Intellectual Capital and Productivity: Predicting the Banking Profitability in Indonesia

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Abstract: This study was aimed at analyzing the effect of Intellectual Capital on the profitability and productivity of a Banking Company registered on the Indonesia Stock Exchange from 2016 to 2018. Purposive sampling was used to obtain a sample of 30 banking companies from 2016 to 2018. The empirical data was analyzed using the PLS method, outer test, and inner test models. The results showed that Intellectual Capital positively influences profitability and productivity. However, Value Added Human Capital (VAHU) and Structural Capital Value Added (STVA) have no significant positive effect on productivity. Also, the results show that Value Added Capital Employed (VACA) has a positive and significant impact on productivity.

Keywords: intellectual capital, profitability, productivity, banking

智力资本和生产力:预测印度尼西亚的银行盈利能力

摘要:摘要:本研究旨在分析知识资本对 2016 年至 2018 年在印尼证券交易所注册的一家 银行公司的盈利能力和生产率的影响。使用有目的抽样来获得 2016 年至 2018 年的 30 家银行公 司的样本。 使用 PLS 方法,外部测试和内部测试模型分析了经验数据。 结果表明,智力资本对 盈利能力和生产率产生积极影响。 但是,增值人力资本(VAHU)和结构资本增值(STVA)对 生产率没有显着的积极影响。 而且,结果表明,使用的增值资本(VACA)对生产率具有积极而 显着的影响。

关键词:智力资本,盈利能力,生产率,银行业。

1. Introduction

A company always tries to maintain and increase its value [1]. This process is conducted in many ways, including owning intellectual capital, disclosing it, and implementing proper corporate financial management. According to [2], intellectual capital represents the knowledge owned by a company in its operational period.

Disclosure of intellectual capital is essential for companies. The availability of Intellectual Capital (IC) is a good signal for the company and assists stakeholders in decision-making. The release of Intellectual Capital is intended to meet stakeholder needs for its information. Financial performance is an essential consideration to achieve company value. The company's financial performance is usually measured using net income. Companies need strategic efforts to survive competitions, such as applying the concept of Knowledge-Based Business (KBB). The knowledge owned by the company is the basis of increasing competitive advantage based on science. Company value is created based on the intangible assets used, including Intellectual Capital (IC), integrated with skills, knowledge, mastery, and organizational mechanisms and processes.

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IC plays a significant role in maximizing the company's strength to win a competitive advantage. Therefore, another goal is achieved by disclosing the IC advantages and obtaining quality resources and added value. This goal complies with the Resource-Based Theory that reviews various company resources, increases, and maintains a competitive business advantage. Therefore, companies need maximum resources and capabilities to develop a better competitive advantage.

IC is a precious intangible asset. However, very few corporations measure, assess, and record IC in the company's balance sheet. There is a need to conduct empirical studies on quantitative measurement and assessment of IC's real value because IC reflects the actual total asset value in the company's balance sheet. In consequence, a competent IC results in increased value from investors' perspective. Regular financial reports are considered incapable of providing this information. Investors need a lot of qualitative and quantitative information from financial reports in the form of company performance achievements. Also, investors need IC information held by the corporation. It is useful in achieving company performance that leads to higher stock returns for investors.

Various ICs were empirically proved in [3] by measuring the company's maximization of Value-Added Intellectual Coefficient - VAICTM. This research examines the implementation of the resource-based theory. It is guided by the assumption that the company's tangible and intangible resources provide effective strategic decisions to increase value. Also, this research is implementing stakeholder theory. This theory shows that companies have to be fair, ethical, moral, and concerned with the economic aspects. In the end, management actions and results are said to be appropriate.

Based on the description above, the importance of this research is that it provides an IC real picture in banking companies, especially in Indonesia. It tests the interrelated variables within the framework of intellectual capital. As a result, this research contributes to better academic insights into the Intellectual Capital of banking companies in Indonesia. The second part develops hypotheses about the influence between variables. The third part discusses the sample and methodology used. There are comments on descriptive statistics in the fourth section, test results, and hypothesis testing before the discussion. The last part discusses the conclusions made in the research.

