



Impact of Intellectual Capital and Leverage on Profitability and Their Implications for Firm Value in Indonesian Healthcare Providers

Adi Anggoro Parulian^{1,2*}, Atang Hermawan¹, Popo Suryana¹, Hedi Kristiawan², Yura Witsqa Firmansyah³, Bhisma Jaya Prasaja², Gracelia Maharani³, Audria Ineswari Mulya Marhadi³, Roma Ave Maria⁴

¹ Department of Management Magister, Post Graduate of Pasundan University, 40154 Bandung City, Indonesia

² Department of Medical Record and Health Information, Vocational Faculty, Santo Borromeus University, 40553 West Bandung Regency, Indonesia

³ Department of Digital Business, Faculty of Social Sciences and Creative Economy, Santo Borromeus University, 40553 West Bandung Regency, Indonesia

⁴ Department of Pharmacy, Vocational Faculty, Santo Borromeus University, 40553 West Bandung Regency, Indonesia

* Correspondence: Adi Anggoro Parulian (adi.stikesborromeus@gmail.com)

Received: 03-29-2024

Revised: 06-04-2024

Accepted: 06-16-2024

Citation: Parulian, A. A., Hermawan, A., Suryana, P., Kristiawan, H., Firmansyah, Y. W., Prasaja, B. J., Maharani, G., Marhadi, A. I. M., & Maria, R. A. (2024). Impact of intellectual capital and leverage on profitability and their implications for firm value in Indonesian healthcare providers. *J. Corp. Gov. Insur. Risk Manag.*, 11(2), 85-97. <https://doi.org/10.56578/jcgirm110201>.



© 2024 by the author(s). Published by Acadlore Publishing Services Limited, Hong Kong. This article is available for free download and can be reused and cited, provided that the original published version is credited, under the CC BY 4.0 license.

Abstract: This study examines the impact of intellectual capital and leverage on profitability, along with their implications for firm value, focusing on healthcare provider companies listed on the Indonesia Stock Exchange (IDX) from 2018 to 2022. A purposive sampling method was employed, resulting in a sample of seven healthcare provider companies. Secondary data were extracted from the companies' annual reports, with intellectual capital measured using Pulic's Value-Added Intellectual Coefficient (VAIC) model, leverage assessed through the debt ratio, profitability evaluated via return on equity (ROE), and firm value gauged by the price-to-book ratio (PBR). Multiple and simple linear regression analyses were conducted to investigate the relationships between these variables. The findings reveal that both intellectual capital and leverage significantly influence profitability, accounting for 69.18% of its variation. Furthermore, profitability is found to significantly impact firm value, explaining 70.79% of its variation. These results indicate that intellectual capital plays a critical role in enhancing profitability, while leverage also contributes to profitability, which in turn, significantly affects firm value. The implications of these findings suggest that healthcare providers in Indonesia could optimize their financial strategies by focusing on intellectual capital and leverage to enhance profitability and, consequently, firm value. This study contributes to the existing literature by providing empirical evidence from the Indonesian healthcare sector and offers insights for both practitioners and policymakers aiming to enhance firm value through strategic financial management.

Keywords: Firm value; Intellectual capital; Leverage; Profitability; Shares; Outstanding shares; Stock; Stock market

1. Introduction

The healthcare industry in Indonesia has grown significantly in the past decade, driven by increased demand, rising incomes, and government investment. The healthcare provider subsector, which includes hospitals and clinics, is crucial in delivering essential services and has expanded due to government initiatives like the National Health Insurance (JKN) program. This growth has boosted employment, attracted foreign investment, and contributed to economic development. The subsector plays a key role in improving public health, enhancing workforce productivity, and supporting broader economic goals, making it vital to Indonesia's overall prosperity.

Companies play a crucial role in a country's economic development by contributing to national stability through job creation and tax revenue. The primary aim of any company is to generate profit, as profitability is essential for its survival (Hinton, 2021). However, modern companies are not only focused on achieving substantial profits but also on enhancing shareholder value. While pursuing profit remains a key goal, financial management experts now emphasize that the main objective is to maximize shareholders' wealth or the firm's overall value. In this context, shareholders' wealth is determined by multiplying the stock price by the total number of outstanding shares, indicating that the firm's value is reflected by its share price on the exchange (Hinton, 2021).

Company value is an attractive factor for investors looking to invest. A company is considered to have good value if it has high stock prices, which is a positive signal for potential investors and guarantees shareholder prosperity (Lestari et al., 2021). A strong company value is reflected by a high demand for its shares in the capital market. The interaction between stock sellers and investors drives up the company's stock price through increased demand and supply dynamics (Al Rahman, 2022). This will positively impact the stock price rise, benefiting stakeholders. Company value is a crucial concept for investors because it serves as an indicator for the market to evaluate the company as a whole (Juniati, 2022). Company value is influenced by investments that can help the company grow and advance its business. Investors will assess how well the company can generate profits from sales and investments.

Based on Figure 1, the graphic reveals a notable variation in company value between the healthcare provider and pharmaceutical subsectors. At the start of 2018, the pharmaceutical subsector's stock price was significantly higher, being 6.54 times its company value, compared to the healthcare sector's average stock price of 2.20 times its company value. By 2019, the pharmaceutical subsector's company value decreased to 3.14 times its stock price, while the healthcare sector's average company value increased to 2.58 times the stock price. Despite the drop, the pharmaceutical subsector's value remained relatively high. In 2020, the pharmaceutical subsector's company value rose to 4.93 times the stock price, compared to 2.89 times for the healthcare sector. The pharmaceutical subsector's value continued to be notably higher. In 2021, however, the pharmaceutical subsector's value fell to 2.45 times the stock price, while the healthcare sector's average value increased to 2.97 times the stock price. Consequently, the pharmaceutical subsector's value was below the healthcare sector's average, though the healthcare provider subsector's value rose to 3.93 times the share price. By 2022, the pharmaceutical subsector's value further decreased to 1.82 times the stock price, while the healthcare sector's average remained at 2.64 times. Therefore, the pharmaceutical subsector's value was again below the healthcare sector's average, whereas the healthcare provider subsector's value was above average at 2.93 times the stock price.

