	0.007***	-0.0011	0.028**	0.0002	0.000***
SIZE	0.0021	0.001***	-0.0007	0.051*	0.0006	0.425
AGE	0.0012	0.000***	-0.0002	0.198	-0.0008	0.024**
Adjusted R2						
Observation	1,371		2,741		1,372	
Industry Effect	Yes		Yes		Yes	

This table reports Tobit regression result for the robustness of the relationship between intellectual capital and investment efficiency. Under-INV is a dependent variable in panel 1, measured by 1st quartile of residuals. Efficient-INV is a dependent variable in panel 2, measured by 2nd and 3rd quartiles of residuals. Over-INV is a dependent variable in panel 3, measured by 4th quartile of residuals.

Table 5 displays the results of re-estimating Equation 2 with the grouped sample, which produced outcomes similar to those of the original model. Even though the robustness result shows a lower coefficient of efficient-INV than the original sample, the human capital is still in an efficient category, and confirmed hypothesis 1. Hypothesis 2 is further supported by the finding that the capital component has a considerable and negative impact on investment efficiency. Meanwhile, there was no substantial correlation observed between structural capital and investment efficiency, which aligns with the findings from the original sample.

Statistical findings demonstrate that the efficient utilization of human resources leads to a decrease of underinvestment and enhance the level of investment efficiency. The resource-based view theory focuses on how companies gain and stay ahead of the competition by making the most of their internal capabilities (Bonsi et al., 2013). Optimizing the utilization of human resources will enhance productivity, resulting in the anticipated value generation from investment cost allocation and a reduction in underinvestment. According to Reis and Sequeira (2007), human resource policies enhance employee quality, which in turn promotes investment efficiency, which supports argument in this research.

In addition, companies prefer to utilize investment resources more effectively when they encounter financial constraints, and conversely. The evidence indicates that financial restrictions hinder managers' capacity to pursue initiatives with positive net present value, thus resulting in higher underinvestment. However, according to research conducted by (Rehman et al., 2023), it has been found that larger companies tend to have more intricate capital structures. These structures can have varying effects on financial performance, depending on the specific circumstances and industry of the company.

Regrettably, a notable correlation between the independent variables and over-INV was not discovered. Therefore, it can be concluded that human capital helps to promote the investment efficiency by reducing the negative impact of underinvestment. Meanwhile, the capital component diminishes efficiency and is more common in under-investment scenarios, emphasizing the necessity for improved capital assessment in projects to be pursued.

CONCLUSION

While previous studies have explored the connection between intellectual capital and how efficiently companies invest, many aspects of this relationship remain unclear. This research examines this link for Indonesian companies between 2010 and 2023. Our findings strongly support the idea that a company's human capital positively influences its investment efficiency. Our result is consistent with, which shows that firms can benefit from optimizing the use of human resources, which can lead to increased productivity. This, in turn, can generate the optimum value from investment cost allocation and reduce underinvestment.

The second hypothesis investigates a direct relationship between capital component and investment efficiency. This relationship is found that capital component is negatively affect the investment efficiency. Capital-intensive companies may have more significant financial limitations due to the substantial expenditure required for the maintenance and enhancement of capital assets. These limitations can restrict the company's capacity to invest in other lucrative prospects, so adversely affecting investment efficiency. This suggest that managers' capacity to carry out initiatives with a good net present value is hindered by financial limitations. However, they enhance the project selection process by limiting access to capital and incentivizing managers to devote resources towards more attractive investment prospects.

The third hypothesis investigates the relationship between structural capital component and investment efficiency. Although the standalone effects of structural capital were insignificant, there is evidence suggesting that it might contribute to investment efficiency when combined with other variables. Investigating these interactions offers promising avenues for future intellectual capital studies.

Finally, this research makes several contributions to the field. First, it expands our understanding of intellectual capital (IC) and its connection to resource-based view (RBV) theory. Second, it confirms the impact of IC on investment performance for Indonesian companies. Third, it reveals a previously unidentified direct link between social capital efficiency and investment efficiency. Future research should investigate contemporary factors influencing IC, how IC is put into practice, and the time it takes for IC investments to yield returns. These elements could significantly impact IC and firm performance. Additionally, future studies could benefit from employing more advanced statistical methods like non-linear and quantile regression, and exploring the time lag between IC investments and performance outcomes.