2. Research Background and Hypotheses

2.1. Intellectual Capital

Intellectual Capital is a valuable and skilled resource based on tacit and explicit knowledge. Tacit knowledge is hidden and difficult for others to imitate. Explicit knowledge is easily transferred or copied by others [4]. According to [5], Intellectual Capital is a company's knowledge asset, which is expected to change over time. Human resources are a combination of capabilities in an organization to solve business problems. Company creativity and innovation is triggered by human capital. Structural capital is the infrastructure that facilitates the function ability of human capital. As stated in [6], IC is an intangible asset that increases value. Also, it is possible to convert IC into value. It consists of four components, including human capital, customer, process, and innovation.

According to [7], there are three main constructs in the IC concept: human capital (knowledge possessed by employees), structural capital (business model. organizational and business expertise, etc.), and relational capital (supplier-customer relationships). Human capital is a combination of employee knowledge and skills in an organization. It is a variation between employee education, experience, attitude, and inheritance regarding business and life. Furthermore, it was stated that structural capital refers to datastores in a company such as records, organizational charts, process manuals, strategies, and routines [7]. Customer capital (CC) is any channel used by companies to develop customer relationships.

2.2. Stakeholder Theory

This research uses a stakeholder theory approach that identifies powerful stakeholders' role, which determines a company's value. In their operations, companies are required to follow the stakeholders' expectations. A company adjusts to stakeholders' expectations when their position is stronger. The stakeholder theory also explains the organization's responses to their interests and needs and how they manage them [8, 9].

The main discussion in this theory is that managers have to perform activities relevant to achieving high returns and periodically provide a report as a form of obligation for the stakeholders' trust. These reports are a right that needs to be provided by the corporation on how organization activities affect company performance. Therefore, stakeholder theory discusses an accountable and orderly organization that provides reports regarding its environmental and social activities and information about the IC owned [10, 11]. An orderly report improves stakeholder understanding of the environment. encourages effective management of company operations, and minimizes potential losses [12]. The core of this theory is how to maintain the relationship between the corporation and the stakeholders.

2.3. Resource-Based Theory

Penrose pioneered the application of the resourcebased theory. It explains various resources owned by companies. Each company has its unique productive activities as a result of resource diversification. This theory discusses the cultivation, usage, and ownership of resources [13, 14]. Tangible and intangible assets are maximally utilized to create company value [15]. Management of resources and expertise is something very superior and unique to every company. It is known as the company's uniqueness to maintain its existence [16].

2.4. Human Capital Theory

The Human capital theory explains investing importance to improve human capital skills. Investment in human capital is as crucial as others [10, 16]. Furthermore, specific physical, financial, human, or organizational resources require a set of strategic decisions to achieve a competitive advantage. It is measured by the ability to acquire and maintain each resource.

Ability, experience, and knowledge have high economic value for organizations because they are benchmarks for determining the productivity level. Health, ability, and mastery of science guarantee worker happiness and bring benefits to employers. Moreover, they potentially increase national productivity. As the most critical company asset, human capital is fully essential in maximizing productivity because it requires a large investment cost in the form of motivation, supervision, and retaining employees. Therefore, a company should understand the main factors in maintaining its existence, such as the current market share conditions, *tripartite* relationship, and IT implementation [17]. It affects the cost of human resource management.

2.5. Intellectual Capital and Profitability

The company's resource-based view was stated in [18]. Building a sustainable competitive advantage above average profitability requires companies to create and

maintain strategic resources [4, 19]. The specific size, type, and nature of the strategic resources determine the company's profitability. Company resources should be valuable, scarce, and unable to be replicated and replaced to achieve sustainable competitive advantage [20]. Theoretically, it is knowledge acceptable as the company's leading resource [21] that fulfils all the necessary attributes recommended in [20]. The research idea about this leads to IC view expansion of knowledge from company resources [5, 22]. Company performance and competitive advantage are highly influenced by knowledge creation and transfers [23]. Competitive advantage through knowledge creation can be achieved in several ways, including research, personnel influx, and learning how customers receive and use the products they want to sell. According to [18], investment in research development allows companies to absorb new external knowledge. As stated in [24], overall company success is significantly influenced by employee expertise and reputation. Furthermore, sales follow a curve similar to the R & D process, which businesses could use as a learning procedure for new products and manufacturing processes.