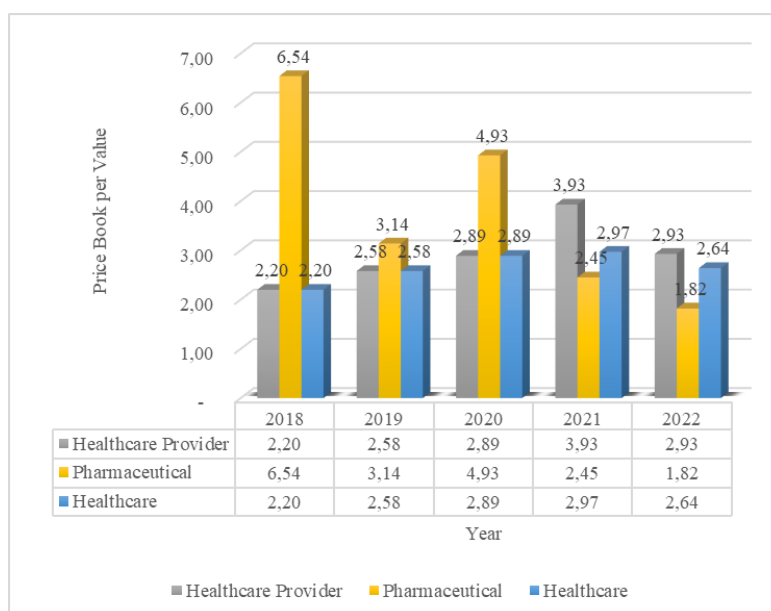


Figure 1. Firm value proxied by price book per value on healthcare sector traded on Indonesian stock exchange during period 2018-2022

Healthcare provider subsector companies can be considered relatively stable in terms of firm value, as measured by the price-to-book value (PBV). The observed phenomenon is that the firm value in the healthcare sector tends to remain stable, unaffected by external factors such as the pandemic, when compared to other subsectors within the same sector. A high company value reflects a company's strong financial performance; the higher the firm value, the greater the investor's confidence in investing in its stock. Conversely, a low company value reflects poor financial performance, and the lower the firm value, the lower the investor's confidence in investing in its stock.

Financial analysis is essential for assessing a firm's financial condition and making well-informed decisions. Profitability ratios, such as ROE and return on assets (ROA), offer insights into how effectively a firm is generating profits from its assets and equity. These ratios are important indicators of a company's capacity to deliver sustainable returns and long-term value to its shareholders. In contrast, firm value represents a company's total worth and is affected by factors such as profitability, growth potential, and risk. By evaluating these financial metrics, investors can better understand a firm's performance and make more informed investment choices.

Evaluating firm value alongside ROE and ROA provides investors with a thorough understanding of a company's financial health and growth prospects. By integrating these factors, investors can gauge how well the company leverages its assets and equity to produce profits and determine its market value. This comprehensive approach to financial analysis enables investors to make strategic decisions that align with their investment objectives and risk appetite.

Healthcare provider companies encompass businesses that deliver medical services, support healthcare, produce medical equipment or pharmaceuticals, or offer medical insurance delivery to patients. This includes hospitals, clinics, medical support services, and other entities involved in direct patient care. These companies are distinct because they operate with humanitarian values, meaning they do not wish for their consumers to fall ill merely to generate profit from healthcare services. However, to maintain their operations and ensure their sustainability, healthcare provider companies must still achieve profitability. Consequently, these companies need to enhance their profitability to preserve and strengthen their firm value.

Profitability and firm value are essential indicators that businesses use to evaluate their success and financial stability. Profitability measures the company's capability to generate revenue and profits, while firm value represents the company's total worth in the marketplace. Grasping the connection between profitability and firm value is vital for organizations aiming to optimize their financial outcomes and achieve sustainable success. By examining how profitability impacts firm value, companies can make well-informed decisions regarding resource allocation, investment strategies, and overall direction. This approach enables businesses to pinpoint areas that need improvement, leverage their strengths, and ultimately strengthen their competitive edge. For instance, a retail company evaluating its profitability data might find that certain product lines consistently underperform, which could negatively affect the company's overall market value. By focusing on improving the profitability of these specific product lines through pricing adjustments or marketing strategies, the company can increase its overall value and competitive advantage in the market. This strategic decision-making process based on profitability insights can ultimately drive long-term success and growth for the organization. However, in some cases, increasing the profitability of certain product lines may not always lead to overall firm value growth. For instance, if the company heavily discounts these products to boost sales and increase profitability, it may attract price-sensitive customers who are not loyal and do not purchase other higher-margin products. This could result in decreased overall profit margins and potentially harm the firm's long-term financial health.

Intellectual Capital is believed to significantly impact a company's profitability by improving operational efficiency, innovation, and competitive advantage. Analyzing it as an independent variable helps to understand how these intangible assets influence financial outcomes in healthcare provider companies. Intellectual Capital, as proxied by Public's VAIC, plays a crucial role in value creation for companies. It includes capital employed, human capital, and structural capital, which are essential for enhancing organizational performance, especially in knowledge-intensive sectors like healthcare. Intellectual capital is particularly important due to its reliance on specialized knowledge, innovative practices, and effective management of relationships with stakeholders. Assessing intellectual capital provides insights into how these factors contribute to the financial performance of healthcare providers. Leverage, or the use of debt to finance assets, can significantly impact a company's profitability. By using debt, companies can potentially enhance their operational capacity and growth prospects, which can influence their earnings and profit margins. Leverage affects the financial risk and potential returns for shareholders. Higher leverage can increase financial risk but may also result in higher returns if managed effectively. Understanding this trade-off is crucial for evaluating financial performance in the context of healthcare providers. By examining intellectual capital alongside leverage, the study can provide a comprehensive view of how both intangible and tangible financial factors interact to influence profitability and firm value, offering a more holistic understanding of financial performance in the healthcare subsector.

A firm's value serves as a vital measure of its overall health and appeal to investors. In today's knowledge-driven economy, intellectual capital has become an essential asset that plays a major role in a company's competitive edge and long-term prosperity. VAIC is a well-established method for assessing the efficiency of intellectual capital, which includes human, structural, and relational capital. Companies that successfully utilize their intellectual capital can boost their profitability by fostering innovation, enhancing operational efficiency, and generating sustainable value.

