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Intellectual Capital On Firm Financial Performance: The Moderation Effect Of Firm Size

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Abstrak

Studi ini berkontribusi pada literatur yang ada mengenai kinerja *intellectual capital* (IC) di Indonesia. Penelitian ini menguji pengaruh IC terhadap kinerja keuangan perusahaan dan yang di moderasi oleh ukuran perusahaan. *Intellectual capital* diukur dengan menggunakan *value-added intellectual capital* (VAIC™) yang terbukti mempunyai pengaruh positif dan signifikan terhadap kinerja keuangan perusahaan pada penelitian sebelumnya. Terdapat variabel kontrol yaitu usia perusahaan, *leverage*, dan kebijakan dividen. Sampel dalam penelitian ini adalah perusahaan sektor *consumer non-cyclical* yang terdaftar di Bursa Efek Indonesia tahun 2020-2022, dan analisis regresi berganda serta moderasi menggunakan SPSS v.16. Hasil dari penelitian ini adalah: 1) *Intellectual capital* memiliki pengaruh positif signifikan pada kinerja keuangan perusahaan, 2) efek moderasi ukuran perusahaan memperkuat hubungan antara *intellectual capital* dan kinerja keuangan perusahaan.

Kata Kunci: *Intellectual Capital; Ukuran Perusahaan; Kinerja Keuangan Perusahaan*

Abstrack

This study contributes to the existing literature on intellectual capital (IC) performance with evidence from Indonesia. This study examines the impact of IC performance on company financial performance and the moderating effect of company size. Intellectual capital is measured using the value added intellectual coefficient (VAIC™), which is found to have a positive and significant impact on the company's financial performance. There are control variables, namely company age, leverage, and dividend policy. The sample in this research is non-cyclical consumer sector companies listed on the Indonesia Stock Exchange in 2020-2022 and multiple regression analysis and moderation using SPSS v.16. The results of this research are: 1) Intellectual capital has a positive effect on firm financial performance, 2) the moderation effect of firm size strenghtnes the relationship between intellectual capital and firm financial performance.

Keyword: *Intellectual Capital; Firm Size; Firm Financial Performance*

INTRODUCTION

Technology, globalization, and changing trends are currently challenges that companies must face in the digital economy era. The digital economy has given birth to various new models, new innovations, new work mechanisms or business processes, and new goods and services that previously did not exist or did not exist (Sugiarto, 2022). Globalization has developed market segmentation by making cross-border interactions easier and bringing about a substantial shift in business processes from a model based on physical work (physical-based economy) to a model that focuses more on knowledge (knowledge-based economy) and technology (Soewarno & Tjahjadi, 2020). Economic development in Indonesia is currently quite positive, based on data obtained from BPS showing that during the 2019-2022 period, Indonesia's economic growth reached an average of 3.4%. This shows that the economic growth trend is stable at around 3.4% annually, despite facing challenges from economic uncertainty and increasing global competition.

To be able to follow the latest developments, strengthen decision-making, anticipate changes that will occur, and respond to changes as early as possible in the digital economy era, companies must have a competitive advantage both from tangible resources (tangible assets) and intangible resources (intangible assets). During the 1990s, companies assessed themselves not only based on the value of tangible assets and financial aspects listed on the accounting balance sheet, but also by measuring knowledge, intangible assets, and business management strategies to gain a competitive advantage. This process involved measuring intellectual capital, also known as intellectual capital (Saez et al., 2010).

According to Pulic (2008), measurement methods should be based on indicators of knowledge economy success, which focus on creating added value and efficient use of resources. VAIC^{TM} was developed to provide an overview of efficiency in creating added value from various company assets, including tangible and intangible assets. The higher the Value Added Intellectual Coefficient (VAIC^{TM}), the more efficiently the company uses its capital, leading to added value for the company.

Numerous studies on intellectual capital have yielded varied results. The research carried out by Nimtrakoon (2015), Nadeem et al. (2018), Smriti & Das (2018), Zeng & Wudhikarn (2018) and Mačerinskienė & Survilaitė (2019) on intellectual capital results had a positive impact on firm financial performance. While the research conducted by Xu et al. (2019) with the overall rsult of the intellectual capital component has a negative impact on firm financial performance.