Previous studies showed that IC directly influences business earnings [25]. Therefore, when stakeholders contribute to business finances, they provide opportunities to increase returns. This study's hypotheses 1a, 1b, and 1c are stated below.

Company profitability is positively affected by: H1a: Value Added Capital Employed (VACA) H1b: Value Added Human Capital (VAHU) H1c: Structural Capital Value Added (STVA)

2.6. Intellectual Capital and Productivity

There are two interpretive perspectives on productivity. Productivity refers to labor, investment, and capital output mainly from human abilities. Intellectual Capital is an aspect of human behavior that requires training. This means that intellectual capital is created using dynamic brain activities. It is a set of resources, abilities, and competencies that influence performance and value creation [4, 26]. Therefore, a company's competitive advantage highly depends on creating, sharing and building intellectual capital.

IC refers to banking companies' knowledge used for competitive advantage. A Systematic interpretation of IC is adopted by identifying three main components: human, organizational, and social capital [27].

Company management should manifest through improved operations, products, services, and systems. Organizational knowledge is developed from interactions between internal and external stakeholders. Intellectual capabilities can also be developed through information technology that increases employee knowledge and value creation. Managers should provide time, space, and opportunities to build relationships and mediums to foster interaction, such as meeting rooms [28]. Furthermore, organizations can intensify knowledge by consistently applying it to operations.

Organizational capital strengthens existing knowledge, influences increased innovative capabilities, and raises productivity [29].

Productivity is efficiency measurements in using and utilizing assets to increase profits. IC is applied to increase productivity. The increase in Value Added Capital Employed (VACA) shows a rise in assets utility held in the production process. VAHU utilization shows increased productivity. Utilizing Structural Capital Value Added (STVA) triggers an increase in productivity. Intellectual capital has a positive effect on productivity [23, 30].

All business stakeholders use Intellectual Capital in decision making and idea creation. For productivity to be effective and efficient, there should be an appropriate use of adequate resources. Therefore, all used resources and processes should be beneficial to the final product. However, this is different from the research findings. Based on the description above, hypotheses 2a, 2b, and 2c are formulated as follows:

Company productivity is positively affected by; H2a: Value Added Capital Employed (VACA). H2b: Value Added Human Capital (VAHU). H2c: Structural Capital Value Added (STVA).

3. Research Methodology

This study used data from all banking companies in the Indonesia Stock Exchange (IDX) for the 2017-2018 period. Non-probability random sampling with a purposive sampling method was used to determine the study population based on four criteria. First, banking companies appeared in the Indonesian stock exchange for the period 2017 - 2018. Secondly, the sample companies had financial reports during the study period. Thirdly, the company has VACA, VAHU, STVA, ROA, and ATO. Lastly, no company experienced losses this year. This study analyzed 30 companies that met the established criteria.

3.1. Operational Definition and Variable Measurement

In this research, the profitability, using the proxy Return on total assets (ROA) and Asset turn-over (ATO) were exogenous variables. The endogenous variable was IC. The IC performance is a variation of three VAIC TM values added [3]. This complies with the added value obtained from physical capital (VACA), human capital (VAHU), and structural capital (STVA) (Table 1).