On the other hand, leverage, often measured by the Debt-to-Equity Ratio (DER), plays a crucial role in a firm's financial structure. The strategic use of leverage can amplify profitability by enabling firms to undertake projects that they might otherwise not be able to finance with equity alone. However, it also introduces financial risk, which needs to be managed carefully to avoid undermining the firm's value.

This study explores the interplay between intellectual capital and leverage and their combined impact on profitability, ultimately leading to increased firm value. Understanding these dynamics is essential for firms, particularly in the healthcare sector in Indonesia, where the pressure to enhance firm value amidst evolving market conditions is ever-present. By examining the relationships between VAIC, DER, and profitability, this research provides valuable insights into how firms can strategically manage their resources to maximize their value and ensure sustainable growth.

2. Literature Review

Previous research has explored the impact of intellectual capital on profitability in both Islamic and conventional banks. Hasan et al. (2017) found that value-added human capital positively affects profitability, structured capital value-added also enhances profitability, value-added capital employed improves profitability, and the VAIC further boosts profitability. In a separate study, Hossain & Ahamed (2021) examined the influence of intellectual capital on profitability, market value, and productivity in Bangladeshi banks. They discovered that banks with higher levels of intellectual capital generally achieved greater profitability but experienced a decline in productivity, with no positive effect on market value. The study indicated that human capital increased profits but led to reduced productivity without affecting market value. Furthermore, banks with more structural capital exhibited lower profitability and no impact on market value or productivity, while employed capital did not influence profitability.

Leverage plays a critical role in understanding how risk builds up during economic booms and how crises emerge when leverage on new loans drops sharply. Monitoring leverage provides essential insights for managing liquidity crises, lending facilities, and evaluating the condition of an indebted economy after a crisis. It is vital to track both old and new leverage, as they often move in opposite directions and reflect different facets of credit conditions and systemic risks (Chang, 2014). According to Kartikasari & Merianti (2016), leverage and total assets significantly influence the profitability of manufacturing companies in Indonesia. However, total sales do not have a significant effect on profitability. The negative correlation between total assets and profitability is logically accepted because the ROA denominator is total assets. Thus, as a company's total assets increase, the ROA decreases if the net income remains constant (Chang, 2014). This comprehensive understanding of leverage not only aids in crisis management but also helps in forming strategies for sustainable growth. Companies and policymakers may consider this knowledge to make decisions based on comprehensive information about resource allocation, investment opportunities, and risk management practices. By closely monitoring leverage, they can identify potential risks early and implement measures to mitigate them, ensuring a more stable economic environment.

Profitability is an essential performance measure for insurance companies. Various factors, including company size, fixed assets, liquidity, capital volume, liabilities, and growth rate, influence profitability. Larger company size tends to improve profitability, whereas higher liabilities typically reduce it. Increased capital volume and growth rate are associated with higher profitability, while fixed assets and liquidity may negatively impact it (Kripa & Ajasllari, 2016). Other than that, Jihadi et al. (2021) highlighted that liquidity, activity, leverage, and profitability ratios are crucial for firm value. Similarly, Hermuningsih (2012) found a positive and significant relationship between profitability and firm value through capital structure. The impact of firm size, leverage, and profitability on firm value on the IDX is intricate and varies across different studies. Most authors have researched commercial firms such as manufacturing, banking, consumer cyclicals, and so on. However, the researcher has identified a gap, suggesting that research should also be conducted on companies that not only focus on profit but also have social value according to societal paradigms, particularly potential investors, such as those in the healthcare provider subsector.

Hypothesis

Hypothesis 1 (H1): Intellectual capital influences its profitability.

H0: Intellectual capital does not impact the profitability of healthcare provider companies listed on the IDX for the period from 2018 to 2022. Ha: Intellectual capital does have an impact on the profitability of healthcare provider companies traded on the IDX for the same period.

Hypothesis 2 (H2): Leverage influences its profitability.

H0: Leverage does not impact the profitability of healthcare provider firms traded on the IDX for the period from 2018 to 2022. Ha: Leverage does impact the profitability of healthcare provider firms traded on the IDX during the same period.

Hypothesis 3 (H3): Intellectual capital and leverage simultaneously have an effect on profitability.

H0: Intellectual capital and leverage have no impact on the profitability of healthcare provider firms traded on the IDX for the period from 2018 to 2022. Ha: Intellectual capital and leverage do impact the profitability of healthcare provider firms traded on the IDX during the same period. Hypothesis 4 (H4): Profitability influences its firm value.

Hypothesis 4 (H4): Profitability has an effect on firm value.

H0: Profitability has no effect the firm value of healthcare provider companies listed on the IDX for the period from 2018 to 2022. Ha: Profitability does have an impact on the firm value of healthcare provider firms traded on the IDX during the same period.

According to Figure 2, the aim of the research is to examine the correlation between intellectual capital, leverage, and profitability, and how this profitability relates to the firm value of healthcare provider firms traded on the IDX from 2018 to 2022. We anticipate that the results of this study will add to the current body of knowledge and offer insights for future research, thereby serving as a basis for the financial evaluation of companies.

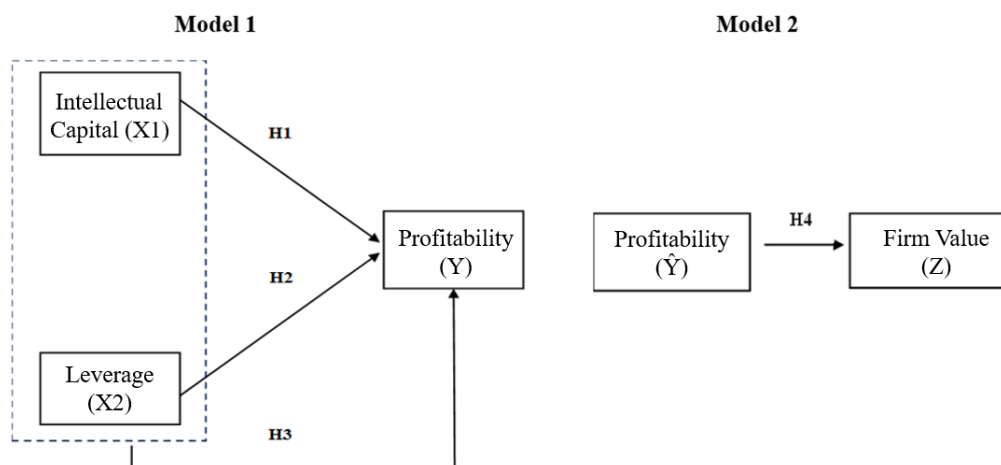


Figure 2. Conceptual model

3. Methodology

The Results section may be divided into subsections. It should describe the results concisely and precisely, provide their interpretation, and draw possible conclusions from the results.

