



Intellectual Capital Dimensions and Financial Leverage of Indonesian Consumer Non-Cyclicals: The Mediating Role of Profitability

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Abstract

This study aims to examine the mediating role of profitability in the relationship between intellectual capital and financial leverage. This study uses secondary data from consumer non-cyclical companies listed on the Indonesia Stock Exchange during 2020–2023. Intellectual capital is measured through its dimensions, namely capital employed efficiency (CEE), human capital efficiency (HCE), structural capital efficiency (SCE), and relational capital efficiency (RCE). Profitability is proxied by Return on Assets (ROA), while financial leverage is measured using the debt-to-asset ratio (DAR) and debt-to-equity ratio (DER). Panel data regression and the Sobel test are employed to analyze the data. The results show that CEE, HCE, and SCE have a positive and significant effect on profitability, while RCE has no significant effect. When financial leverage is measured using DAR, only SCE has a significant effect, while CEE, HCE, RCE, and ROA are not significant. In contrast, when financial leverage is measured using DER, ROA has a significant negative effect, while CEE, HCE, SCE, and RCE are not significant. Furthermore, profitability mediates the relationship between intellectual capital dimensions (CEE, HCE, and SCE) and financial leverage when leverage is measured using DER, but not when leverage is measured using DAR. This study contributes to the literature by providing empirical evidence on the role of intellectual capital in shaping corporate financial decisions in Indonesia's consumer non-cyclical sector.

Keywords: *Financial Leverage, Intellectual Capital, Profitability*

INTRODUCTION

In today's knowledge-based economy, intangible assets have become a crucial source of competitive advantage for companies, particularly intellectual capital, which refers to the knowledge, skills, and organizational processes that enable a company to create value and improve performance (Wernerfelt, 1984). Intellectual capital plays a crucial role in enhancing a company's productivity, innovation, and financial performance. Companies that manage their intellectual capital effectively are more likely to achieve sustainable competitive advantage and increase their profitability (Jin & Xu, 2022).

The importance of intellectual capital can be explained through the Resource-Based View, which emphasizes that firms can achieve superior performance when they effectively utilize valuable, rare, and unmatched resources (Grant, 1991). Human capital, structural capital, and relational capital make up intellectual capital and represent a strategic resource that can enhance firm performance and influence financial decision-making. Furthermore, firm financing decisions can also be explained through the Pecking Order Theory, which suggests that firms tend to prioritize internal financing generated from profitability before relying on external financing such as debt (Myers & Majluf, 1984).

The consumer non-cyclical sector plays a crucial role in the Indonesian economy. Demand for these products tends to be relatively stable compared to other sectors, even during periods of economic uncertainty. As a result, companies in this sector are often considered more resilient to economic fluctuations (Xu & Wang, 2019). However, despite this relative stability, companies in the consumer non-cyclical goods sector can still face financial and operational challenges that impact



their profitability and financing strategies (Shamsuzzoha & Tanaka, 2021). From 2020 to 2023, companies' current-year profits consistently declined year-over-year.

The 2020–2023 period was significant for Indonesian companies due to economic disruption and recovery. During this period, many companies experienced declining profitability, supply chain disruptions, and uncertainty in financial decision-making. Even companies in relatively stable sectors such as consumer non-cyclical goods faced pressure to maintain financial performance and determine appropriate financing structures. This situation highlights the importance of intellectual capital as a strategic resource that can help companies maintain performance during periods of economic uncertainty.

Business performance can decline if debt is used instead of internal funding because debt carries higher costs and greater risks. Jin and Xu (2022) stated that there appears to be a paradox between a company's investment in intellectual capital (IC) and the use of debt (financial leverage). On the one hand, IC typically discourages the use of debt because it is considered risky. However, IC can also generate high profits, which can increase a company's ability to repay its debt.

This analysis can provide insights into optimal strategies for managing resources and financial leverage to achieve better results. However, not all research supports the view that intellectual capital reduces leverage. For example, O'Brien (2003) found in his research that some companies with strong intellectual capital actually increased leverage as a strategy to capitalize on market opportunities or fund further innovation.

On the other hand, research by Dakua (2019) stated that organizations with high levels of intellectual capital tend to be more willing to take risks by increasing leverage, especially in highly innovative or knowledge-based industries. They argue that in some cases, high leverage is necessary to finance rapid growth and innovation, despite the increased risks.

However, prior studies examining the relationship between intellectual capital, profitability, and financial leverage have produced inconsistent findings. Several studies report that intellectual capital improves firm profitability and reduces reliance on external financing, consistent with the Resource-Based View and the Pecking Order Theory. In contrast, other studies find that intellectual capital may encourage firms to increase leverage in order to finance innovation and knowledge-based investments.

In addition, empirical evidence regarding the indirect relationship between intellectual capital and financial leverage through profitability remains limited and inconclusive. While some studies suggest that profitability acts as an important transmission mechanism linking intellectual capital to financial leverage decisions, other studies report insignificant or mixed results depending on industry characteristics and institutional contexts.

These inconsistencies create an empirical gap, particularly in emerging markets such as Indonesia and in relatively stable sectors such as consumer non-cyclical industries, where the role of intellectual capital in shaping financing decisions remains underexplored. Therefore, further empirical investigation is required to clarify how different dimensions of intellectual capital influence financial leverage both directly and indirectly through profitability.

Based on this gap, using profitability as a mediating variable, this study attempts to investigate how intellectual capital elements affect financial leverage in consumer non-cyclical companies listed on the Indonesia Stock Exchange between 2020 and 2023. Specifically, this study investigates how intellectual capital dimensions affect corporate profitability as measured by Return on Assets (ROA) and how they affect financial leverage as measured by the debt-to-asset ratio (DAR) and the debt-to-equity ratio (DER). By integrating several components of intellectual capital and using two proxies for financial leverage, this study is expected to provide deeper insights into how intellectual capital influences corporate financial decisions and corporate performance.

This study contributes to the literature by using two proxies for financial leverage: the debt-to-asset ratio (DAR) and the debt-to-equity ratio (DER). Using these two measures allows for a more comprehensive assessment of a firm's financial leverage, as the DAR reflects the proportion of a firm's assets financed by debt. In contrast, the DER reflects the relative proportion of debt to shareholder equity. Examining these two indicators provides a broader perspective on how firms manage their financing decisions and financial risk.