Table 1 The research variables				
Variables	Variables	Measurement		
Measurement	includes various advantages in the company's operations, as well as maximizing the assets utilization for profit	$ROA = \frac{Net \text{ profit}}{Total \text{ asset}}$		
Asset turn over (ATO)	The ratio of total income to total assets	ATO = $\frac{\text{Total income}}{\text{Total asset}}$		
The V	AIC TM formulation i	s described as follows:		
Value Added (VA)	The difference between Output and Input.	(VA) = OUT – IN. VA (OUT) - Total sales + other income		
Value Added Capital Employed (VACA) Capital	includes (equity, net income). VACA is the contribution to each unit of CE	(IN) - Load + expenses (other than employee load) VACA = VA/CE.		
Employed (CE) Value Added Human Capital (VAHU)	towards value- added Human Capital (HC) includes employee load. VAHU is the contribution created by every rupiah invested	VAHU = VA/HC.		
Structural Capital Value Added (STVA)	STVA determines the number of SC owned to generate 1 rupiah from VA as an indication of the value creation SC success. Organizational	(STVA) = SC/VA.		
Structural Capital (SC) = VA – HC	intellectual abilities. VAIC ™ (BPI Business Performance Indicator).	Value Added Intellectual Coefficient (VAIC™) = VACA + VAHU + STVA. VAIC™		

3.2. Data Analysis Technique

The data was analyzed using Structural Equation Modeling (SEM). This technique is a statistical approach that examines the causal relationships using factor and path analysis.

One of the SEM solving methods is the Partial Least Square (PLS). The PLS method was chosen because the alternative provided to the estimation approach towards traditional SEM allows data testing with a small sample. Also, it does not require normality assumptions. The data were first analyzed using the outer and inner models before processing.

3.2.1. Outer Model Test

The outer model (outer relationship or measurement model) was used to test indicators against latent variables. The (Cronbach alpha) construct reliability tests are not needed when there is no correlation [31].

Its substantive content is used to evaluate the formative indicators of the Outer model. The height of the individual reflexive is correlated more than 0.70 with the construct to be measured. However, in the early stages of research, a loading value measurement scale of 0.5 to 0.6 is considered sufficient.

3.2.2. Inner Model Test

The inner models consist of relations, structure, and substantive theory. The variance percentage evaluated the inner model through the R^2 value, which showed the effects of the dependent and independent variables [32]. To predict the relevance and significance of the structural path parameter coefficients, the Stone-Geisser Q-square was used.

3.2.3. Research Model

The hypothesis equation in this study consists of two models:

1. The influence of VACA, VAHU, and STVA towards profitability:

$$ROA = \alpha + \beta 1 VACA + \beta 2 VAHU + \beta 3 STVA + \epsilon \quad (1)$$

2. The influence of VACA, VAHU, and STVA on productivity:

 $ATO = \alpha + \beta 1 VACA + \beta 2 VAHU + \beta 3 STVA + \epsilon \quad (2)$

4. **Research Results**

4.1. Descriptive Statistics

The mean VAIC of banking companies is 3,639, with 5,198 standard deviations, as shown in Table 2. This information explains that banking companies provide Rp. 3,639 added value invested per 1 rupiah in the context of intellectual capital. Moreover, Table 2 describes the ROA and ATO mean values. The mean ROA value is 0.011, with a standard deviation of 0.008. The mean ATO is 0.147, with a standard deviation of 0.136.

Table 2 Descriptive statistics			
Min	Max	Mean	Std. Deviation

	Min	Max	Mean	Std. Deviation
VACA	0.147	6.142	0.599	0.927
VAHU	1.300	27.658	2.622	4.158
STVA	0.147	1.060	0.418	0.192
VAICTM	1.650	34.847	3.639	5.198
ROA	0.003	0.038	0.011	0.008
ATO	0.079	0.996	0.147	0.136

4.1.1. Outer Model Test

The outer model test shows hypothesis 1 and the IC effect on profitability. The test was performed with regard to the P-value, significant with 0.05 (significance level = 5%).

Table 3 uses PLS for the 2016-2018 data. The PLS test results showed that VAIC indicators, including STVA, VACA & VAHU, had a significant t-statistical value of p <0.05. The VACA, VAHU and STVA t-statistic value was 2.461 significant at p <0.05, p <0.05 for 2.208 and 1.508 for <0.05. VACA, VAHU, STVA significantly influence company profitability (Table 3).