The object of this research is non-cyclical consumer companies. Non-cyclical consumer companies, a sector of the industrial classification, encompass companies that typically sell anti-cyclical, primary, or basic goods to consumers, ensuring their demand remains unaffected by economic growth. Non-cyclical consumer companies were chosen as the object of analysis because companies in this industry have an important role in serving consumer needs, especially basic needs. The rapid population growth in Indonesia has also resulted in a rise in the meeting of consumption needs.

RESEARCH METHOD

Research Subject, Populations and Samples, Analysis Methods

This research type, known as quantitative research, employs a positivist research philosophy. It collects data from specific sample populations using quantitative or statistical data analysis tools, with the goal of testing predetermined hypotheses (Sugiyono, 2020). The study's population consists of companies operating in the non-cyclical consumer sector on the Indonesia Stock Exchange (BEI) between 2020 and 2022. This study employed a purposive sampling technique, which involved selecting the sample from non-cyclical consumer sector companies in the main board category of the Indonesia Stock Exchange (BEI), as well as active companies with annual financial reports for the period 2020-2022. This resulted in a sample of 39 companies. The study employs SPSS for data analysis, which includes several stages: descriptive statistical analysis, classic assumption test including normality, multicollinearity, heteroscedasticity, and autocorrelation, hypothesis test including f test, t test and R^2 determination coefficient test, as well as multiple regression.

Operational Definition of Variables

Intellectual capital measurement uses the value-added intellectual coefficient (VAIC^{TM}) approach discovered by Pulic (1998). The initial calculation step is to calculate value-added (VA) = OUT – IN, where OUT (output) = total sales and other income and IN (input) = sales expenses and other costs (other than employee expenses). The physical capital calculation indicator is value-added capital employed (VACA), which is calculated using the formula VACA = VA/CE, where CE is employee capital, which is the same as available funds or equity. We calculate the value-added human capital (VAHU) indicator using the formula VAHU = VA/HU, where HU represents human capital, which is equivalent to employee expenses. We calculate the structural capital indicator, known as structural capital value-added (STVA), using the formula STVA = VA – HC. Intellectual capital is the total sum of all components whose indicator is value-added intellectual capital (VAIC^{TM}) with the formula VAIC^{TM} = VACA+VAHU+STVA.

The firm's financial performance indicators are calculated using return on assets (ROA) = EAT/total assets. A firm's size shows the size of the company as measured by Ln total assets.

Firm's age is measured from the year of establishment to the year of research; leverage is measured using the debt-to-asset ratio (DAR) = total debt/ total assets; and dividend policy is measured using the dividend payout ratio (DPR) = (dividend per share/ earning per share) x 100 %.

Table 1. Operational Variable

Variables	Indicators
Intellectuall Capital (VAIC)	Value Added Intellectual Coefficient (VAIC^{TM})
Firm Financial Performance (ROA)	ROA = EAT/ Total Aset
Firm Size (SIZE)	Ln Total Aset
Firm Age (AGE)	Age of Company
Leverage (LEV)	Total Liability/ Total Aset
Dividen Policy (DIV)	Dividend per share/ Earning per share

Source : The Processed Data

RESULTS AND DISCUSSIONS

Descriptive Statistics

Table 2. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
VAIC^{TM}	114	.4241	13.4381	4.239378E0	2.6813992
ROA	114	-.2071	.5990	.064249	.0978124
SIZE	114	26.6469	32.8264	2.954843E1	1.5372724
AGE	114	17.00	116.00	46.4474	23.72113
LEV	114	.0979	.9590	.453946	.2067694
DIV	114	-.8694	5.3851	.444491	.7220920
Valid N (listwise)	114				

Source : SPSS

Based on the calculation presented in Table 2, we can determine:

a. The sample size (N) is 114 companies listed on the Indonesian Stock Exchange for 6 consecutive years, consisting of IC, ROA, SIZE, AGE, LEV, & DIV.

