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The Effect of Intellectual Capital on Financial Performance in the Banking Industry in Indonesia

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Abstract

In today's knowledge-based economy, intellectual capital (IC) is increasingly recognized as a strategic asset in the banking sector. This study investigates the impact of IC on the financial performance of Indonesian banks, measured by Return on Assets (ROA). The Modified Value-Added Intellectual Coefficient (MVAIC) model is employed, which includes Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Relational Capital Efficiency (RCE), to assess IC comprehensively. Using panel data regression, the study analyzes financial data from the ten largest banks listed on the Indonesia Stock Exchange over the 2014–2023 period. The findings demonstrate that IC has a significant positive influence on ROA, with HCE and RCE emerging as the most impactful components. Control variables such as firm size, leverage, GDP growth, and inflation (CPI) are included to ensure analytical robustness. This study contributes to the literature by extending the application of the MVAIC model within an emerging market context. The results highlight the critical role of effective IC management in improving bank efficiency, competitiveness, and long-term financial performance. Future research is encouraged to explore the intersection between IC and digital transformation in banking operations.

1. Introduction

The banking sector plays a fundamental role in promoting economic development, ensuring financial stability, and supporting inclusive growth. In today's globalized and competitive environment, banks are expected not only to serve as financial intermediaries but also to drive innovation and optimize resource allocation. In emerging economies such as Indonesia, the banking industry faces increasing pressure to enhance its efficiency and adaptability in response to rapid technological changes and market uncertainties.

A key performance indicator frequently used to assess the efficiency of banks is Return on Assets (ROA), which reflects the institution's ability to generate profits from its asset base. Traditionally, financial performance has been evaluated using tangible assets. However, recent developments highlight the growing importance of intangible assets—particularly Intellectual Capital (IC)—in shaping organizational success, especially in knowledge-intensive sectors like banking.

Intellectual Capital encompasses non-physical resources such as employee expertise, internal processes, customer relationships, and strategic networks. These assets are often not reported in conventional financial statements but play a critical role in sustaining competitive advantage and driving long-term profitability. Effective IC management has become a key differentiator for financial institutions striving to improve performance, agility, and innovation capacity.

To measure IC, the Modified Value-Added Intellectual Coefficient (MVAIC) model has emerged as a more comprehensive framework compared to its predecessor, the VAIC model. MVAIC incorporates four dimensions: Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Relational Capital Efficiency (RCE). This multidimensional approach allows for a holistic assessment of how intellectual assets contribute to financial outcomes.

Although the relationship between IC and firm performance has been widely studied in developed countries, research applying the MVAIC model in the context of Indonesia's banking sector remains limited. Furthermore, few studies have examined this relationship

while accounting for the influence of external macroeconomic variables such as Gross Domestic Product (GDP) growth and inflation (CPI), which are known to affect bank performance.

This study aims to fill that gap by investigating the impact of Intellectual Capital—measured using the MVAIC model—on the financial performance of the ten largest publicly listed banks in Indonesia from 2014 to 2023. Using panel data regression, the research also incorporates control variables such as firm size, leverage, GDP growth, and inflation to ensure robust empirical results. The findings are expected to provide practical implications for banking executives seeking to enhance efficiency and profitability through strategic IC investments. Additionally, the study offers recommendations for policymakers to support the development of IC-driven initiatives as part of national financial sector strengthening strategies.

2. Literature Review

2.1 Intellectual Capital

The shift towards a knowledge-driven economy has underscored the increasing significance of intangible assets, especially intellectual capital (IC), in improving organizational performance (Edvinsson & Malone, 1997). IC comprises non-physical assets such as human expertise, organizational structures, and relational networks, which collectively provide firms with competitive advantages (Bontis, 1998). These intangible resources are critical in driving innovation, operational efficiency, and market differentiation, which directly influence a firm's financial outcomes (Grant, 1991). ROA is an important financial indicator that evaluates how effectively a company uses its assets, both physical and intangible, to generate profit (Chen et al., 2005).

Acknowledging the strategic importance of intellectual capital, scholars have created and improved several methods to assess its impact on company performance. Among these, the Modified Value-Added Intellectual Coefficient (MVAIC) has gained prominence as an advanced framework for assessing IC's efficiency and value creation (Nazari & Herremans, 2007). MVAIC, an evolution of Pulic's (2000) VAIC model, addresses its predecessor's limitations by incorporating additional dimensions of IC, providing a more comprehensive analysis (Xu & Wang, 2020).