3.1 Data and Sample

This study focuses on intellectual capital, leverage, profitability, and firm value. The research is centered on healthcare provider companies. The population consists of 28 healthcare companies listed on the IDX from 2018 to 2022. The reason for choosing the period from 2018 to 2022 is that the COVID-19 pandemic occurred in the middle of this period, which led to a decrease in consumer purchasing power and generally caused a decline in company values. However, this was not the case for companies in the healthcare provider subsector, which tended to remain stable. During this period, many people also questioned the professionalism of medical personnel due to the increasing number of casualties over time. The Indonesian government provided financial assistance and subsidies to hospitals as part of the effort to break the chain of COVID-19 transmission. As a result, this subsector experienced rapid growth compared to before, although much of it was reflected in increased debt.

The sampling method employed is nonprobability sampling using purposive sampling. This approach was chosen because healthcare provider companies in Indonesia were first listed in 2011 with only a few companies, and not all of them met the criteria relevant to the phenomenon and time period being studied. Consequently, the authors opted for purposive sampling, which involves selecting samples based on specific criteria or considerations. The sample consists of companies that meet these particular criteria, which are detailed in Table 1 of the research.

Table 1. Excluding criteria for companies from the population

No	Criteria	Total
1	Population	28
2	Healthcare companies not listed on subsector healthcare provider in the IDX during the period 2018 – 2022	(15)
3	Healthcare provider companies did not experience delisting in the 2018 – 2022 period	0
4	Healthcare provider companies has been registered for 5 years or more on the IDX	(6)
5	Healthcare provider companies that provide annual report and sustainability report during the period 2018 – 2022.	(0)
	Sample	7
	Period	5
	Total Sample (7 × 5)	35

This research examined a sample of 7 healthcare provider firms traded on the IDX. The sample size is relatively small, which may be attributed to Indonesia being a developing archipelago country, where healthcare provider companies are not evenly spread across the country's various regions and islands. The public perception is that healthcare provider companies function only as social entities rather than businesses. Like other companies, healthcare provider companies cannot sustain their existence without profits. That is why some healthcare provider companies do not list their companies on the IDX. The sample of only 7 companies with 35 total observations over 5 years may not fully represent the diversity of the healthcare provider sector in Indonesia. This small sample size can limit the ability to generalize the findings to a broader population of healthcare providers, as the results may be influenced by the specific characteristics or behaviors of the sampled companies. To enhance the generalizability of the findings, future research could expand the sample size to include a larger number of healthcare provider companies and possibly include companies from different regions or countries within the industry. This would provide a more comprehensive understanding of the influence of intellectual capital and leverage on profitability and firm value across a broader spectrum of the healthcare sector.

3.2 Variable Measurement

This study employs three types of variables: dependent (z), independent (x), and intervening (y) variables, using two panel data regression models. The firm value serves as the dependent variable, while intellectual capital and leverage act as the independent variables. Profitability functions as the intervening variable. Detailed measurement procedures for all variables are presented in Table 2.

Table 2. Indicator variables

Indicator Variables	Criteria
Firm Value	PBV = Share price / Book value per share (BVS) (equity / outstanding shares)
Profitability	ROE = Return after taxes / equity VA = Out – in
Intellectual Capital	VACA = Value added / capital employed VAHU = Value added / human capital SCVA = Structure capital / value added VAIC = SCVA + VAHU + VACA
Leverage	DER = Total debt / equity

This research employs profitability, as measured by ROE, as the dependent variable for Model 1. ROE is computed by dividing net earnings by total assets. In contrast, Model 2 utilizes firm value, represented by the PBV ratio, as the dependent variable. PBV is determined by dividing the share price by the book value per share (BVS). The BVS is measured by dividing total shareholders' equity by the number of shares issued.

For Model 1, intellectual capital is the independent variable and is measured using the VAIC framework. VAIC comprises three components: value added capital employed (VACA), value added human capital (VAHU), and structured capital value added (SCVA). Leverage, expressed as the DER, is determined by dividing total debt by equity. Model 2 examines profitability, influenced by Model 1 variables, through ROE. ROE is computed by dividing net income by equity for healthcare organizations.

This study employs three panel data regression models, such as common effects, fixed effects, and random effects, to identify the most suitable model for the analysis. The Chow test is utilized to compare the common effects and fixed effects models, while the Hausman test differentiates between fixed and random effects models. Additionally, the Lagrange multiplier test is conducted to distinguish between the common effects and random effects specifications.

The classic assumption test is conducted to fulfill the prerequisites for linear regression analysis. This is followed by hypothesis testing, which involves defining the hypothesis and performing statistical tests using multiple linear regression analysis. The model used in this study is as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

where,

Y=Profitability

α =Constants

β_1 - β_2 =Regression coefficient

X1=Intellectual capital

X2=Leverage

ε =Error (Variables not explicitly detailed in the mode)

The Model 2 used is as follows:

$$Z = \alpha + \beta_3 \hat{Y} + \varepsilon$$

where,

α =Constants

β_3 =Regression coefficient

\hat{Y} =Predicted profitability

ε =Error (Variables not explicitly detailed in the model)

4. Results

4.1 Panel data Regression Model

Test of Chow: The estimation results for the panel data regression Models 1 and 2 are presented in Table 3. The Chow Test results, with P-values of 0.000 for both models, indicate that the appropriate estimation method for the panel data regression is the fixed effects model.

Hausman Test: Results of the Hausman Test showed that $P = 0.3872 > 0.05$ and $P = 0.007 < 0.05$, it can be concluded that the estimation model of panel data regression is random effect model for Model 1 and fixed effect model for Model 2.