b. The minimum value of VAIC™, amounting to 0.4241 is owned by PT Eagle High Plantations Tbk in 2020, while the maximum value of 13.4381 is owned by PT FKS Food Sejahtera Tbk in 2020, with a mean of 4.239378E0 and a standard deviation of 2.6813992.
c. The minimum value of ROA, amounting to -0.2071 is owned by PT Martina Berto Tbk in 2020, while the maximum value of 0.5990 is owned by PT FKS Food Sejahtera Tbk in 2020, with a mean of 0.064249 and a standard deviation of 0.0978124.
d. The minimum value of SIZE, amounting to 26.6469 is owned by PT Dharma Samudera Fishing Industries in 2020, while the maximum value of 32.8264 is owned by PT Indofood Sukses Makmur Tbk in 2022, with a mean of 2.954843E1 and a standard deviation of 1.5372724.
e. The minimum value of AGE amounting to 17 is owned by PT Buyung Poetra Sembada Tbk in 2020, while the maximum value of 116 is owned by PT PP London Sumatra Indonesia Tbk in 2022, with a mean of 46.4474 and a standard deviation of 23.72113.
f. The minimum value of LEV amounting to 0.0979 is owned by PT Wilmar Cahaya Indonesia Tbk in 2022, while the maximum value of 0.9590 is owned by PT Matahari Putra Prima Tbk, with a mean of 0.453946 and a standard deviation of 0.2067694.
g. The minimum value of DIV amounting to -0.8694 is owned by PT Mandom Indonesia in 2020, while the maximum value of 5.3851 is owned by PT Buyung Poetra Sembada Tbk in 2022, with a mean of 0.444491 and a standard deviation of 0.7220920.

Classical Assumptions Test

Normality Test

Table 3. Result of Normality Test One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		114
Normal Parameters[a]	Mean	.0000000
	Std. Deviation	.07433283
Most Extreme Differences	Absolute	.110
	Positive	.100
	Negative	-.110
Kolmogorov-Smirnov Z		1.178

Asymp. Sig. (2-tailed)	.125
a. Test distribution is Normal.	

From table 3, it can be seen that the significance of the unstandardized residual is 0.125>0.05, so it can be concluded that the data in this study are normally distributed.

Multicollinearity Test

Table 4. Result of Multicollinearity Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.093	.144		.650	.517		
	VAIC	.020	.003	.536	6.677	.000	.829	1.206
	SIZE	-.005	.005	-.079	-.991	.324	.837	1.194
	AGE	.001	.000	.195	2.515	.013	.892	1.121
	LEV	-.024	.037	-.051	-.654	.514	.886	1.129
	DIV	.023	.010	.173	2.290	.024	.932	1.073
a. Dependent Variable: ROA								

From table 4, it can be seen that all independent and control variable used produce variance inflation factor (VIF) of less than 10 and tolerance value of more than 0.1. Then, it

can be concluded that there are no symptoms of multicollinearity among the independent & control variables used in the regression model.

Autocorrelation Test

Table 5. Result of Autocorrelation Test

Runs Test

	Unstandardized Residual
Test Value[a]	.00745
Cases < Test Value	57
Cases >represents Test Value	57
Total Cases	114
Number of Runs	51
Z	-1.317
Asymp. Sig. (2-tailed)	.188
a. Median	

Table 5 shows that the Asymp. Sig (2-tailed) value of 0.188 is greater than 0.05, so it can be concluded that the data have no autocorrelation.

Heteroscedasticity Test

Table 6. Result of Heteroscedasticity Test

			VAIC	SIZE	AGE	LEV	DIV	Unstandardized Residual
Spearman's rho	VAIC	Correlation Coefficient	1.000	.376**	.212*	-.110	.337**	-.049
		Sig. (2-tailed)	.	.000	.023	.243	.000	.607
		N	114	114	114	114	114	114
	SIZE	Correlation Coefficient	.376**	1.000	.041	.266**	.276**	.035
		Sig. (2-tailed)	.000	.	.662	.004	.003	.710
		N	114	114	114	114	114	114
	AGE	Correlation Coefficient	.212*	.041	1.000	-.193*	.239*	.056
		Sig. (2-tailed)	.023	.662	.	.040	.011	.553
		N	114	114	114	114	114	114
	LEV	Correlation Coefficient	-.110	.266**	-.193*	1.000	-.171	-.030
		Sig. (2-tailed)	.243	.004	.040	.	.069	.751
		N	114	114	114	114	114	114
	DIV	Correlation Coefficient	.337**	.276**	.238*	-.171	1.000	.182
		Sig. (2-tailed)	.000	.003	.011	.069	.	.052
		N	114	114	114	114	114	114
	Unstandardized Residual	Correlation Coefficient	-.049	.035	.056	-.030	.182	1.000
		Sig. (2-tailed)	.607	.710	.553	.751	.052	.
		N	114	114	114	114	114	114

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

This study uses the Spearman's Rho test method to detect the presence or absence of heteroscedasticity. If the sig. (2-tailed) value is > 0.05, it indicates the absence of heterocedasticity. If the value of Sig. (2-tailed) < 0.05 indicates heterocedasticity, Based on Table 6, it is clear that this regression model does not contain heterocedasticity.