The MVAIC model evaluates IC through four distinct components. CEE measures the productivity of physical and financial resources in generating value (Mondal & Ghosh, 2012). HCE captures the contributions of employees' knowledge, skills, and expertise, highlighting the critical role of human resources in value creation (Bontis, 1998). Structural Capital Efficiency (SCE) assesses the effectiveness of organizational processes, databases, and systems in supporting operations and innovation (Chen et al., 2005). Lastly, RCE highlights the importance of value generated through external relationships, such as customer networks, supplier connections, and partnerships, which enhance a firm's market position and resource accessibility (Sveiby, 1997).

Empirical studies utilizing MVAIC provide robust evidence of the positive relationship between IC and ROA. For example, Mondal and Ghosh (2012) discovered that the efficiencies of human and relational capital have a significant impact on ROA, particularly in knowledge-intensive industries. Similarly, Zeghal and Maaloul (2010) demonstrated that firms with higher IC efficiency consistently achieve superior financial performance, underscoring the strategic role of intangible resources in sustaining profitability. Additionally, Xu and Wang (2020) highlighted the importance of integrating structural and relational capital to complement human and physical capital, further strengthening a firm's financial outcomes.

2.2 Resource Based View

The Resource-Based View (RBV) is a key theoretical framework in studies examining the link between intellectual capital (IC) and ROA.

Introduced by Barney (1991), RBV suggests that firms attain a sustainable competitive edge by strategically utilizing distinctive, valuable, and non-replicable resources. These resources, especially intangible assets such as IC, play a crucial role in fostering competitive differentiation and improving organizational performance (Grant, 1991).

IC, as conceptualized in the RBV, aligns with the theory's emphasis on intangible resources that meet the criteria of value, rarity, inimitability, and organizational exploitability (Barney, 1991). Human capital, encompassing employee knowledge, skills, and expertise, contributes to innovation and efficiency, enabling firms to deliver superior products and services (Bontis, 1998). Structural capital, comprising internal processes, systems, and databases, ensures efficient operations and supports knowledge retention (Chen et al., 2005). Relational capital, derived from relationships with external stakeholders, enhances market access and strengthens customer loyalty (Sveiby, 1997). These elements collectively act as strategic assets that influence a firm's profitability and market position (Mondal & Ghosh, 2012).

The RBV framework underpins the MVAIC model, a quantitative tool for measuring IC's contribution to firm performance. By evaluating IC's components (CEE, HCE, SCE, and RCE), MVAIC operationalizes RBV principles, translating theoretical concepts into measurable constructs (Pulic, 2000; Nazari & Herremans, 2007). For instance, CEE reflects the productive use of physical and financial resources, which aligns with RBV's emphasis on maximizing resource efficiency (Mondal & Ghosh, 2012). HCE highlights the role of human expertise as a core intangible asset that drives value creation, consistent with RBV's focus on knowledge as a strategic resource (Chen et al., 2005). SCE and RCE represent organizational capabilities and external relationships, aligning with RBV's emphasis on resource orchestration and relational rents (Grant, 1991).

2.3 Hypothesis Development

a. Hypothesis 1

The relationship between intellectual capital (IC) and financial performance, particularly ROA, has been widely recognized in various industries, including banking. Earlier studies suggest that banks with greater intellectual capital generally achieve better financial performance, as they are better equipped to innovate, respond to market dynamics, and enhance customer satisfaction (Firer & Williams, 2003). IC, comprising human capital, structural capital, and relational capital, is crucial in fostering these capabilities, leading to enhanced operational efficiency and profitability (Bontis, 1998). The MVAIC model, an advancement of Pulic's (2000) VAIC model, provides a more comprehensive framework for assessing IC's impact on financial outcomes by evaluating the efficiency of capital employed, human resources, internal processes, and external relationships (Nazari & Herremans, 2007).

As the importance of intellectual capital in boosting organizational performance becomes more widely acknowledged, it is proposed that IC significantly influences ROA. Research within the banking industry backs this claim, showing that banks that effectively utilize IC components like human and relational capital tend to perform better than those with less efficient IC management (Zeghal & Maaloul, 2010). **Hypothesis 1: Intellectual capital significantly influences return on assets (ROA).**

b. Hypothesis 2

Capital Employed Efficiency (CEE) evaluates how efficiently a company leverages its physical and financial resources to create value, directly impacting its profitability and overall financial performance (Mondal & Ghosh, 2012). The effectiveness of capital utilization plays a crucial role in influencing ROA, which serves as a key metric to assess a company's ability to transform its total assets into profits (Chen et al., 2005). As a key component of the MVAIC model, CEE examines the connection

between the capital employed by a company and its capacity to generate value, emphasizing the significance of tangible resources in driving financial achievement (Pulic, 2000).