Lagrange Multiplier Test: Results of the Lagrange Multiplier Test showed that $P = 0.000 < 0.05$ and $0.000 < 0.05$, it can be concluded that the estimation model of panel data regression for both models is random effect and fixed effect. Table 3 illustrates the selection of panel data regression models.

Based on the table above, the best estimation for selecting a panel data regression model from these three tests is the random effects model for linear regression in Model 1. For Model 2, the fixed effects model should be used for linear regression analysis. Both models will then proceed to test data suitability through classical assumption tests.

Table 3. Results of the selection of panel data regression models

Model	Test	Prob	Conclusion
Model 1	Chow Test	0.0000	Fixed Effect
	Hausman Test	0.3872	Random Effect
	Lagrange Multiplier Test	0.0000	Random Effect
Model 2	Chow Test	0.0000	Fixed Effect
	Hausman Test	0.0070	Fixed Effect
	Lagrange Multiplier Test	0.0000	Random Effect

Table 4. Results of the selection of panel data regression models

Model	Test	Value	Conclusion
Model 1	Normality Test	0.167	normally distributed
	Multicollinearity Test	1.0003264	no multicollinearity symptoms
	Heterocedasticity Test	0,6985	no heteroscedasticity
		0,0514	no heteroscedasticity
Model 2	Normality Test	0.441	normally distributed
	Multicollinearity Test	1.0000000	no multicollinearity symptoms
	Heterocedasticity Test	0,1899	no heteroscedasticity

4.2 Test of Classical Assumptions

Classical assumption tests are conducted on both models used in the study, such as normality, multicollinearity, and heteroskedasticity tests. By testing these assumptions, researchers ensure the validity and reliability of the regression analysis results.

Normality test: The Jarque-Bera Test results, with P-values of 0.167 and 0.441, indicate that the regression data is normally distributed. Consequently, the regression model meets the normality assumption.

Multicollinearity test: The multicollinearity test results showed tolerance values near 1, with variance inflation factors (VIF) of 1.0003264 and 1.0000000, both less than 10. This indicates that the independent variables are not correlated, and there are no signs of multicollinearity.

Heteroscedasticity test: The heteroscedasticity test, using the Glejser Test, revealed that all P-values for the independent variables in both models were greater than 0.05, indicating no presence of heteroscedasticity. This

suggests that the regression model maintains homogeneity in the residual variance. Table 4 presents the results of the classical assumption tests.

Based on the classical assumption tests above in Table 4, it is stated that Model 1 has met the requirements for normality, multicollinearity, and heteroscedasticity. Similarly, Model 2 has also satisfied the tests for normality, multicollinearity, and heteroscedasticity. Therefore, it can be concluded that both models are suitable, and linear regression analysis can be performed.

If panel data does not meet classical assumptions, several steps can be taken to address the issues:

1. Diagnostic testing: Conduct diagnostic tests to identify specific violations of classical assumptions, such as heteroscedasticity, autocorrelation, or multicollinearity.

2. Robust standard errors: Use robust standard errors to account for heteroscedasticity or autocorrelation, which can improve the reliability of your coefficient estimates.

3. Model specification: Re-evaluate the model specification. Consider whether any important variables are missing or if there are non-linear relationships that need to be addressed.

4. Transformation of variables: Apply transformations to variables (e.g., logarithmic transformation) to stabilize variance and address issues like heteroscedasticity.

5. Alternative estimation techniques: Utilize alternative estimation methods such as Generalized Least Squares (GLS) or Instrumental Variables (IV) if endogeneity is a concern.

6. Panel data methods: Employ panel data-specific techniques such as Fixed Effects or Random Effects models, and ensure that the choice between these models is appropriate based on Hausman tests.

7. Sensitivity analysis: Perform sensitivity analysis to check how robust your results are to changes in model specifications or assumptions.

8. Consult literature: Review relevant literature to understand how similar issues have been addressed in other studies and apply appropriate methodologies.

4.3 Panel Data Regression Analysis

This study utilizes a random effects model for Model 1 and a fixed effects model for Model 2. The equations representing the relationships between the variables are as follows:

Model 1:

$$\text{PROFIT} = -0.048 + 0.093\text{VAIC} - 0.249\text{DER}$$

Model 2:

$$\text{PBV} = 1.404 - 4.760\text{PROFIT}$$

This equation demonstrates that with a constant value of -0.048, if other influencing factors (such as intellectual capital and leverage) remain unchanged, profitability stands at -0.048. The regression coefficient for intellectual capital is positive at 0.093, indicating that a 1% increase in intellectual capital (VAIC) results in a 0.093% increase in profitability (ROE). In summary, higher intellectual capital is associated with greater profitability for the company.

The regression coefficient for leverage is negative at -0.249, indicating that the relationship between leverage and profitability is inversely proportional. This coefficient suggests that for every 1% increase in leverage (VAIC), profitability (ROE) decreases by 0.249%, assuming other factors remain constant. Therefore, higher leverage leads to a lower percentage of profitability.

The equation features a constant of 1.404, which signifies that if profitability stays constant and is not influenced by other factors, the firm's value is 1.404. The regression coefficient for profitability is -4.760, indicating a negative relationship between profitability and firm value. This implies that for every unit increase in profitability, the firm value decreases by 4.760%, provided that other factors remain constant. Consequently, as profitability increases, the firm's value tends to decrease.

4.3.1 Hypothesis test

Hypothesis testing is measured using simple and multiple linear regression tests. The results of the tests have been summarized by the researcher, and the findings of the linear regression analysis are as follows:

Model 1

In Table 5, the value of probability for VAIC or X1 is 0.0000, below the 0.05 cutoff. The t-value surpasses the critical t-value ($8.304782 > 1.693889$), resulting in the acceptance of H1. This indicates that intellectual capital has a positive effect on the profitability of healthcare provider companies listed on the IDX from 2018 to 2022.

With a probability value of 0.0014 for profitability (X2), which is below the 0.05 threshold, and a calculated t-value of -0.248868 being less than the critical t-value of -1.693889, the negative sign reflects the type of

relationship between X2 and Y. Therefore, H2 is accepted, indicating that leverage has a negative partial impact on the profitability of healthcare provider companies listed on the IDX for the period from 2018 to 2022.