Furthermore, this study applies the Sobel test to examine the mediating role of profitability in the relationship between intellectual capital and financial leverage. The Sobel test provides a statistical assessment of the indirect effect and helps determine whether the mediating variable significantly transmits the influence of intellectual capital on a firm's financial decisions.

This study offers two advantages: theoretical and experiential. The theoretical contributions of this research will aid the investigation of resource-based theory, pecking order theory, and other theories, providing a deeper understanding of the phenomena associated with previously researched variables. Furthermore, it is anticipated that this study will be helpful and enlightening for scholars and serve as a resource for further research.

For the practical contribution to the results of this study, it is hoped that it can be a suggestion and consideration for the management of consumer non-cyclical companies in managing their assets and liabilities both effectively and efficiently, and focusing on profitability that is always close to the company's operational activities with more care in capital placement and intellectual capital management, because high profitability can reduce the company's dependence on debt.

LITERATURE REVIEW

Dimensions of Intellectual Capital and Profitability.

IC is defined by [Edvinsson and Sullivan \(1996\)](#) as knowledge that can be transformed into business value. It is also a type of tacit asset that is difficult to measure financially and lacks a clear form ([Fincham & Roslender, 2003](#)). The relationship between intellectual capital and firm performance can be explained through the Resource-Based View (RBV), which emphasizes that firms achieve sustainable competitive advantage by effectively utilizing valuable, rare, inimitable, and non-substitutable resources. Intellectual capital, which encompasses human capital, structural capital, and relational capital, represents a strategic intangible asset that enhances firms' capability to create value and improve operational efficiency.

From the RBV perspective, firms that effectively manage intellectual capital are more likely to improve innovation and decision-making. These capabilities enable firms to enhance productivity and generate higher economic value from their resources. Consequently, intellectual capital plays an important role in improving firm profitability. Therefore, based on the RBV framework, intellectual capital is expected to influence firm profitability positively.

Capital employed efficiency reflects a company's ability to utilize its financial and physical resources to generate value ([Chen et al., 2005](#)). Efficient use of capital resources allows companies to optimize operational activities and improve financial results ([Zeghal & Maaloul, 2010](#)). Companies that effectively utilize their capital resources are better able to generate higher returns on their investments.

[Nimtrakoon \(2015\)](#) and [Buallay et al. \(2019\)](#) stated that efficient capital use can positively impact a company's financial performance. They added that capital management, in the form of equity and net profit, can increase a company's added value, ultimately improving performance as measured by Return on Assets (ROA).

Human capital refers to the knowledge, skills, competencies, and experience of employees that contribute to company performance. From a Resource-Based View perspective, human capital

is considered a strategic intangible resource that can enhance organizational productivity and innovation. Companies that effectively utilize employee knowledge and skills are better able to improve operational efficiency and generate higher profits (Xu & Wang, 2019).

Jin and Xu (2022) also support this relationship. Their research has shown that human capital efficiency significantly increases profitability in agricultural companies because employee expertise improves decision-making, productivity, and innovation. This is in line with research by Xu & Wang (2018), which shows that human capital efficiency has a significant positive effect on profitability, as measured by return on assets (ROA), in banking companies in Vietnam.

Structural capital refers to organizational processes, databases, systems, and routines that support employees in carrying out their tasks effectively. According to the Resource-Based View, strong structural capital enables companies to store and utilize knowledge more efficiently, which supports innovation and operational performance (Smriti and Das, 2018).

Well-developed organizational systems and procedures enable companies to improve coordination and efficiency, ultimately contributing to higher profitability (Bayraktaroglu et al., 2019). Research by Nejari and Aamoum (2023) found that tangible assets and structural capital have a beneficial effect on company profitability. Therefore, companies with higher structural capital efficiency are expected to achieve better financial performance.

Relational capital reflects a company's relationships with external stakeholders, including customers, suppliers, and strategic partners. These relationships are crucial for strengthening market position and increasing access to resources and business opportunities. From a Resource-Based View perspective, strong relational capital can enhance a company's competitive advantage through increased customer loyalty and strategic partnerships.

Xu and Liu (2020) and Nadeem et al. (2017) found that relational capital efficiency has a positive impact on financial success. They argued that businesses that invest capital in relationships through marketing or advertising tend to increase consumer purchasing power, which can enhance company profitability.

Therefore, effective relational capital management is expected to improve profitability. Therefore, efficient intellectual capital management is expected to increase a company's profitability. Therefore, the hypotheses are:

H1: Capital employed efficiency has a positive effect on profitability

H2: Human capital efficiency has a positive effect on profitability

H3: Structural capital efficiency has a positive effect on profitability

H4: Relational capital efficiency has a positive effect on profitability

Dimension Intellectual Capital and Financial Leverage

In the corporate finance literature, academics have focused on the financing choices made by businesses. Businesses in the knowledge economy are shifting from capital-intensive to knowledge-intensive production patterns (Xu & Wang, 2018). In such a situation, this issue becomes increasingly important. debt-to-asset ratio (DAR) and debt-to-equity ratio (DER) are two of the most commonly used leverage ratios in financial analysis to measure a company's reliance on debt.

According to Jin and Xu (2022), investors and analysts expect companies to have low to moderate (safe) debt ratios, as excessively high ratios indicate high financial risk. If debt increases (e.g., due to new loans), the expected (target) sign is that the company can maintain its DAR and DER at "safe" (low) levels to avoid compromising profitability. This means that the lower the DAR and DER ratios, the healthier the company's financial condition due to its low debt burden.

From the perspective of the Resource-Based View, firms that possess strong intellectual capital tend to have superior capabilities in generating value and improving operational efficiency. These advantages allow firms to enhance financial performance and strengthen internal financial

resources.

In line with Pecking Order Theory, firms with stronger internal resources are more likely to rely on internally generated funds rather than external financing. Since intellectual capital contributes to higher firm performance and profitability, companies with more efficient intellectual capital utilization may reduce their dependence on debt financing.