	Weights	Standard deviation	T-Statistic
VAIC			
STVA	0.758	0.08	14.508*
VACA	1.727	0.55	2.461*
VAHU	-1.622	0.58	2.208*
Profitability			
ROA	1.000		

Description: *significant at p<0.05

The outer model tested hypothesis 2 and IC effect on company productivity. The estimation result from 2016-2018 PLS VACA showed a significant t-statistic value of 7.01 at p < 0.051. VAHU and STVA had insignificant weight values of 1.8 and 0.29, as shown in Table 4.

Table 4 Outer weight value of H2				
	Weights	Standard deviation	T-Statistics	
VAIC				
STVA	-0.09	0.37	0.29	
VACA	0.79	0.13	7.01*	
VAHU	0.40	0.27	1.68	
Productivity				
ATO	1.000			
Description: *significant at $p < 0.05$				

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4.1.2. Validity Test

Convergent and discriminant validity tests were used to determine the relationship between constructs, the significance value, and R^2 . Convergent validity refers to the correlation between the component and construct scores calculated by PLS. An individual reflective measure is high when the correlation value is more than 0.70.

4.1.3. Inner Model Test

The inner model was used to determine the correlation level between constructs, the significance value, and the R^2 . To evaluate the structural model, this study used dependent construct R^2 , the Stone-Geisser Q-square method, t-test, and the significance of the structural path parameter coefficients, as shown in Table 5.

Table 5 R-square value			
Variables	R-Square		
IC	-		
Profitability	0.383		
Productivity	0.767		

The R^2 value of 0.383 profitability is shown in Table 5, meaning that the IC variable explains the profitability of 38.8%. R^2 profitability is an H1 test, while the R^2 value of 0.767 results from H2 testing. The greater the R^2 number, the higher the independent variable explains the dependent variable. This fact implies a better structural equation.

Table 6 Inner weights value				
Variables	Original sample estimate	T- statistic	Standard deviation	Decisions
IC -> Profitability	0.790	13.406	0.067	H1 accepted
IC -> Productivity	0.775	27.014	0.046	H2 accepted

Description: *significant at *p*<0.05 (1-tailed)

Table 5 shows that the t-statistics between IC, profitability, and productivity was above 1.645 and significant at p < 0.05. Profitability had a t-value of 13.406, while it had 27,014, significant at p < 0.05. Therefore, IC significantly influences profitability, which shows that H1 was accepted. H2 had an inner weight significance of 27,014, meaning that it was also accepted. Therefore, IC significantly affects company productivity.

5. Discussion

5.1. The Influence of Intellectual Capital on Profitability

The test results on hypothesis 1 show the effect of intellectual capital on profitability. The results showed that STVA, VACA, and VAHU obtained a significant t-statistics value of p < 0.05. Therefore, all hypotheses H1a, H1b, and H1c are accepted. The overall inner model test results show the significant influence of IC (VAIC TM) on the company's profitability, meaning that H1 is accepted with a significance of 13.406. In line with this, it was established that intellectual capital affects profitability [24, 33]. Higher IC Value Added value indicates greater profitability in banking companies. It shows that the company is managing its assets much better, increasing the returns on its assets.

5.2. The influence of Intellectual Capital on Productivity

The test results for hypothesis 2 show the effect of intellectual capital on productivity. VAHU and STVA were insignificant, while VACA had a t-statistical value of p < 0.05. Therefore, company productivity is influenced by IC (VAIC TM), which means that H2 was accepted with a significance of 27.014. This result is in line with [22, 34] which stated that all business stakeholders could use IC in decision making. Since productivity is a combination of effectiveness and efficiency, the used resources and processes should be beneficial to the end product.

VACA positively affects company productivity, meaning that H2a is accepted. This research agrees with [20, 35] and others which established that banking companies use physical capital to increase corporate efficiency. eVAHU does not have a significant t-statistics value, meaning that H2b is rejected. This result shows that the use of human resources in banking companies is insufficient, leading to inefficient management of the organization.

STVA does not significantly affect the productivity of banking companies in Indonesia. This fact is evidenced by the insignificant t-statistics value, meaning that H2c is rejected. These results support [36, 37]. Measurement in the VAIC methodology is considered incomplete because advertising costs are an expense and are not included in the structural capital.