REFERENCES

- Abdulsalam, F., Al-Qaheri, H., & Al-Khayyat, R. (2011). The Intellectual Capital Performance of Kuwaiti Banks: An Application of vaicTM1 Model. *IBusiness*, 03(01), 88–96. <https://doi.org/10.4236/ib.2011.31014>
- Abel, A. B. (1983). Optimal Investment Under Uncertainty (Vol. 73, Issue 1).
- Ahmed, B., Akbar, M., Sabahat, T., Ali, S., Hussain, A., Akbar, A., & Hongming, X. (2020). Does Firm Life Cycle Impact Corporate Investment Efficiency? *Sustainability*, 13(1), 197. <https://doi.org/10.3390/su13010197>
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Bayraktaroglu, A. E., Calisir, F., & Baskak, M. (2019). Intellectual capital and firm performance: an extended VAIC model. *Journal of Intellectual Capital*, 20(3), 406–425. <https://doi.org/10.1108/JIC-12-2017-0184>
- Bonsi, R., Gnyawali, D. R., & Hammett, A. L. (n.d.). Achieving Sustained Competitive Advantage in the Forest Products Firm: The Importance of the Resource-Based View. *Journal of Forest Products Business Research*, 5. <http://legacy.forestprod.org/jfpbr/jfpbr->

a26.asp

- Bontis, N. (1998). Intellectual capital: an exploratory study that develops measures and models. *Management Decision*, 36(2), 63–76. <https://doi.org/10.1108/00251749810204142>
- Chang, X., Fu, K., Low, A., & Zhang, W. (2015). Non-executive employee stock options and corporate innovation. *Journal of Financial Economics*, 115(1), 168–188. <https://doi.org/10.1016/j.jfineco.2014.09.002>
- Chen, F.-C., Liu, Z.-J., & Kweh, Q. L. (2014). Intellectual capital and productivity of Malaysian general insurers. *Economic Modelling*, 36, 413–420. <https://doi.org/10.1016/j.econmod.2013.10.008>
- Chen, M., Cheng, S., & Hwang, Y. (2005). An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of Intellectual Capital*, 6(2), 159–176. <https://doi.org/10.1108/14691930510592771>
- Clarke, M., Seng, D., & Whiting, R. H. (2011). Intellectual capital and firm performance in Australia. *Journal of Intellectual Capital*, 12(4), 505–530. <https://doi.org/10.1108/14691931111181706>
- Drucker, P. F., & Alum, R. A. (1986). *Innovation and Entrepreneurship: Practice and Principles*. <https://about.jstor.org/terms>
- Dyer, J. H., & Singh, H. (1998). The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage. *The Academy of Management Review*, 23(4), 660. <https://doi.org/10.2307/259056>
- Edvinsson, L., & Malone, M. S. (1997). *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*. Harper Business.
- Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3–56. [https://doi.org/10.1016/0304-405X\(93\)90023-5](https://doi.org/10.1016/0304-405X(93)90023-5)
- Fazzari, S. M., Hubbard, R. G., & Petersen, B. C. (1998). *Financing Constraints and Corporate Investment*.
- Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17(S2), 109–122. <https://doi.org/10.1002/smj.4250171110>
- He, K., Chen, W., & Zhang, L. (2021). Senior management's academic experience and corporate green innovation. *Technological Forecasting and Social Change*, 166, 120664. <https://doi.org/10.1016/j.techfore.2021.120664>
- Hottenrott, H., & Peters, B. (2009). Innovative Capability and Financing Constraints for Innovation More Money, More Innovation? *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1547083>
- Huang, C.-C., & Huang, S.-M. (2020). External and internal capabilities and organizational performance: Does intellectual capital matter? *Asia Pacific Management Review*, 25(2), 111–120. <https://doi.org/10.1016/j.apmr.2019.12.001>
- Iftikhar, F., Husnain, M., Munir, Q., & Ali, S. (2023). Does Intellectual Capital Efficiency Matter for Firms' Investment Efficiency? 2023 International Conference on Sustainable Islamic Business and Finance, SIBF 2023, 183–188. <https://doi.org/10.1109/SIBF60067.2023.10380096>
- Kaplan, R. S., & Norton, D. P. (2004). *Measuring the Strategic Readiness of Intangible Assets*. www.hbr.org
- Lev, B. (1983). Some economic determinants of time-series properties of earnings. *Journal of Accounting and Economics*, 5, 31–48. [https://doi.org/10.1016/0165-4101\(83\)90004-6](https://doi.org/10.1016/0165-4101(83)90004-6)
- Lev, B. (2001). *Intangibles: Management, Measurement, and Reporting*. Brookings Institution Press.
- Lian, Y., & Weng, X. (2024). ESG performance and investment efficiency. *Finance Research*