Previous studies have shown that higher CEE is associated with improved profitability, as companies that optimize their asset usage tend to experience greater financial returns (Firer & Williams, 2003). Additionally, efficient use of capital enhances a firm's competitive advantage by enabling better cost management and more effective investment in strategic initiatives (Bontis, 1998). **Hypothesis 2: Capital Employed Efficiency (CEE) significantly influences Return on Assets (ROA).**

c. Hypothesis 3

Human Capital Efficiency (HCE) represents the value generated by a company's workforce, primarily through their expertise, competencies, and accumulated experience. HCE is a key driver of organizational performance, as a highly skilled and engaged workforce can significantly enhance productivity and innovation, leading to improved financial outcomes (Bontis, 1998). According to Chen et al. (2005), banks that allocate greater resources to human capital initiatives, such as employee training and development, often achieve superior financial outcomes, including increased ROA. This is because skilled employees are better equipped to drive operational efficiency, customer satisfaction, and innovative solutions, all of which contribute to profitability (Firer & Williams, 2003).

The efficient management of human capital is essential in achieving sustainable competitive advantage, as it enables firms to adapt to market changes and optimize resource utilization (Edvinsson & Malone, 1997). In knowledge-based industries, the ability to leverage human capital is especially critical in maintaining financial performance (Chen et al., 2005). **Hypothesis 3: Human Capital Efficiency (HCE) significantly influences Return on Assets (ROA).**

d. Hypothesis 4

Structural Capital Efficiency (SCE) pertains to how well an organization's infrastructure comprising its processes, systems, organizational framework, and intellectual assets facilitates productivity and contributes to value creation. An effective and thoughtfully designed organizational structure helps companies streamline their operations, improve decision-making processes, and maximize resource utilization, ultimately leading to better financial outcomes (Bontis, 1998). In the banking sector, a robust and well-functioning infrastructure is critical in ensuring efficient service delivery, managing risk, and maintaining regulatory compliance, all of which affect profitability and ROA (Chen et al., 2005).

Research has shown that firms with higher SCE are better equipped to adapt to market changes and optimize their internal processes, leading to greater operational efficiency and financial success (Firer & Williams, 2003). Utilizing structural capital, including sophisticated information systems, efficient operational workflows, and robust knowledge management frameworks, can enhance the quality of customer service, reduced operational costs, and better resource utilization (Edvinsson & Malone, 1997). **Hypothesis 4: Structural Capital Efficiency (SCE) significantly influences Return on Assets (ROA).**

e. Hypothesis 5

Relational Capital Efficiency (RCE) evaluates how effectively an organization handles its external connections, encompassing customers, suppliers, partners, and other stakeholders. Within the banking industry, cultivating strong customer relationships helps build trust and loyalty, which are essential for attracting and retaining clients in a highly competitive environment (Chen et al., 2005). Efficient management of relational capital enables banks to understand customer needs, provide personalized services, and enhance customer satisfaction, all of which contribute to

financial performance and profitability (Bontis, 1998).

RCE reflects the ability of firms to leverage their external networks to create value, gain market insights, and secure long-term partnerships (Kujansivu & Lönnqvist, 2007). Effective external relationship management also facilitates cross-selling opportunities, higher customer retention rates, and improved brand reputation, which positively impact financial metrics like ROA (Sveiby, 1997). Relational capital strengthens a company's capacity to create long-term value, it is posited that **Hypothesis 5: Relational Capital Efficiency (RCE) significantly influences Return on Assets (ROA).**

3. Research Methods

This study adopts a quantitative research approach using panel data regression analysis to examine the impact of Intellectual Capital (IC) on financial performance in the Indonesian banking sector. The focus is to evaluate how components of IC—namely Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Relational Capital Efficiency (RCE)—influence Return on Assets (ROA) as a measure of financial performance. The selection of panel data regression is justified by its ability to capture both cross-sectional and time-series variations, improving the robustness of parameter estimation compared to single-year or cross-sectional methods (Hsiao, 2014).