A company is more likely to have more debt if it has more physical assets such as property, plant, and equipment (Harc, 2015). Debt risk should be minimized if a company invests more in intangible assets (Frank & Goyal, 2003). There are several explanations for this finding. On the one hand, because intangible assets cannot be reused with relatively low transaction costs when borrowers face financial burdens, they are not used as collateral for debt.

However, intangible assets are typically risky and challenging to value. The negative correlation between asset intangibility and financial leverage can be attributed to these factors. Managers can maximize a firm's financial leverage by realigning assets and liabilities with IC incentives in mind (Ting & Lean, 2009).

Lim et al. (2020) concluded that while identifiable intangible assets encourage debt, certain intangible assets with high value risk and inadequate collateralization make debt financing difficult, based on research on US public companies. D'Amato (2021) asserts that Italian companies with greater IC resources have less financial leverage.

However, Dalwai & Sewpersadh (2021) found that overall debt is unaffected by aggregate IC for tourism businesses. Identifying and assessing a company's IC resources is becoming increasingly important. The IC dimension, as an intangible asset, is expected to affect financial leverage negatively. Therefore, we propose the following hypotheses:

H5: Capital employed efficiency negatively impacts financial leverage

H6: Human capital efficiency negatively impacts financial leverage

H7: Structural capital efficiency negatively impacts financial leverage

H8: Relational capital efficiency negatively impacts financial leverage

Profitability on Financial Leverage and Mediating Profitability on Intellectual Capital Dimensions on Financial Leverage

The relationship between profitability and financial leverage can be explained using Pecking Order Theory. This theory suggests that firms follow a hierarchy in their financing decisions: firms prefer internal financing (retained earnings) first, followed by debt, and issue equity as a last resort due to information asymmetry and higher transaction costs. Highly profitable firms tend to generate sufficient internal funds to finance their operations and investments. As a result, they have less need to rely on external financing such as debt. Consequently, firms with higher profitability are more likely to exhibit lower financial leverage.

According to research by Jin and Xu (2022), because profitable businesses may generate cash internally and borrow less, the pecking order hypothesis (POT) implies a negative correlation between financial leverage and profitability (Fama & French, 2002). Vu Thi and Phung (2021) confirm this negative relationship. According to research by Frank and Goyal (2009), profitable businesses tend to have lower levels of financial leverage.

Because they are more profitable, we could anticipate that companies investing additional IC will possess less leverage. Therefore, the relationship between profitability and financial leverage can be explained by the Pecking Order Theory, which suggests that firms prioritize internal financing over external debt. Firms with higher profitability generate more internal funds, reducing their reliance on external financing (Mondal & Ghosh, 2012).

Chen et al. (2005) suggest that high capital employed efficiency can reduce leverage as firms become more financially independent. Jin and Xu (2022) claim in their research that business

profitability acts as a partial mediator of the relationship between capital employed efficiency and financial leverage.

Jin and Xu (2022) state that profitability can mediate the effect of Human Resource Efficiency on financial leverage. Businesses with high Human Resource Efficiency tend to have more productive and innovative employees, which contributes to better financial performance and reduces dependence on external financing (Dzenopoljac et al., 2016).

Wang and Chang (2005) found that high structural capital efficiency is associated with better financial performance, which may imply lower leverage use. D'Amato (2021) further showed how business success acts as a mediator between them. According to POT, profitable businesses are more likely to fund their investments in intellectual capital with shares.

Based on previous research findings and logical reasoning, the hypotheses in this study are as follows:

H9: Profitability hurts financial leverage

H10: Profitability mediates the effect of capital employed efficiency on financial leverage

H11: Profitability mediates the effect of human capital efficiency on financial leverage

H12: Profitability mediates the effect of structural capital efficiency on financial leverage

H13: Profitability mediates the effect of relational capital efficiency on financial leverage

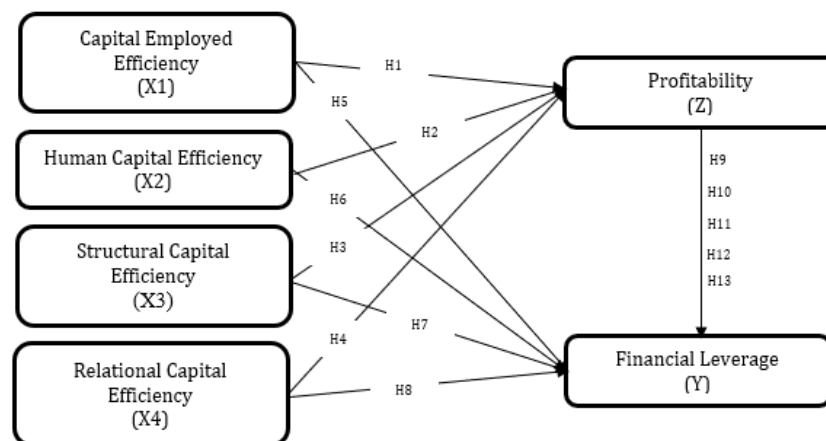


Figure 1. Conceptual Framework

RESEARCH METHOD

This study employs a quantitative explanatory research design to examine the causal relationships between intellectual capital, profitability, and financial leverage. Explanatory research is used to test hypotheses derived from established theories, particularly the Resource-Based View and Pecking Order Theory. The unit of analysis in this study is firm-year observations, where each observation represents a company in a specific year. This approach allows the study to analyze variations across firms and over time.

The population consists of companies listed on the Indonesia Stock Exchange (IDX) during the observation period. The sample was selected using purposive sampling based on specific criteria. The sample was selected based on the following criteria: (i) Consumer non-cyclical companies listed on the Indonesia Stock Exchange between 2020 and 2023; (ii) Companies that regularly publish financial reports between 2020 and 2023; (iii) Companies that generated profits between 2020 and 2023; and (iv) Companies that use the rupiah. These criteria resulted in the selection of 50 consumer non-cyclical companies as the study sample size.