- Letters, 62. <https://doi.org/10.1016/j.frl.2024.105084>
- Modigliani, F., & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment (Vol. 48, Issue 3).
- Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), 147–175. [https://doi.org/10.1016/0304-405X\(77\)90015-0](https://doi.org/10.1016/0304-405X(77)90015-0)
- Nahapiet, J., & Ghoshal, S. (1998). Social Capital, Intellectual Capital, and the Organizational Advantage. *The Academy of Management Review*, 23(2), 242. <https://doi.org/10.2307/259373>
- Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14–37. <https://doi.org/10.1287/orsc.5.1.14>
- Petty, R., & Guthrie, J. (2000). Intellectual capital literature review. *Journal of Intellectual Capital*, 1(2), 155–176. <https://doi.org/10.1108/14691930010348731>
- Pew Tan, H., Plowman, D., & Hancock, P. (2007). Intellectual capital and financial returns of companies. *Journal of Intellectual Capital*, 8(1), 76–95. <https://doi.org/10.1108/14691930710715079>
- Pham, C. Van, Liu, S. F., & Chen, S. H. (2023). Corporate ESG performance and intellectual capital: International evidence. *Asia Pacific Management Review*. <https://doi.org/10.1016/j.apmr.2023.12.003>
- Pulic, A. (1998). Measuring the Performance of Intellectual Potential (IP) in Knowledge Economy. 19th Annual National Business Conference.
- Pulic, A. (2000). VAICTM an accounting tool for IC management. *International Journal of Technology Management*, 20(5/6/7/8), 702. <https://doi.org/10.1504/IJTM.2000.002891>
- Radjenović, T., & Krstić, B. (2017). Intellectual Capital as The Source of Competitive Advantage: The Resource-Based View. *Facta Universitatis, Series: Economics and Organization*, 127. <https://doi.org/10.22190/FUEO1702127R>
- Reis, A. B., & Sequeira, T. N. (2007). Human Capital and Overinvestment in R&D. *The Scandinavian Journal of Economics*, 109(3), 573–591. <https://doi.org/10.1111/j.1467-9442.2007.00508.x>
- Richardson, S. (2006). Over-investment of free cash flow. *Review of Accounting Studies*, 11(2–3), 159–189. <https://doi.org/10.1007/s11142-006-9012-1>
- Romer, P. M. (1986). Increasing Returns and Long-Run Growth. In *Source: The Journal of Political Economy* (Vol. 94, Issue 5).
- Schultz, T. W. (1961). Investment in Human Capital (Vol. 51, Issue 1).
- Stein, J. C. (1996). Rational Capital Budgeting In An Irrational World. *The Journal of Business*, 69(4), 429. <https://doi.org/10.1086/209699>
- Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of Financial Economics*, 26(1), 3–27. [https://doi.org/10.1016/0304-405X\(90\)90011-N](https://doi.org/10.1016/0304-405X(90)90011-N)
- Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy*, 15(6), 285–305. [https://doi.org/10.1016/0048-7333\(86\)90027-2](https://doi.org/10.1016/0048-7333(86)90027-2)
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. In *Management Journal* (Vol. 18, Issue 7).
- Thien, T. H., & Hung, N. X. (2023a). Intellectual capital and investment efficiency: The mediating role of strategic management accounting practices. *Cogent Business and Management*, 10(2). <https://doi.org/10.1080/23311975.2023.2207879>
- Thien, T. H., & Hung, N. X. (2023b). Intellectual capital and investment efficiency: The mediating role of strategic management accounting practices. *Cogent Business & Management*, 10(2). <https://doi.org/10.1080/23311975.2023.2207879>
- Tobin, J. (1969). A General Equilibrium Approach To Monetary Theory. *Journal of Money, Credit and Banking*, 1(1), 15. <https://doi.org/10.2307/1991374>

- Ul Rehman, W., Saltik, O., Degirmen, S., Ocak, M., & Shabbir, H. (2023). Dynamics of intellectual capital and financial performance in ASEAN banks. *Arab Gulf Journal of Scientific Research*. <https://doi.org/10.1108/AGJSR-12-2022-0287>
- Wang, Y., & Wang, X. (2024). From ratings to action: The impact of ESG performance on corporate innovation. *Heliyon*, 10(4). <https://doi.org/10.1016/j.heliyon.2024.e26683>
- Wernerfelt, B. (1984a). A Resource-Based View of the Firm. *Strategic Management Journal*, 5(2), 171–180. <http://www.jstor.org/stable/2486175>
- Wernerfelt, B. (1984b). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180. <https://doi.org/10.1002/smj.4250050207>
- Wernerfelt, B. (1984c). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180. <https://doi.org/10.1002/smj.4250050207>
- Youndt, M. A., Subramaniam, M., & Snell, S. A. (2004). Intellectual Capital Profiles: An Examination of Investments and Returns*. *Journal of Management Studies*, 41(2), 335–361. <https://doi.org/10.1111/j.1467-6486.2004.00435.x>