Relationship between Intellectual Capital, Firm Performance and Leverage with Firm Values: Empirical Evident from Indonesia

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ABSTRACT: The aim of this study is to investigate the relationship between the Value Added Intellectual Capital (VAIC) components, Firm Performance and leverage on Firm Value. The validity of Firm Value measurements will be tested using Tobin's Q, Price Earnings per Share (PER), and Price to Book Value (PBV) with Assets as a control variable. The research design is explanatory research through hypothesis formulation, using panel regression. The research population is 122 manufacturing industries are listed on the Indonesian capital market, with a sample N valid of 277, observation period 2018-2020. Based on the robustness test, the model fits when the firm value uses Tobins'Q and PBV. Research findings show that Capital Employee Efficiency (CEE) and Return on Equity (ROE) positively influence Tobin'sQ. On the other hand, Firm Performance (ROA) positively influences firm value (PBV), Net Profit Margin (NPM) and leverage (DAR) negatively influence PBV. The inconsistency in research results on the influence of IC, Firm Performance, and Leverage on firm value is more caused by different measurement models. Therefore, in interpreting the relationship patterns of IC, Firm Performance and Leverage on Firm Value, must carefully based on the measurement characteristics and underlying concepts. IC, Firm Performance and Leverage substantially influence firm value, supporting previous research.

KEYWORD: Intellectual Capital, Firm Performance, Leverage, and Firm Value
Gel Clasification: M21, M5.

INTRODUCTION

The aim of this research is to investigate the relationship between the VAIC Pulic 2000 component variables including Capital Employee Efficiency (CEE), Human Capital Efficiency (HCE), Structural Capital Efficiency, which will be combined with company performance including Return on Assets (ROA), Return on Equity (ROE) , Net Profit Margin (NPM), and Leverage use Debt to Assets (DAR) as indicators of debt funding decisions influence firm value which has so far shown inconsistent results (Vo and Ellis, 2017; Maditinos *et al.*, 2011; Kim, Kim and Lee, 2011; Blaylock, Lawson and Mayberry, 2020); Chen, Cheng and Hwang, 2005). The novelty of the research, methodologically, will reveal the inconsistent results of previous research, by testing panel regression by determining the measurement of company value which is a reflection of the company's performance in the capital market by measuring Tobin'sQ $= \frac{Market\ Capitalization + Book\ Value\ of\ Debt}{Book\ Value\ of\ Asset}$, then it will be compared with $PER = \frac{Price\ of\ Stock}{\text{Earnongs per Share}}$, and $PBV = \frac{Price\ of\ Stock}{\text{Book Value}}$. Based on the comparison of the three models with the Total Assets variable as a control variable, it is hoped that it can clarify the differences between the results of previous research. And it can strengthen the concept of intellectual capital VAIC in influencing firm performance and firm value, even though many studies recommend that Intellectual Capital (IC) tends to lead to multi-criteria IC. This research collaborates IC with firm fundamental performance and leverage on firm value (Aggarwal and Padhan, 2017; Bakhsha, Afrazeh and Esfahanipour, 2017; Vo and Ellis, 2017; Iazzolino and Laise, 2013; Edvinsson, 1997).

The relationship between, intellectual capital variables, firm performance and leverage with company value is conceptually based on agency theory, which explains that management's actions in carrying out company operations are agents for investors who place their capital in the company as principal or capital owners who entrust their capital to the company. In this way, the company's performance, which is observed from the performance of intellectual capital, the company's financial performance, and funding policy strategies, will be responded by investors in the decision to invest in the capital market, which will shape the strength of share prices in the market and which will be developed by subsequent researchers, the relationship between agent parties in terms of management with the creditor and investors as principal (Michael and MECKLING*, 1976; Chen and Chou, 2015;

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Kim, Kim and Lee, 2011). Based on a series of previous research, to reveal the relationship between the IC variables, Firm Performance, Leverage and firm value, chronologically the stages of discussion in this article are (1) Introduction; (2) Literature Review and Hypothesis; (3) Methodology; (4) Results and Discussions; and (5) Conclusion and Implications.