Pecking Order Theory, which states that successful businesses prefer internal financing over debt, is one of the primary objectives of this study. Therefore, this criterion should not be used by

companies experiencing losses. Firms with negative profits were excluded to ensure that the analysis reflects financing behavior consistent with the assumptions of Pecking Order Theory, where internal funds are expected to play a primary role.

This study uses secondary data obtained from publicly available financial reports and official publications of the Indonesia Stock Exchange (IDX). The financial statement data were collected from the official website of the Indonesia Stock Exchange (www.idx.co.id) and annual reports and financial statements published by each company. The data collection process used documentation techniques to extract relevant financial data from the companies' annual reports and financial statements.

The collected data include information necessary to calculate intellectual capital efficiency, profitability indicators, and financial leverage ratios. To ensure data quality, observations with incomplete financial information, inconsistent reporting, or missing values related to the research variables were excluded from the sample. This procedure helps maintain the reliability and consistency of the dataset used in the analysis.

This study examines the mediating role of profitability in the relationship between intellectual capital and financial leverage. The dimensions of intellectual capital—capital employed efficiency (CEE), human capital efficiency (HCE), structural capital efficiency (SCE), and relational capital efficiency (RCE)—are treated as independent variables. Profitability, measured by Return on Assets (ROA), acts as the mediating variable that links intellectual capital to firms' financial leverage decisions. Financial leverage is measured using the debt-to-asset ratio (DAR) and debt-to-equity ratio (DER) as dependent variables.

Therefore, the causal structure examined in this study follows the sequence: intellectual capital dimensions → profitability → financial leverage. Accordingly, this study examines both the direct effect of intellectual capital on profitability and the indirect effect of intellectual capital on financial leverage through profitability.

Financial leverage is the use of debt in a business's capital structure, where debt serves as a lever that can lead to profits or losses for the business (D'Amato, 2021). The financial leverage ratio describes how much of total assets and total equity is financed by creditors. The debt-to-equity ratio (DER) and the debt-to-asset ratio (DAR) are the most frequently used financial leverage metrics. The formula used is as follows:

$$\text{Debt-to-Asset Ratio (DAR)} = \text{Total Debt} / \text{Total Assets}$$

$$\text{Debt-to-Equity Ratio (DER)} = \text{Total Debt} / \text{Total Equity}$$

Jin and Xu (2022) state that intellectual capital is an intangible asset that includes specific technology, customer information, brand name, reputation, and corporate culture that can provide competitive advantage and added value to a business. According to Stewart (1997) and Fincham and Roslender (2003), intellectual capital is defined as knowledge, information, intellectual property, and experience that may be useful to a company.

To measure intellectual capital (IC) performance, this study uses the modified value-added intellectual coefficient (MVAIC) technique developed by Xu and Wang (2019). It considers human capital, structural capital, relational capital, and capital efficiency. The calculation process is as follows:

$$\text{VA} = \text{Net profit} + \text{interest} + \text{taxes} + \text{staff costs}$$

$$\text{CEE} = \text{Value added (VA)} / \text{Net asset book value}$$

$$\text{HCE} = \text{Value added (VA)} / \text{Total employee expenses}$$

$$\text{SCE} = (\text{Value added (VA)} - \text{Total employee expenses}) / \text{Value added (VA)}$$

$$\text{RCE} = \text{Marketing, sales, and advertising costs} / \text{Value added (VA)}$$

$$\text{MVAIC} = \text{CEE} + \text{HCE} + \text{SCE} + \text{RCE}$$

According to [Haris et al. \(2019\)](#), a profitability ratio is a metric used to assess how well a business generates profits relative to sales, net assets, or equity. The most frequently used profitability ratio metric is return on assets. This is the formula used:

$$\text{Return on Assets} = \text{Net profit} / \text{Total assets}$$

The empirical analysis includes descriptive statistics, classical assumption tests (multicollinearity and heteroskedasticity tests), panel data model selection tests (Chow test, Hausman test, and Lagrange Multiplier test), hypothesis testing using panel regression, and mediation analysis using the Sobel test.

Assuming that this MVAIC is the total value of CEE, HCE, SCE, and RCE. Additionally, this study examines how the dimensions of intellectual capital influence firm profitability and how profitability subsequently affects financial leverage. Equation model structure (1):

$$\text{ROA} = \alpha + \beta_1\text{CEE} + \beta_2\text{HCE} + \beta_3\text{SCE} + \beta_4\text{RCE} + \varepsilon \quad (1)$$

After equation (1) is carried out, we test the financial leverage variable (DAR) with the following equation model structure (2):

$$\text{DAR} = \alpha + \beta_1\text{CEE} + \beta_2\text{HCE} + \beta_3\text{SCE} + \beta_4\text{RCE} + \beta_5\text{ROA} + \varepsilon \quad (2)$$

Next, we tested the proxy financial leverage variable (DER) with the following equation model structure (3):

$$\text{DER} = \alpha + \beta_1\text{CEE} + \beta_2\text{HCE} + \beta_3\text{SCE} + \beta_4\text{RCE} + \beta_5\text{ROA} + \varepsilon \quad (3)$$

This study's traditional assumptions included multicollinearity and heteroscedasticity tests ([Basuki & Prawoto, 2016](#)). Hypothesis testing included t-tests, f-tests, and coefficient of determination analysis.

This study uses mediation analysis employing the Sobel test to examine the mediating role of profitability in the relationship between intellectual capital dimensions and financial leverage. The Sobel test determines if there is a statistically significant indirect relationship between the independent and dependent variables via the mediator.

The mediation process adheres to the paradigm put forward by [Baron and Kenny \(1986\)](#), which has been extensively used in empirical research to evaluate mediation connections. The coefficients and standard errors from the regression models are combined with the Sobel test to determine the significance of the indirect effect.

The Sobel test is still often employed in empirical finance and accounting studies because of its ease of use and interpretability, even if more recent research suggests using bootstrapping methods to assess indirect effects. As a result, the Sobel test is used in this study as a first method to assess the mediating function of profitability (ROA).

FINDINGS AND DISCUSSION

Descriptive Analysis Results

Descriptive analysis provides an overview of the characteristics of the research variables: profitability, loans, intellectual capital, and credit risk. The mean, maximum, minimum, and

standard deviation of the variables under investigation are among the features of the data utilized in this research (see Table 2).