Hypothesis Testing

Table 7. Result of Multiple Regression Analysis and Moderated Regression Analysis (MRA)

	Model 1		Model 2	
	B	Sig	B	Sig
(Constant)	-0.047	0.072	-1.005	0.001
VAIC	0.019	0.000	0.291	0.000
SIZE	-	-	0.033	0.001
VAIC*SIZE	-	-	-0.009	0.000
AGE	0.001	0.014	0.001	0.012
LEV	-0.034	0.347	-0.030	0.384
DIV	0.023	0.26	0.024	0.014
F		19.509		18.408
Sig		0.000		0.000
R square		0.396		0.480

Multiple Regression Analysis

Based on table 7 above, a multiple linear regression equation can be prepared as follows:

ROA = -0.047 + 0.019 VAIC^{TM} + 0.001 AGE – 0.034 LEV + 0.023 DIV + e

It can be concluded that the equation of multiple linear regression is as follows:

a. Constant a represents a value of -0.047, which means that if VAIC^{TM}, AGE, LEV, & DIV have a value of 0, then ROA has a value of -0.047.
b. The regression coefficient of the VAIC^{TM} variable (X) of 0.019 means that if VAIC^{TM} has increased by 1%, then the value of ROA (Y) will increase by 0.019, assuming other independent variables are constant. A positive coefficient indicates a positive relationship between VAIC^{TM} and ROA; the higher the VAIC^{TM}, the higher the ROA value.
c. The regression coefficient of the AGE variable (K_1) of 0.001 means that if AGE has increased by 1, then the value of ROA (Y) will increase by 0.001, assuming other independent variables are constant. A positive coefficient means a positive relationship exists between AGE and ROA, the higher the AGE, the higher the value of ROA.
d. The regression coefficient of the LEV variable (K_2) of -0.034 means that if LEV has increased by 1%, then the value of ROA (Y) will decrease by 0.034, assuming other independent variables are constant. A negative coefficient means that there is a negative relationship between LEV and ROA; the higher the LEV, the lower the value of ROA.
e. The regression coefficient of the DIV variable (K_3) of 0.023 means that if DIV has increased by 1%, then the value of ROA (Y) will increase by 0.023, assuming other

independent variables are constant. A positive coefficient means a positive relationship exists between DIV and ROA; the higher the DIV, the higher the value of ROA.

Moderated Regression Analysis (MRA)

Based on table 7 above, a moderated regression equation can be prepared as follows

ROA = -1.005 + 0.291VAIC + 0.033 SIZE – 0.009 VAIC*SIZE + 0.001 AGE – 0.030 LEV + 0.024 DIV

It can be concluded that the equation of moderate linear regression is as follows :

a. Constant a represents a value of -1.005, which means that if VAIC™, SIZE, AGE, LEV, & DIV has a value of 0, then ROA has a value of -1.005.
b. The regression coefficient of the VAIC™ variable (X) of 0.291 means that if VAIC™ has increased by 1%, then the value of ROA (Y) will increase by 0.291, assuming other independent variables are constant. A positive coefficient means a positive relationship exists between VAIC™ and ROA; the higher the VAIC™, the higher the value of ROA.
c. The regression coefficient of the SIZE variable (M) of 0.033 means that if SIZE has increased by 1%, then the value of ROA (Y) will increase by 0.033, assuming other independent variables are constant. A positive coefficient means a positive relationship exists between SIZE and ROA; the higher the SIZE, the higher the value of ROA.
d. The regression coefficient of the VAIC*SIZE variable/ moderating interaction variable of -0.009 means that if VAIC*SIZE has increased by 1%, then the value of ROA (Y) will decrease 0.009, assuming other independent variables are constant; the higher the VAIC*SIZE, the lower the value of ROA.
e. The regression coefficient of the AGE variable (K_1) of 0.001 means that if AGE has increased 1, then the value of ROA (Y) will increase by 0.001, assuming other independent variables are constant. A positive coefficient means a positive relationship exists between AGE and ROA, the higher the AGE, the higher the value of ROA.
f. The regression coefficient of the LEV variable (K_2) of -0.030 means that if LEV has increased 1%, then the value of ROA (Y) will decrease by 0.030, assuming other independent variables are constant. A negative coefficient means that there is a negative relationship between LEV and ROA, the higher the LEV, the lower the value of ROA.
g. The regression coefficient of the DIV variable (K_3) of 0.024 means that if DIV has increased by 1%, then the value of ROA (Y) will increase by 0.024, assuming other independent variables are constant. A positive coefficient means a positive relationship exists between DIV and ROA; the higher the DIV, the higher the value of ROA.