In Table 6, the significance value for Model 1 shows an F-statistic probability of 0.000, which is below the 1% significance level ($\alpha = 0.01$). This leads to the acceptance of H3, indicating that both intellectual capital and leverage influence the profitability of healthcare provider companies listed on the IDX during the period from 2018 to 2022.

Model 2

Given that the profitability probability value (\hat{Y}) is 0.0484, which falls short of 0.05, and the calculated t-value of -2.067523 surpasses the critical t-value of -1.692360, with a negative sign indicating the direction of the relationship between \hat{Y} and Z. Additionally, the significance value in Model 2 from Table 7 shows an F-statistic probability of 0.000, which is below the 1% error rate ($\alpha = 0.01$). Therefore, H4 is accepted, indicating that profitability has a negative partial effect on the profitability of healthcare provider firms that have traded on the IDX for the period 2018-2022.

Determination coefficient (R^2)

Table 6 reveals that the R-squared value for Model 1 is 0.709946, or 70.9946%. The coefficient of determination indicates that approximately 70.9946% of the variability in the dependent variable (Y) can be explained by the independent variable (X). The remaining 29.0054% of the variability is likely due to other factors not included in the current research. Thus, the effect of intellectual capital (X1) and leverage (X2) on profitability (Y) accounts for 70.9946%, with the remaining 29.0054% attributed to other unexamined variables.

Meanwhile, according to Table 7, considering that this R-squared value on Model 2 is 0.768067 or 76.8067%. The analysis explains roughly 76.8067% of the changes in variable Z by considering the influence of variable \hat{Y} . The remaining 23.1933% might be due to other factors. It can be concluded that the magnitude of the influence of profitability (\hat{Y}) on firm value (Z) is 76.8067%, while the remaining 23.1933% is influenced by other variables not examined in this study.

Table 5. Result of T test

Model	Variable	Coefficient	Std. Error	T-Statistic	Prob
Model 1	C	-0.048124	0.036862	-1.305501	0.2010
	X1	0.092761	0.011170	8.304782	0.0000
	X2	-0.248868	0.071391	-3.486005	0.0014
Model 2	C	1.404117	0.403222	3.482245	0.0017
	Y	-4.760154	2.302346	-2.067523	0.0484

Table 6. Result of F test and coefficient of determination (R^2) on Model 1

Weighted Statistics			
R-squared	0.709946	Mean dependent var	0.024666
Adjusted R-squared	0.691818	S.D. dependent var	0.058612
S.E. of regression	0.032538	Sum squared resid	0.033879
F-statistic	39.16213	Durbin-Watson stat	1.826703
Prob(F-statistic)	0.000000		

Table 7. Result of F test and coefficient of determination (R^2) on Model 2

Weighted Statistics			
R-squared	0.768067	Mean dependent var	0.599474
Adjusted R-squared	0.707936	S.D. dependent var	1.154650
S.E. of regression	0.624006	Akaike info criterion	2.092319
Sum squared resid	10.51336	Schwarz criterion	2.447827
Log likelihood	-28.61558	Hannan-Quinn criterion	2.215040
F-statistic	12.77329	Durbin-Watson stat	1.393261
Prob(F-statistic)	0.000000		

5. Discussion

5.1 Profitability and Intellectual Capital

The result of this study, demonstrating a positive and significant effect of intellectual capital on profitability, aligns with previous research. Pratiwi & Muthohar (2021) examined the influence of intellectual capital, tax advice,

and leverage on firm value, with profitability as an intervening variable, in food and beverage companies listed on the IDX (BEI) from 2014 to 2019. Their results revealed a significant positive effect of intellectual capital on profitability. Similarly, Hasan et al. (2017) investigated the effect of intellectual capital on profitability in banking companies from 2008 to 2016. Their findings indicated a significant positive influence of intellectual capital (VAIC, VACA, VAHU, and STVA) on profitability. The relationship between intellectual capital and financial performance is illustrated by the optimization of intangible asset utilization in running the company, which enhances the company's financial performance (Malaya, 2019). Therefore, intellectual capital serves as the foundation for companies to undertake innovation and product/service development, enhance service quality, improve operational efficiency, ensure regulatory compliance and accreditation, strengthen competitiveness and competitive advantage, and foster relationships with consumers and patients. The healthcare provider subsector directly relates to several MDGs, such as improving maternal health, reducing child mortality, and also combating diseases like HIV/AIDS and malaria in Indonesia. Intellectual capital in this context includes medical expertise, healthcare innovation, and efficient service delivery, all of which contribute to achieving these goals, such as value-added capital employed, value-added human capital, and structured capital value-added. Intellectual capital in healthcare can enhance profitability by improving patient outcomes, increasing efficiency, and fostering innovation in medical treatments and technologies. That is different from intellectual capital for manufacturing, banking, consumer non-cyclicals, and so on, which includes brand management, customer insights, and product innovation. Profitability is not driven by intellectual capital but by brand loyalty, product quality, and market penetration.

5.2 Profitability and Leverage

Based on the study findings, it can be concluded that leverage exerts a significant partial, non-directional, or inverse influence on profitability. As leverage increases, profitability tends to decrease, and vice versa. This finding aligns with previous research by Febriani (2020), who examined the influence of liquidity and leverage on company value with profitability as an intervening variable in manufacturing firms traded on the IDX from 2014 to 2018. Their results indicated a significant negative effect of leverage on profitability. Similarly, Pratiwi & Muthohar (2021) investigated the effect of liquidity, growth opportunity, and leverage on firm value, with profitability as an intervening variable in Panin Bank Dubai from 2016 to 2020. Their findings revealed a significant negative influence of leverage on profitability. Leverage is a ratio that measures a company's ability to meet its total obligations. High leverage indicates that the firm's debt interest expense is also at higher risk, potentially leading to a decline in profitability. This interest expense reduces revenue and negatively impacts the company's profit margin. Conversely, low leverage indicates a lower risk of the company defaulting on its debt, allowing it to maximize its targeted profits (Lamba & Atahau, 2022; Rizki & Hakim, 2023; Subiyanto & Amanah, 2022). Leverage can serve as a benchmark for potential investors to analyze a firm's ability to finance itself through debt. As leverage decreases, investor interest in investing in the company tends to increase.