Table 1. Descriptive Analysis Results

Variable	Mean	Std. Dev.	Min	Max
CEE	1.232510	1.321222	0.006231	7.118160
HCE	2.462864	1.445545	1.003860	9.956380
SCE	0.474977	0.236813	0.003840	0.899560
RCE	0.153520	0.272519	0.000028	1.439150
MVAIC	4.323871	1.981760	1.123987	13.40577
Return on Asset	0.078893	0.064255	0.001126	0.342820
Debt To Asset Ratio	0.448185	0.304602	0.012879	2.311940
Debt To Equity Ratio	0.987156	0.979958	0.013047	7.940700

Before conducting a research hypothesis test, the panel data regression technique must be estimated, as this study employs panel data analysis and data processing using EViews 12. The Chow, Hausman, and Multiple Lagrange tests were used in this investigation to identify the optimal regression model.

Panel Data Regression Results

Table 2. Analysis of Panel Data Structure Model Test 1

No	Method	Effects test	Statistic	d.f	Prob	Testing	Results
1	Chow Test	Cross-section F	9.44	(49.146)	0.000	Common	Fixed
		Cross-section Chi-square	285.61	49	0.000	Effect vs Fixed Effect	Effect
No	Method	Test summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob	Testing	Results
2	Hausman Test	Cross-section random	14.14	4	0.0068	Fixed Effect vs Random Effect	Fixed Effect

Based on Table 2, the results of paired testing using the Chow test and the Hausman test on the two panel data regression methods above, it was found that the results of both models were fixed effect models, so it was concluded that the fixed effect model (FEM) was used further to estimate and analyze the data in this study.

Table 3. Analysis of Panel Data Structure Model Test 2

No	Method	Effects test	Statistic	d.f	Prob	Testing	Results
1	Chow Test	Cross-section F	46.49	(49.145)	0.00	Common	Fixed
		Cross-section Chi-square	563.23	49	0.00	Effect vs Fixed Effect	Effect
No	Method	Test summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob	Testing	Results
2	Hausman Test	Cross-section random	8.62	5	0.1251	Fixed Effect vs Random Effect	Random Effect
No	Method		Cross-section	Test hypothesis	Both	Testing	Results

<i>time</i>							
3	<i>LM Test</i>	<i>Breus ch- pagan</i>	231.79 (0.00)	1.21 (0.2708)	233.00 (0.00)	<i>Random Effect vs Common Effect</i>	<i>Random Effect</i>

Based on Table 3, the test results using the Chow test, Hausman test, and LM test on the three panel data regression methods above, it was found that two of the three methods showed a random effect model, so it was concluded that the random effect model (REM) in the panel data regression method was used further to estimate and analyze data in the study.

Classical Assumption Test Results

Table 4. Results of Multicollinearity Test of Structure 1

	CEE	HCE	SCE	RCE
CEE	1,00	-0,11	-0,25	0,09
HCE	-0,11	1,00	0,86	-0,09
SCE	-0,25	0,86	1,00	-0,06
RCE	0,09	-0,09	-0,06	1,00

Based on Table 4, the correlation coefficients of CEE, HCE, SCE, and RCE are CEE and HCE = -0.118260, CEE and SCE = -0.252466, CEE and RCE = 0.094399, HCE and SCE = 0.860616, HCE and RCE = -0.098972, SCE and RCE = -0.065768. The correlation value is <0.9. Thus, multicollinearity is absent from the model.

Table 5. Results of Heteroscedasticity Test of Structure 1

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.164867	0.047054	3.503823	0.0006
CEE	-0.006877	0.009229	0.745174	0.4574
HCE	-0.021649	0.012834	1.686762	0.0938
SCE	0.122581	0.114923	1.066638	0.2879
RCE	0.127881	0.117744	1.086085	0.2792

Based on Table 5, the prob values of the CEE, HCE, SCE, and RCE variables are 0.4574, 0.0938, 0.2879, and 0.2792 > 0.05, so it can be concluded that there are no symptoms of heteroscedasticity, or they pass the heteroscedasticity test.

Table 6. Results of Multicollinearity Test of Structure 2

	CEE	HCE	SCE	RCE	ROA
CEE	1.00	-0.11	-0.25	0.09	0.36
HCE	-0.11	1.00	0.86	-0.09	0.33
SCE	-0.25	0.86	1.00	-0.06	0.29
RCE	0.09	-0.09	-0.06	1.00	0.05
ROA	0.36	0.33	0.29	0.05	1.00

Based on Table 6, the correlation coefficients of CEE, HCE, SCE, RCE, and ROA are CEE and HCE = -0.118260, CEE and SCE = -0.252466, CEE and RCE = 0.094399, CEE and ROA = 0.361358,

HCE and SCE = 0.860616, HCE and RCE = -0.098972, HCE and ROA = 0.334064, SCE and RCE = -0.065768, SCE and ROA = 0.296740, RCE and ROA = 0.059466. The correlation value is <0.9. Therefore, it can be concluded that the model is free from multicollinearity.

Table 7. Results of the Heteroscedasticity Test for Structure 2

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.037490	0.012154	3.084513	0.0023
CEE	0.001142	0.003312	0.344908	0.7305
HCE	0.003708	0.004805	0.771623	0.4413
SCE	0.011049	0.033755	0.327327	0.7438
RCE	0.002456	0.018282	0.134314	0.8933
ROA	-0.127216	0.067997	-1.870908	0.0629

Based on Table 7, the prob values of the CEE, HCE, SCE, RCE, and ROA variables are 0.7305, 0.4413, 0.7438, and 0.8933, respectively, and 0.0629 > 0.05, so it can be concluded that they pass the Heteroscedasticity test. After finding the results of the panel data estimation and classical assumptions, the data can be regressed using the regression equation.