Coefficient of Determination (Adjusted R^2)

Table 7 reveals that the adjusted R2 value of model 1 of 0.396 indicates that the independent variable can excavate 39.6% of the dependent variable's variability. This indicates that VAIC™, AGE, LEV, and DIV determine 39.6% of ROA, while other factors not examined in this study determine 60.4%. For model 2, the adjusted R2 value is 0.480, indicating that VAIC™, SIZE, AGE, LEV, and DIV determine 48% of ROA, while other factors not examined in this study determine 52%

Simultaneous Significance Test (F Test)

Based on Table 7, model 1 has an F count value of 19.509 with a significance of 0.000. Given that the probability is less than 0.05, we can use the regression model to predict ROA, implying that the combined influence of VAIC™, AGE LEV, and DIV on ROA makes the regression model suitable. Then model 2 has a F count value of 18.408 with a significance of 0.000. Given that the probability is less than 0.05, we can use the regression model to predict ROA, indicating that the combined influence of VAIC™, SIZE, AGE, LEV, and DIV on ROA makes the regression model fit.

Significance Test of Individual Parameters (Statistical Test t)

The T test aims to determine the absence or presence of an influence between each independent variable individually and the dependent variable. If the probability or significance is greater than 0.05, then the independent variables individually do not influence the dependent variable; if it is less than 0.05, then the independent variables individually do influence the dependent variable.

It can be seen in model 1 that VAICTM and AGE have a significant effect on ROA, while LEV and DIV do not have a significant effect on ROA. Model 2 can be seen that VAICTM, AGE, DIV and VAIC*SIZE moderation have a significant effect on ROA, while LEV has no significant effect on ROA.

Discussion

a. The Effect of VAIC™ on ROA

   Based on the results of model 1 in the table above, the significance value of t is 0.000, which is less than 0.05, indicating that VAIC™ significantly influences ROA. The VAIC™ beta in the regression equation, with a positive value of 0.019, demonstrates the positive influence of VAIC™ on ROA. Therefore, we accept hypothesis 1, as it aligns with the research results. VAIC™ has a positive effect on ROA.

b. The Effect of VAIC™ on ROA moderate by SIZE

The research results show that there is a moderating effect of the firm size variable on the relationship between intellectual capital and company financial performance. This is shown by the R2 value in model 2 of the regression having a higher value (R2 model 2 = 0.480) than the R2 value in model 1 (R2 model 1 = 0.396), so hypothesis 2 can be accepted.

CONCLUSION

This research aims to obtain empirical evidence regarding the impact of the impact of intellectual capital on firm financial performance and the role of company size as a moderating variable. Researchers looked at data and talked about it for non-cyclical consumer sector companies listed on the Indonesia Stock Exchange in 2020 and 2022, and came to the conclusion that intellectual capital, as measured by VAIC™, shows significant positive results. This is because intellectual capital is used correctly, which means it can have an effect on the company's financial performance. This means that management can better manage the company's resources, which also improves its financial performance. Second, firm size strength the influence of intellectual capital on firm financial performance. This can be seen from the increase in the R2 value in model 1 and model 2.

This study only focuses on the non-cyclical consumer sector, and in future research, it can be expanded to other sectors such as health, transportation, technology, and others. Future research may use other methods to get different results. Apart from that, the variables used can be developed by adding macro variables. It is recommended that future research add more control variables to the regression equation.

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