5.3 Profitability, Intellectual Capital and Leverage

According to the data of this study, these findings demonstrate that the profitability of healthcare provider subsector companies can be influenced by a multitude of factors, including those analyzed in this research, namely intellectual capital and leverage. These analyzed factors represent internal company factors. Consequently, an external factor analysis is also necessary to determine the factors influencing profitability. The effect of intellectual capital and leverage on profitability aligns with previous research conducted by (Nabila et al., 2021) on banking sector companies listed on the IDX (BEI) from 2016 to 2019, which employed profitability as a mediating variable. Their findings revealed that both intellectual capital (VAIC) and capital structure (DER) simultaneously exert a significant influence on profitability. Similarly, a study by Widhiastuti et al. (2020) investigated the influence of intellectual capital, working capital, and leverage in affecting profitability and its relationship on the firm value in the mining, plantation and consumer goods manufacturing industries listed on the Indonesia Stock Exchange from 2014 to 2018. The results indicated that both intellectual capital and leverage exert a significant influence on profitability. The findings of the study reveal that both intellectual capital and leverage have a notable and simultaneous impact on profitability. This suggests that the effective management and utilization of intellectual capital, alongside strategic use of leverage, play crucial roles in enhancing a company's profitability. Specifically, intellectual capital, which includes human, structural, and relational assets, and leverage, which reflects the company's financial strategy, together contribute significantly to the firm's ability to generate profits. This interplay highlights the importance of integrating these factors into financial strategies to optimize performance and achieve better financial outcomes.

5.4 Firm Value and Profitability

The impact of profitability, proxied by ROE, on firm value, proxied by PBV, is negative and significant. Profitability, as measured by ROE, represents a company's ability to generate net income from its operational activities relative to the capital it employs. As a company's profitability increases, the proportion of capital decreases. Consequently, some companies, particularly those in the healthcare provider subsector, may engage in divestment to raise capital, leading to a decline in the number of stocks outstanding and, consequently, a decrease in firm value. Conversely, if a company experiences a decline in profitability, the proportion of capital increases. As a result, some companies, particularly those in the healthcare provider subsector, may engage in stock splits to increase the number of stocks outstanding, leading to an increase in company value. The findings of this research are also supported by Ginting (2021), who asserts that profitable companies tend to prioritize retaining earnings rather than distributing them to investors through dividends. When a company's earnings are not overly high, retained earnings will increase, resulting in a reduced amount of dividends distributed to investors (Hasanah et al., 2021). Aggarwal & Padhan (2017) offer a contrasting perspective, highlighting the characteristics of capital-intensive companies with long-term project development and operations. They argue that company value is more determined by the quality of a company's operations in these long-term projects rather than profitability alone. Therefore, investors place greater emphasis on a company's ability to effectively control and maintain its operations rather than solely focusing on the amount of profit generated at a particular point in time.

6. Conclusions

The research examining the effects of intellectual capital and leverage on profitability, as well as their implications for firm value in healthcare provider companies listed on the IDX from 2018 to 2022, led to several key conclusions. Intellectual capital was found to have a significant positive effect on profitability, suggesting that increased intellectual capital is associated with higher profitability for these companies. Conversely, leverage was observed to have a significant negative impact on profitability, indicating that higher leverage tends to reduce profitability in the healthcare sector. The research found a statistically significant effects of leverage on profitability in healthcare provider companies listed on the IDX from 2018 to 2022, with lower leverage associated with higher profitability. Additionally, both intellectual capital and leverage together significantly impact profitability. Their combined effect accounts for 70.99% of the variability in profitability, while the remaining 29.01% is due to other unexamined factors like liquidity, asset growth, inflation, asset structure, dividend policy, and tax avoidance.

Profitability has a negative and significant impact on firm value. The effect of profitability on the firm value of healthcare provider companies listed on the IDX from 2018 to 2022 is statistically significant, indicating that higher profitability leads to lower firm value. This relationship is counterintuitive to the traditional expectation that higher profitability should lead to higher firm value. The study suggests that this inverse relationship may be attributed to the healthcare industry's unique characteristics, such as high capital intensity, government regulations, and competitive dynamics. Profitability explains 76.81% of the variation in firm value, while the remaining 23.19% is attributed to other factors not examined in this study. These factors may include firm size, corporate social responsibility (CSR), tax aggressiveness, liquidity, profit growth, and others.

The study is limited by its focus on the healthcare subsector within Indonesia, which may restrict the generalizability of the findings to other sectors or regions. The analysis did not fully account for external factors, such as economic conditions or regulatory changes that could influence the results. Future research should consider extending the study to other sectors or geographical regions to compare and validate the findings. Investigating the effects of external economic variables and regulatory changes on the correlation between intellectual capital, leverage, and profitability could provide a more comprehensive understanding.

This research underscores the importance of intellectual capital in enhancing the efficiency and effectiveness of healthcare providers. By focusing on the strategic management of intellectual capital and prudent leverage, healthcare organizations can improve financial performance and deliver better healthcare outcomes. Policymakers and healthcare managers can utilize these insights to foster environments that support innovation and operational excellence, thereby benefiting both patients and the broader healthcare system in Indonesia.

The suggestions for healthcare managers and policymakers in Indonesia include focusing on intellectual capital, as conceptualized in the VAIC model. This model encompasses Human Capital, Structural Capital, and Relational Capital. In the healthcare sector, Human Capital involves the skills and expertise of medical staff, Structural Capital includes the organization's processes and systems, and Relational Capital pertains to relationships with patients, suppliers, and stakeholders. Effectively managing these types of intellectual capital can lead to improved patient outcomes, a higher quality of care, and enhanced patient satisfaction. Additionally, intellectual capital contributes to streamlining operations through better knowledge management and innovative processes, which can increase efficiency, result in cost savings, and improve resource utilization, ultimately impacting profitability. This

can provide a competitive edge in a crowded market, attracting more patients and increasing market share and firm value.