Regression Results

Table 8. Model Regression Results (1)

Variable	MODEL 1 ($ROA = \alpha + \beta_1CEE + \beta_2HCE + \beta_3SCE + \beta_4RCE + \epsilon$)			
	Coefficient	Std. Error	t-Statistic	P-value
C	-0.031167	0.019496	-1.598619	0.1121
CEE	0.015025	0.003810	3.943886	0.0001
HCE	0.018963	0.005304	3.575057	0.0005
SCE	0.109394	0.047662	2.295197	0.0231
RCE	-0.046380	0.048940	-0.947696	0.3449

Based on Table 8, the results of the regression equation (1) on the variables CEE, HCE, and SCE, namely CEE = 0.0001 <0.05, HCE = 0.0005 <0.05, SCE = 0.0231 <0.05. However, for the RCE variable, namely RCE = 0.3449 >0.05. Therefore, it can be concluded that the variables CEE, HCE, and SCE have a positive and significant effect. Meanwhile, the RCE variable was found to be insignificant. Therefore, H1, H2, and H3 are accepted. Furthermore, H4 is rejected.

Table 9. Model Regression Results (2)

Variable	MODEL 2 ($DAR = \alpha + \beta_1CEE + \beta_2HCE + \beta_3SCE + \beta_4RCE + \beta_5ROA + \epsilon$)			
	Coefficient	Std. Error	t-Statistic	P-value
C	0.536559	0.058365	9.193189	0.0000
CEE	0.004199	0.009865	0.425672	0.6708
HCE	0.012856	0.013777	0.933154	0.3519
SCE	-0.257306	0.114783	-2.241667	0.0261
RCE	-0.044787	0.095357	-0.469672	0.6391
ROA	0.049165	0.204044	0.240951	0.8098

Based on Table 9 and the results of regression equation (2), the SCE variable = 0.0261 < 0.05. CEE, HCE, and RCE, namely CEE = 0.6708 >0.05, HCE = 0.3519 >0.05, RCE = 0.6391 > 0.05. For the ROA variable, 0.8098 > 0.05. So it can be concluded that in the Financial Leverage Proxy DAR

test, the SCE variable has a negative and significant effect. However, CEE, HCE, RCE, and ROA were found to be insignificant. H7 was accepted. And H5, H6, H8 and H9 were rejected.

Table 10. Model Regression Results (3)

Variable	MODEL 3 DER = $\alpha + \beta_1\text{CEE} + \beta_2\text{HCE} + \beta_3\text{SCE} + \beta_4\text{RCE} + \beta_5\text{ROA} + \epsilon$			
	Coefficient	Std. Error	t-Statistic	P-value
C	1.414381	0.238724	5.924743	0.0000
CEE	-0.026910	0.063462	-0.424035	0.6720
HCE	0.110107	0.091937	1.197635	0.2325
SCE	-0.856817	0.653144	-1.311834	0.1911
RCE	0.156129	0.363224	0.429842	0.6678
ROA	-3.577461	1.299972	-2.751953	0.0065

Based on Table 10 and the results of regression equation (3), the ROA variable = 0.0065 < 0.05. CEE, HCE, SCE and RCE, namely CEE = 0.6720 > 0.05, HCE = 0.2325 > 0.05, SCE = 0.1911 > 0.05, RCE is 0.6678 > 0.05. So it can be concluded that in the Financial Leverage Proxy DER test, the ROA variable has a negative and significant effect. However, CEE, HCE, SCE, and RCE were found to be insignificant. H9 was accepted. And H5, H6, H7 and H8 were rejected.

Next, conduct a Sobel test to determine the effect of the mediating variable on the independent and dependent variables. The test is accepted if the calculated t value is greater than the table t value, and vice versa. This is shown in Table 11.

Table 11. Structural Hypothesis Test 2 DAR Model (t-test)

Variable	T-Count	Table T	Conclusion
CEE	0.157973168	1.65	Rejected
HCE	0.156618822	1.65	Rejected
SCE	0.149326027	1.65	Rejected
RCE	-0.118622015	1.65	Rejected

Based on Table 11, the absolute calculated t values for the CEE, HCE, SCE, and RCE variables are all lower than the t table value (1.65), so these variables are not significant. This means that H10, H11, H12, and H13 are rejected.

Table 12. DER Model Hypothesis Test (t-test)

Variable	T-Count	Table T	Conclusion
CEE	-2.23800367	1.65	Accepted
HCE	-2.184516751	1.65	Accepted
SCE	-1.708612872	1.65	Accepted
RCE	0.843346595	1.65	Rejected

Based on Table 12, the absolute calculated t values for the CEE, HCE, and SCE variables (2.238, 2.185, and 1.709, respectively) are greater than the t table value (1.65), indicating that these variables are significant. In contrast, the RCE variable has a calculated t value (0.843) lower than the t table value, indicating that it is not significant. This means that H10, H11, and H12 are accepted, while H13 is rejected.

Discussion

The Influence of Intellectual Capital on Profitability

The results indicate that capital employed efficiency (CEE), human capital efficiency (HCE), and structural capital efficiency (SCE) have a positive and significant effect on profitability. In contrast, relational capital efficiency (RCE) has no significant effect. This finding suggests that internal intellectual capital components play a more important role in increasing company profitability compared to relational capital.

The positive and significant effect of capital employed efficiency (CEE) on profitability indicates that companies that efficiently utilize their physical and financial resources tend to generate higher returns on assets. Efficient capital utilization enables companies to maximize asset productivity and improve operational performance. This finding supports the Resource-Based View perspective, which states that companies can achieve superior performance through the efficient use of valuable resources ([Barney, 1991](#)).

Companies that efficiently manage their capital resources are better able to create competitive advantage and improve financial results. These results are consistent with previous research by [Nimtrakoon \(2015\)](#) and [Bualay et al. \(2019\)](#), which found that capital efficiency significantly increases company profitability in the context of emerging markets. However, this finding contradicts the research of [Xu and Li \(2022\)](#), which reported that capital efficiency does not always significantly affect profitability due to differences in industry structure and investment strategies between companies.

Human capital efficiency (HCE) was also found to have a positive and significant impact on profitability. These results indicate that companies with higher employee knowledge, expertise, and productivity tend to achieve better financial performance. Human capital is one of the most strategic intangible resources that contributes to value creation within an organization. According to the Resource-Based View, employee knowledge and abilities are valuable resources that are difficult for competitors to imitate, thus providing a sustainable competitive advantage ([Barney, 1991](#)).