The population of this study consists of commercial banks listed on the Indonesia Stock Exchange (IDX), and the sample includes the 10 largest banks based on average market capitalization over the 2014–2023 period. The selection criteria ensure that the sample reflects institutions with significant economic influence and sufficient data availability. Banks with incomplete financial reports or inconsistent data were excluded to maintain the reliability of the dataset.

3.1 Operational Definitions and Measurement of Variables

- ROA (Return on Assets): Net Income / Total Assets, measuring asset utilization efficiency in generating profit (Chen et al., 2005).
- CEE (Capital Employed Efficiency): Value Added / Capital Employed, representing physical and financial capital efficiency (Pulic, 2004).
- HCE (Human Capital Efficiency): Value Added / Labor Cost, capturing the contribution of human resources to value creation (Bontis, 1998).
- SCE (Structural Capital Efficiency): Structural Capital / Value Added, assessing the effectiveness of organizational processes and systems (Chen et al., 2005).
- RCE (Relational Capital Efficiency): Relational Capital / Value Added, measuring the effectiveness of customer and partner relationship management (Sveiby, 1997).
- Control Variables:
  - Firm Size (log of total assets),
  - Leverage (Debt-to-Equity Ratio),
  - GDP Growth, and
  - Consumer Price Index (CPI) as a proxy for inflation—all incorporated to control for macroeconomic and firm-level variations (Tambunan, 2021).

3.2 Data Source and Collection

The study relies on secondary data obtained from audited annual financial statements and IC disclosures of the sampled banks, published on the official website of the IDX (www.idx.co.id) and each bank's investor relations portal. Macroeconomic indicators (GDP and CPI) were obtained from Bank Indonesia and BPS-Statistics Indonesia. The data span a ten-year period (2014–2023) to allow for a comprehensive temporal analysis.

3.3 Data Analysis Technique

The data were analyzed using EViews 12 software. The following steps were performed:

1. Descriptive Statistics: To provide an overview of data trends and distribution.

2. Classical Assumption Tests: Including multicollinearity (VIF < 10), heteroscedasticity (Breusch-Pagan test), autocorrelation (Durbin-Watson test), and normality (Jarque-Bera test).
3. Model Selection Tests: Fixed Effects, Random Effects, and Pooled OLS models were compared using the Hausman Test to determine the most appropriate specification.
4. Regression Analysis: Panel data regression was conducted to test both individual (t-test) and joint significance (F-test) of the independent variables on ROA.
5. Coefficient of Determination (R^2): To assess the proportion of variation in ROA explained by the independent variables.

All statistical results are interpreted at a 5% significance level (α = 0.05). Ethical considerations were observed by using publicly available, verified data to ensure transparency and replicability.

4. Results and Discussion

4.1 Research Results

The results indicate a significance value of 0.00000, which is less than the alpha level of 0.05, demonstrating that H1a is accepted, indicating that Intellectual Capital significantly influences ROA. Based on the analysis, the Adjusted R-squared value is 0.639387 or 63.9387%, showing that ROA can be explained by the independent variables, while the remaining percentage is attributable to other factors not captured in the model.

The t-test results for the CEE variable show a significance value of 0.0010, which is less than 0.05, leading to the rejection of H0. This indicates that the CEE variable has a significant effect on ROA. The t-test results for the HCE variable show a significance value of 0.0094, which is less than 0.05, leading to the rejection of H0. This indicates that the HCE variable has a significant effect on ROA.

Conversely, the t-test results for the SCE variable show a significance value of 0.5087, which is greater than 0.05, leading to the acceptance of H0. This indicates that the SCE variable does not significantly affect ROA. Similarly, the t-test results for the RCE variable show a significance value of 0.2762, which is greater than 0.05, leading to the acceptance of H0. This indicates that the RCE variable does not significantly affect ROA.

4.2 Research Discussion

IC simultaneously influences ROA. The impact of CEE on ROA indicates that banks efficiently utilizing physical capital tend to be more profitable. This result is consistent with the resource-based view (RBV) theory, which posits that effectively utilizing resources can improve a firm's competitive advantage (Barney, 1991).

HCE exhibits a negative effect on ROA. This may reflect that high costs associated with employee training or development have not directly generated added value, particularly in the short term (Chen et al., 2005). Although SCE has a positive coefficient, its effect on ROA is not statistically significant. This suggests that the organization's infrastructure and internal processes have not fully supported the creation of added value (Sveiby, 1997).