Previous intellectual capital studies have generalized the belief that IC has a direct effect on company productivity. Furthermore, this study verified that IC is significantly related to banking productivity in Indonesia. This result is in line with [35, 38], which linked IC with innovation. Therefore, Intellectual Capital is an essential aspect of consideration when evaluating company productivity.

Structural capital refers to organizational knowledge represented by relationships with suppliers, clients, local commodities, government, and shareholders. This study's results showed that structural banking capital is still low. Therefore, banking entities should improve relations with customers, local communities, government, and shareholders to improve productivity.

6. Conclusions and Suggestions

6.1. Conclusions

Analysis of the above discussions produces several conclusions. First, IC (VAIC TM) has a positive and significant effect on profitability during the three years of observation, 2016-2018. Subsequently, IC is used to predict the profitability of banking companies in Indonesia. VACA, VAHU, and STVA have a positive and significant effect on profitability. Higher VAIC increases the profitability of the banking company. It means that the company manages its assets much better, increasing the returns on its assets. Second, Intellectual Capital (VAIC TM) and VACA have a positive and significant effect on productivity, while VAHU and STVA do not. Banking companies use physical capital to increase efficiency.

The results showed that companies could improve their profit generation capabilities by improving IC, since there is a significant relationship between IC and company performance or profitability. As it was believed earlier, IC and company profitability do not have a strong relationship. However, this research findings showed that a company could increase profitability by continuously improving IC. Therefore, companies can develop and maintain their competitive advantage by strategically using IC. This means that IC and future performance have a positive relationship, supporting the company's resource-based view.

This study also proved that intellectual capital does not impact knowledge productivity but influences interaction. When companies' stakeholders do not interact sufficiently, there is a possibility of hindering productivity. Formal policies regarding systems, processes, and structures reinforce company culture and improve knowledge productivity. Therefore, managers need to construct strategies for self-motivated knowledge productivity.

This study holds managerial implications. IC is used to identify the possibility of corporate profits. The developed approach to calculating IC is a comparison instrument for company management and strategic implementation for hiring, compensation, training, and marketing processes. Competitive salaries and company benefits attract employees. However, companies need to allocate money to training, which helps employees acquire new skills, experience, and knowledge. A company fails to meet high-achieving employees' expectations because of the expenses incurred in compensation and training. Therefore, this is a failure of the company itself. When employees leave the company while carrying their accumulated knowledge, it causes huge losses for employers. As a result, a comprehensive career growth program is indispensable. Technical training opportunities and tuition fee programs improve human capital and skills in terms of customer service. The main problem is that companies need to actively mobilize to attract and maintain technical professionalism in retaining employee knowledge. That is why companies with more IC get higher profitability.

6.3. Limitations and Future Research

This research had several limitations. First, a sample size of 30 firms over the three years 2016-2018 with 90 observations is considered small and limits the ability to generalize the findings. Similar financial models are often tested with huge sample sizes because the information is easily obtained to reduce the high volatility of market data. Second, each IC pillar's testing was based on one indicator, which may only capture a portion of the IC data. Therefore, many items of intangible assets, such as linkages between employees and company culture, cannot be tracked. Third, companies were not treated individually. This means the amortization and accumulation of rate values according to the whole sample can have different results because of distinct strategies and priorities between companies. A company prioritizes better employees with high salaries, while another one provides more training and development opportunities. However, the priorities may still lie somewhere between these two. However, there are three most essential aspects to be considered. First is how effectively the money is invested in transferring new knowledge from the training sessions into human capital. The second one is the number of useful bits of knowledge per each dollar incurred in training. Third are the related factors, such as the type of training session and trainer skill level.

Studies should be continued and compare companies from different countries to improve the accuracy and reliability of the model in the future. However, there should be considerations on challenges arising from different currencies and profitability. Also, future studies should use comprehensible income variables to explain the relationship. Lastly, it is necessary to conduct this study in other industries and compare the implications in different business sectors.

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