This finding supports previous research by [Xu and Wang \(2019\)](#) and [Jin and Xu \(2022\)](#), which found that human capital efficiency plays a significant role in increasing company profitability. However, some studies have shown conflicting results. For example, [Sardo et al. \(2018\)](#) found that the effect of human capital on financial performance can vary depending on company size, industry characteristics, and the level of human resource investment.

Structural capital efficiency (SCE) was also found to have a positive effect on profitability. Structural capital refers to organizational processes, information systems, databases, and routines that support employees in carrying out their tasks effectively. Firms with strong structural capital can facilitate knowledge sharing and improve operational coordination, ultimately improving financial performance.

This finding is consistent with the findings of [Smriti and Das \(2018\)](#), who found that structural capital significantly contributes to firm profitability. Similarly, [Nejjari and Aamoun \(2023\)](#) reported that structural capital efficiency plays a significant role in improving financial performance across several industries. However, some studies report inconsistent findings. For example, [Xu and Li \(2022\)](#) found that structural capital does not always have a significant effect on firm profitability due to variations in organizational structure and technological capabilities across firms.

In contrast, relational capital efficiency (RCE) did not significantly impact profitability in this study. Relational capital reflects the relationships between a company and external stakeholders such as customers, suppliers, and business partners. While these relationships can enhance a company's reputation and market trust, they may not always directly impact short-term financial

performance.

In the context of consumer non-cyclical companies experiencing the economic recovery phase following the COVID-19 pandemic, many are focusing more on strengthening internal capabilities and improving operational efficiency. Consequently, internal intellectual capital components such as human capital, structural capital, and capital utilization appear to have a stronger influence on profitability compared to relational capital.

This finding is consistent with research conducted by [Sardo et al. \(2018\)](#), which reported that relational capital does not always significantly impact a company's profitability. However, this result contradicts the findings of [Nadeem et al. \(2017\)](#) and [Xu and Liu \(2020\)](#), who found that strong stakeholder relationships can positively impact company performance by increasing customer loyalty and market reputation.

The Influence of Intellectual Capital and Profitability on Financial Leverage

The results of this study reveal different findings when financial leverage is measured using two different proxies: the debt-to-asset ratio (DAR) and the debt-to-equity ratio (DER). The negative and significant effect of structural capital efficiency (SCE) on financial leverage, as measured by DAR, indicates that firms with stronger structural capital tend to rely less on debt financing relative to their total assets.

Structural capital encompasses organizational processes, management systems, technological infrastructure, and internal databases that support efficient operational activities. Firms with stronger internal systems and organizational processes are better able to manage operational efficiency and generate internal funds, thereby reducing their reliance on debt relative to total assets.

This finding is supported by a study by [Vishnu and Gupta \(2014\)](#), which found that components of intellectual capital, particularly structural capital, contribute to increased operational efficiency and can influence a firm's financial strategy. Similarly, research by [Dzenopoljac et al. \(2016\)](#) indicates that intellectual capital plays a significant role in improving firm efficiency and alleviating financial constraints. However, this finding contradicts the research of [Ting and Lean \(2009\)](#), who found that intellectual capital can encourage firms to increase leverage because firms require additional financing to support knowledge-based investments and innovation activities.

Furthermore, capital employed efficiency (CEE), human capital efficiency (HCE), and relational capital efficiency (RCE) were found to have no significant effect on financial leverage in either the DAR or DER models. These results suggest that although intellectual capital plays a significant role in enhancing firm performance and value creation, it does not necessarily influence a firm's financial leverage decisions. Financing decisions are typically influenced by other financial factors such as firm size, asset tangibility, growth opportunities, and risk considerations.

These findings are consistent with research by [Mondal and Ghosh \(2012\)](#), which found that intellectual capital significantly influences firm performance but has a limited direct impact on leverage policy. However, this result contradicts the findings of [Alipour \(2012\)](#), who reported that intellectual capital efficiency can influence corporate financial decisions because companies with stronger intangible resources tend to gain better access to external financing.

In contrast to the DAR model, the DER model shows that profitability (ROA) has a negative and significant effect on financial leverage. This finding suggests that firms with higher profitability tend to rely less on debt than on equity. Profitable firms generally generate sufficient internal funds through retained earnings, which reduces their need for external financing. This finding strongly supports the Pecking Order Theory, which explains that firms prefer internal financing over external financing.

Profitable firms tend to rely more on retained earnings than external financing, reflecting a more conservative financial leverage strategy during periods of economic uncertainty. Similar findings were reported by [Fama and French \(2002\)](#), who found that profitability is negatively associated with leverage because profitable firms rely more on internal financing. Similarly, [Booth et al. \(2001\)](#) found that profitability tends to reduce firms' reliance on debt across countries.

However, this finding contradicts the findings of [Abor \(2005\)](#), who reported that profitable firms can increase leverage to finance growth and expansion opportunities. The differences between the DAR and DER models suggest that the impact of intellectual capital and profitability on financial leverage may depend on how leverage is measured. DAR reflects the proportion of total assets financed by debt, while DER reflects the relationship between debt and shareholder equity.

This finding may be explained by industry characteristics, which generally emphasize operational stability and efficiency. Consequently, companies in this sector often prioritize internal efficiency and prudent financial management over aggressive debt financing. During the 2020–2023 period, which coincided with the post-pandemic economic recovery, many companies focused on strengthening operational resilience, improving supply chain management, and optimizing internal resources to maintain financial stability.

The significance of structural capital in the DAR model suggests that efficient internal systems reduce a company's reliance on debt relative to assets. Meanwhile, the significant negative relationship between profitability and DER suggests that profitable companies tend to use internal funds rather than increasing debt relative to equity.

The Mediating Role of Profitability

The Sobel test results show different findings when financial leverage is measured using the debt-to-asset ratio (DAR) and the debt-to-equity ratio (DER). Based on Table 11, profitability, measured by return on assets (ROA), does not mediate the relationship between intellectual capital components (CEE, HCE, SCE, and RCE) and financial leverage when leverage is proxied by DAR.