Data Availability

The data used to support the research findings are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

References

- Aggarwal, D. & Padhan, P. C. (2017). Impact of capital structure on firm value: evidence from Indian Hospitality industry. *Theor. Econ. Lett.*, 7(4), 982-1000. <https://doi.org/10.4236/tel.2017.74067>.
- Al Rahman, T. (2022). *Analisis pengaruh good corporate governance terhadap nilai perusahaan pada perusahaan properti dan real estate di bursa efek Indonesia tahun 2016-2020*. [Doctoralthesis]. Universitas Jambi.
- Chang, Y. (2014). *Risk Topography: Systemic Risk and Macro Modeling*. Chicago: University of Chicago Press. <https://doi.org/10.7208/9780226092645-010>.
- Febriani, R. (2020). Pengaruh likuiditas dan leverage terhadap nilai perusahaan dengan profitabilitas sebagai variabel intervening. *Progress: Jurnal Pendidikan, Akuntansi Dan Keuangan*, 3(2), 216-245. <https://doi.org/10.47080/progress.v3i2.943>.
- Ginting, R. A. (2021). The effect of capital structure, earning management, profitability, free cash flow and environment cost on firm value with dividend policy as moderating variables in pharmaceutical sub sector companies listed on the 2007-2019 Indonesia Stock Exchange Peri. *Jurnal Sains Sosio Humaniora*, 5(2), 981-995. <https://doi.org/10.22437/jssh.v5i2.16477>.
- Hasan, R., Mohammad, N., & Alam, M. F. (2017). Impact of intellectual capital on profitability - Conventional versus Islamic banks. *J. Account. Fin. Audit. Stud.*, 3(2), 64-80. <https://doi.org/10.56578/jafas030204>.
- Hasanah, A., Rangkuti, D. N., Pinem, G. Z. D., & Nasution, F. (2021). Evaluation of the health information system in Teladan public health center in 2020 using the health metrics network instrument approach. *Int. Arch. Med. Sci. Public Health*, 2(1), 1-14.
- Hermuningsih, S. (2012). Pengaruh profitabilitas, size terhadap nilai perusahaan dengan sruktur modal sebagai variabel intervening. *Jurnal Siasat Bisnis*, 16, 232-242.
- Hinton, J. (2021). *Relationship-to-profit: A theory of business, markets, and profit for social ecological economics*. [Doctoralthesis]. University of Clermont Auvergne.
- Hossain, M. S. & Ahamed, F. (2021). Comprehensive analysis on determinants of bank profitability in Bangladesh. *arXiv preprint arXiv:2105.14198*. <https://doi.org/10.48550/arXiv.2105.14198>.
- Jihadi, M., Vilantika, E., Hashemi, S. M., Arifin, Z., Bachtiar, Y., & Sholichah, F. (2021). The effect of liquidity, leverage, and profitability on firm value: Empirical evidence from Indonesia. *J. Asian Finance Econ. Bus.*, 8(3), 423-431. <https://doi.org/10.13106/jafeb.2021.vol8.no3.0423>.
- Juniati, E. (2022). *Pengaruh efektivitas aset, likuiditas, dan kesejahteraan pemegang saham terhadap nilai perusahaan (Studi pada perusahaan BUMN yang terdaftar di bursa efek Indonesia periode 2016-2020)*. [Doctoralthesis]. Universitas Muhammadiyah Semarang.
- Kartikasari, D. & Merianti, M. (2016). The effect of leverage and firm size to profitability of public manufacturing companies in Indonesia. *Int. J. Econ. Financ. Issues*, 6(2), 409-413.
- Kripa, D. & Ajasllari, D. (2016). Factors affecting the profitability of insurance companies in Albania. *Eur. J. Multidiscip. Stud.*, 1(1), 352-360. <https://doi.org/10.26417/EJMS.V1I1.P352-360>.
- Lamba, A. B. & Atahau, A. D. R. (2022). Pengaruh leverage terhadap nilai perusahaan yang dimediasi profitabilitas. *Reviu Akuntansi Dan Bisnis Indonesia*, 6(1), 16-31. <https://doi.org/10.18196/rabin.v6i1.12698>.
- Lestari, K. A., Titisari, K. H., & Suhendro, S. (2021). Analisis nilai perusahaan ditinjau dari profitabilitas, likuiditas, struktur modal, kebijakan dividen dan kepemilikan manajerial. *Inovasi: Jurnal Ekonomi, Keuangan, dan Manajemen*, 17(2), 248-255.
- Malaya, J. J. (2019). *Pengaruh intellectual capital terhadap nilai perusahaan, melalui kinerja keuangan (Studi pada perusahaan manufaktur yang terdaftar di bursa efek Indonesia tahun 2013-2017)*. [Doctoralthesis]. Universitas Brawijaya.
- Nabila, F., Surasni, N. K., & Husnan, L. H. (2021). Pengaruh intellectual capital dan struktur modal terhadap nilai perusahaan dengan profitabilitas sebagai variabel pemediasi. *Jurnal EMBA*, 9(1), 618-627.
- Pratiwi, A. & Muthohar, A. M. (2021). Pengaruh growth opportunity, likuiditas, dan leverage terhadap nilai perusahaan dengan profitabilitas sebagai variabel intervening. *J. Account. Digit. Finance*, 1(3), 163-180. <https://doi.org/10.53088/jadfi.v1i3.175>.

- Rizki, A. & Hakim, M. Z. (2023). Pengaruh profitabilitas, likuiditas, leverage, firm size dan growth terhadap kebijakan deviden (Pada perusahaan sektor trade service and invesment yang terdaftar di bursa efek Indonesia periode 2014-2018). *Jurnal Dinamika Umt*, 5(2). <http://doi.org/10.31000/dinamika.v5i2.10190>.
- Subiyanto, T. S. & Amanah, L. (2022). Pengaruh good corporate governance, intellectual capital dan leverage terhadap kinerja keuangan. *Jurnal Ilmu Dan Riset Akuntansi*, 11(1), 1-22.
- Widhiastuti, S., Ekasaputra, B., & Jayadi, J. (2020). Analysis of the influence of intellectual capital, working capital, and leverage in affecting profitability and its relationship on the value of the company. *Fokus Bisnis: Media Pengkajian Manajemen dan Akuntansi*, 19(1), 38-53. <https://doi.org/10.32639/fokusbisnis.v19i1.614>.