The insignificance of RCE may be attributed to the longer time required to establish external relationships that directly impact profitability (Zeghal & Maaloul, 2010).

5.Closing

5.1 Conclusion

This study concludes that Intellectual Capital (IC) significantly influences financial performance, as measured by Return on Assets (ROA), in Indonesia's banking sector. Among the IC components, Capital Employed Efficiency (CEE) has a positive and significant impact on ROA, suggesting that efficient use of physical capital enhances profitability. Conversely, Human Capital Efficiency (HCE) shows a significant but negative impact, indicating that investments in human capital may not directly translate into short-term financial gains. The regression model explains 63.94% of the variation in ROA, underscoring the relevance of

IC in financial performance and supporting the Resource-Based View (RBV) theory. These findings highlight the strategic importance of optimizing IC to improve financial outcomes in the banking industry.

5.2 Suggestion

Bank management is advised to enhance physical capital efficiency by strategically allocating investments to high value-generating sectors, supported by data-driven decision-making tools. Additionally, human capital development strategies should be periodically reviewed to ensure they deliver measurable returns. Incorporating performance-based training evaluations and linking employee development with key financial indicators is recommended. Future research should expand the model by integrating additional variables such as technological innovation, environmental sustainability, or enterprise risk management. Employing more robust methodologies, such as Structural Equation Modeling (SEM) or cross-country comparisons, can further improve generalizability and depth of understanding regarding IC's influence on performance.

Bibliography

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99–120.

Bontis, N. (1998). Intellectual capital: An exploratory study that develops measures and models. Management Decision, 36(2), 63–76.

Chen, M. C., Cheng, S. J., & 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.

Chou, Y. C., & Buchdadi, A. D. (2018). Firm performance, institutional ownership, and capital structure: Empirical evidence from the Indonesian banking sector. Business: Theory and Practice, 19(1), 72–81.

Edvinsson, L., & Malone, M. S. (1997). Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower. HarperBusiness.

Firer, S., & Williams, S. M. (2003). Intellectual capital and traditional measures of corporate performance. Journal of Intellectual Capital, 4(3), 348–360.

Grant, R. M. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. California Management Review, 33(3), 114–135.

Hapsari, A. P., Mahfud, M. K., & Soesetio, Y. (2022). Analisis pengaruh manajemen aset terhadap profitabilitas bank di Indonesia. Jurnal Keuangan dan Perbankan, 26(1), 45–60.

Kujansivu, P., & Lönnqvist, A. (2007). Investigating the value and efficiency of intellectual capital. Journal of Intellectual Capital, 8(2), 272–287.

Marsuni, N. S. (2024). Optimizing Regional Original Income: A Comprehensive Analysis and Assessment of Revenue Management Practices in Pangkajene Regency and Islands. *Income Journal Of Economics Development*, *4*(1), 20-24.

Mondal, A., & Ghosh, S. K. (2012). Intellectual capital and financial performance of Indian banks. Journal of Intellectual Capital, 13(4), 515–530.

Nazari, J. A., & Herremans, I. M. (2007). Extended VAIC model: Measuring intellectual capital components. Journal of Intellectual Capital, 8(4), 595–609.

Pulic, A. (2000). VAIC–an accounting tool for IC management. International Journal of Technology Management, 20(5–8), 702–714.

Pulic, A. (2004). Intellectual capital – does it create or destroy value? Measuring Business Excellence, 8(1), 62–68.

Stewart, T. A. (1997). Intellectual capital: The new wealth of organizations. Doubleday.

Suhardjanto, D., Wardhani, R., & Fitriasari, D. (2020). Intellectual capital and performance of Indonesian banks: Moderating role of corporate governance. International Journal of Business and Society, 21(2), 485–505.

Sveiby, K. E. (1997). The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets. Berrett-Koehler Publishers.

Tambunan, T. T. H. (2021). Indonesia's economic growth amid global uncertainties. Economic Journal of Emerging Markets, 13(2), 90–102.

Xu, J., & Wang, B. (2020). Intellectual capital, financial performance, and companies' sustainable growth: Evidence from the energy sector. Sustainability, 12(6), 2436.

Zeghal, D., & Maaloul, A. (2010). Analysing value added as an indicator of intellectual capital and its consequences on company performance. Journal of Intellectual Capital, 11(1), 39–60.