This finding suggests that improvements in intellectual capital do not necessarily translate into changes in the proportion of debt relative to total assets through the profitability channel. In other words, although intellectual capital contributes to firms' operational efficiency and performance, these improvements do not always influence firms' reliance on debt financing when leverage is measured relative to total assets.

In contrast, the results in Table 12 indicate that profitability significantly mediates the relationship between several components of intellectual capital (CEE, HCE, and SCE) and financial leverage when leverage is measured using DER. At the same time, relational capital efficiency (RCE) remains insignificant. This finding implies that firms with more efficient intellectual capital can improve profitability, which subsequently influences their financing decisions. Higher profitability allows firms to rely more on internally generated funds, thereby affecting the proportion of debt relative to shareholders' equity.

This result can be explained by Pecking Order Theory, which states that firms prefer internal financing and use external financing, such as debt, only when internal funds are insufficient ([Myers & Majluf, 1984](#)). Firms with stronger intellectual capital capabilities tend to generate higher profitability through better knowledge management, innovation, and operational efficiency. As a result, increased profitability can influence firms' financing decisions and their capital structure policies.

Therefore, profitability acts as an important mechanism that links intellectual capital efficiency to firms' financial leverage decisions. Furthermore, leverage measured relative to equity (DER) appears to be more sensitive to profitability's influence on financing decisions than leverage measured relative to total assets (DAR). This suggests that profitability plays a more meaningful

role in shaping firms' capital structure when leverage is evaluated in relation to shareholders' equity.

These findings are consistent with previous studies that highlight the importance of intellectual capital in improving firm performance and financial decision-making. For instance, [Dzenopoljac et al. \(2016\)](#) found that intellectual capital enhances firm performance through improved organizational efficiency and knowledge utilization. Similarly, [Mondal and Ghosh \(2012\)](#) reported that intellectual capital significantly contributes to firm profitability. However, the extent to which profitability subsequently affects firms' leverage decisions may vary depending on how financial leverage is measured.

From the firm perspective, these results reflect how companies utilize intellectual capital to strengthen their internal financial capacity. Firms with more efficient intellectual capital—particularly in terms of capital employed efficiency, human capital efficiency, and structural capital efficiency—tend to generate higher profitability through improved productivity, knowledge utilization, and organizational processes.

This improved profitability subsequently influences firms' financing structures, particularly when leverage is measured relative to equity (DER). In such conditions, profitable firms are more capable of relying on internally generated funds, which affects the proportion of debt relative to shareholders' equity. However, when leverage is measured relative to total assets (DAR), the mediation effect of profitability becomes insignificant, suggesting that firms' total asset structures may not necessarily change in response to profitability improvements derived from intellectual capital efficiency.

CONCLUSIONS

This study examines the relationship between intellectual capital, profitability, and financial leverage in consumer non-cyclical firms listed on the Indonesia Stock Exchange. The research results show that the dimensions of intellectual capital (CEE, HCE, SCE) influence company profitability, except RCE. The effect of intellectual capital on financial leverage varies depending on how leverage is measured.

When financial leverage is proxied by the debt-to-asset ratio (DAR), only structural capital efficiency (SCE) shows a significant direct effect, suggesting that structural resources such as organizational processes, systems, and knowledge infrastructure may influence firms' asset-based leverage decisions. Other intellectual capital components do not show a significant relationship with DAR.

In contrast, when financial leverage is measured using the debt-to-equity ratio (DER), profitability plays a significant mediating role in the relationship between several dimensions of intellectual capital and financial leverage. This finding indicates that firms with more efficient intellectual capital can improve profitability, which subsequently influences their financing decisions when leverage is evaluated relative to shareholders' equity. However, this mediating effect of profitability does not occur when leverage is measured using DAR.

Overall, the results highlight that the role of profitability in linking intellectual capital to financial leverage is conditional on the leverage proxy used. These findings suggest that intellectual capital contributes to firms' financial decisions through improvements in profitability, particularly when leverage is evaluated relative to shareholders' equity (DER).

The findings provide implications for managers, creditors, and policymakers. For managers, strengthening intellectual capital—particularly human capital efficiency (HCE) and structural capital efficiency (SCE)—is essential to improve firm profitability (ROA). Investments in employee capability development, knowledge management, and organizational systems can enhance operational efficiency and reduce firms' reliance on debt financing, leading to lower DER and DAR.

For creditors and investors, intellectual capital efficiency may serve as an additional indicator in assessing firm profitability and financial risk. From a policy perspective, these results highlight the importance of encouraging more comprehensive intellectual capital disclosure among companies listed on the Indonesia Stock Exchange to improve transparency in the capital market.

LIMITATION & FURTHER RESEARCH

Despite providing important insights into the relationship between intellectual capital, profitability, and financial leverage, this study has several limitations that should be acknowledged. First, this study relies solely on secondary data obtained from financial statements of companies listed on the Indonesia Stock Exchange (IDX). Although these data are publicly available and reliable, financial reports may not fully capture all aspects of intellectual capital, particularly intangible elements such as knowledge management practices and organizational culture.

Second, the measurement of intellectual capital in this study is based on quantitative indicators derived from financial data, which may not completely reflect the broader qualitative dimensions of intellectual capital within firms. As a result, the measurement may only represent a partial view of intellectual capital performance. Third, the scope of the study is limited to companies listed on the Indonesia Stock Exchange during the observation period, which may restrict the generalizability of the findings to firms in other countries, industries, or institutional environments.

Future research is encouraged to extend this study by employing alternative analytical approaches, such as structural equation modeling (SEM) or dynamic panel methods (e.g., Generalized Method of Moments/GMM), to address potential endogeneity better and capture dynamic relationships among variables. In addition, future studies may broaden the scope of analysis by including firms from a wider range of industries or conducting cross-sector comparisons, as the role of intellectual capital and financing decisions may vary across sectors.

Extending the observation period is also recommended to capture long-term dynamics and improve the robustness of the findings under different economic conditions. Furthermore, incorporating additional explanatory variables—such as firm size, growth opportunities, corporate governance mechanisms, and innovation capability—may provide a more comprehensive understanding of the determinants influencing profitability and financial leverage decisions.

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