2. LITERATUR REVIEW AND HYPOTHESIS

2.1. Relationship between IC and Firm Value

The concept of the relationship between IC and firm value was originally initiated by Pulic 2000. In this case, Pulic divided the VAIC components into Capital Employee Efficiency (CEE); Human Capital Efficiency (HCE); and Structural Capital Efficiency (SCE). as an indicator of company performance which looks at the level of operational efficiency of the company management, are measured using the performance of human resource capital, supported by the performance of physical capital including fixed assets, machines, buildings, land, as well as cash, receivables and inventory working capital in an effort to achieve profitability levels (Pulic, 2000; Pulic, 2004; Pulić, 2008). This public idea was widely responded to by subsequent research which examined the influence of Intellectual Capital on firm performance and firm value (Weqar and Haque, 2020; Weqar, Sofi and Haque, 2020; Piri *et al.*, 2014; Chen, Cheng and Hwang, 2005). On the other hand, there are several studies that criticize the Pulic 2000 model for using multi-criteria measurements (Iazzolino and Laise, 2013; Bakhsha, Afrazeh and Esfahanipour, 2017). Responding to criticism from previous researchers, this research will develop and investigate the relationship between Intellectual Capital Pulic 2000 by combining it with firm performance; return on assets (ROA), return on equity (ROE), and Leverage (DAR), its influence on firm value as measured using Tobin' sQ, Price Earnings Ratio (PER), and Price to Book Value (PBV). Referring to the arguments between the research results above, the research hypothesis can be formulated as follows:

H_a1. Capital Employee Efficiency positively influences a firm value .

H_a1. Human Capital Efficiency positively influences a firm value.

H_a3. Structural Capital Efficiency positively influences a firm value.

2.2. Firm Performance and Firm Value

The relationship between firm performance and firm value empirically shows the relationship between the company's operational performance which has been pursued by management. In this study, the Return on Assets measurement is used, which is the result of dividing the company's average operating profit before deducting interest and tax costs compared to the total assets. This means the extent to which the company's physical capital, both working capital and fixed assets is able to generate operational profits. Then Return on Equity can describe the ability of own capital to generate net profit after tax. Next, the company's performance will be seen from the level of efficiency activities using traditional accounting, namely Net Profit Margin, profit after tax compared to company sales. In the end, the company's performance as measured using intellectual capital performance and company performance will be responded by investors in the capital market and will be taken into consideration in investment decisions and a market equilibrium price will be formed that reflects the company's value. Thus, many studies have examined the relationship between intellectual capital performance and company performance in relation to firm value (Chen, Cheng and Hwang, 2005; Smriti and Das, 2018; Soewarno and Tjahjadi, 2020).

This research develops the independent variables CEE, HCE, SCE, by adding variables in terms of measuring company performance using traditional accounting measurements, namely ROA, ROE, and Net Profit Margin, their influence on company value, which has so far shown inconsistent results which are thought to be caused by differences in company value measurements. This research methodologically will test the validity of the company value measurement model by comparing Tobin's Q, PER, and PBV with Total Assets as a control variable for model validation, which is expected to be able to clarify differences in previous research results. (Soewarno and Tjahjadi, 2020; Liow, 2010); Blaylock, Lawson and Mayberry, 2020; Maditinos *et al.*, 2011; Kurniati, 2019). Based on the review of previous research, the following research hypothesis can be formulated below:

H_a4. Return on Assets positively influences a firm value.

H_a5. Return on Equity positively influences a firm value.

H_a6. Net Profit Margin positively influences a firm value.

4.3. Leverage and Firm Value

Management's accuracy in determining the optimal capital structure, in principle, can be said to be the performance of intellectual capital which is not revealed in many previous studies. Therefore, this research looks at the efficiency and effectiveness of company operations, also looks at the composition of the capital structure between debt capital and own capital as the performance of intellectual capital which is known as the optimal capital structure theory. (Modigliani F. and Miller M., 1963);

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(MYERS, 1984). Therefore, this research assumes that the condition that management can determine the funding structure policy is the performance of intellectual capital in the form of leverage which is able to leverage operational activities, in conditions where sales demand tends to increase, and the company's operational efficiency activities can be managed well, then the existence of an optimal capital structure becomes important as the performance of management's intellectual capital, which can be measured using Debt to Assets (DAR) or Debt to Equity (DER). Thus, this research will investigate the effect of leverage (DAR) on company value (MYERS, 1984; Awais *et al.*, 2016; Aggarwal and Padhan, 2017; Cheng, Liu and Chien, 2010; Kim, Kim and Lee, 2011). Based on the literature review and development of research hypotheses, the research model framework developed and the following hypothesis formulation can be outlined below:
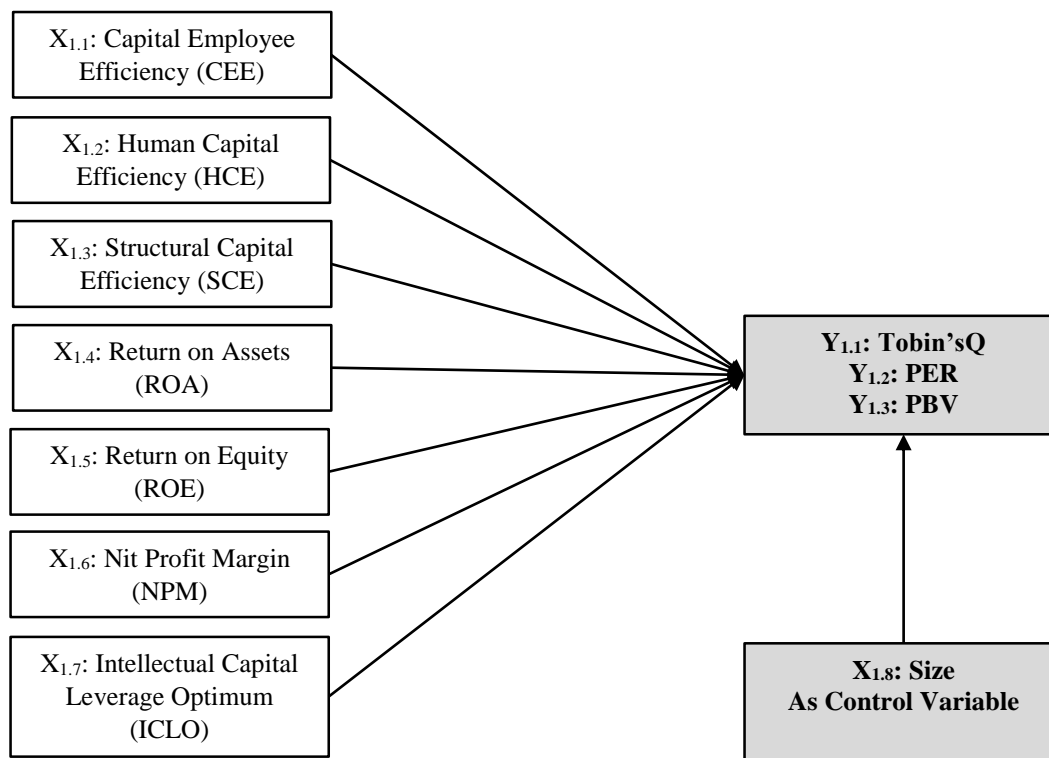

Figure 1: Relationship between IC nad Firm Value

Hypothesis Penelitian:

H_a7. Leverage (DAR) influences a firm value.

3. METODOLOGY

The research design is an explanatory research that investigates causality relationships using the formulation of hypotheses to see the relationship between the Intellectual Capital, Firm Performance, and Leverage on Firm Value, with Assets as a control variable. The analysis technique that tests the relationship between these variables uses panel regression, which is supported by descriptive analysis. The sample framework is a Manufacturing Industry that went public in Indonesia. 122 companies were observed for four years, with N sample 366 in the period 2018 to 2020 sample observations, by using pooling data. The data analysis technique uses multiple regression as follows:

$Y_{1.1i,t}$ Tobin'sQ = α + β_1CEE$_{i,t}$ + β_2HCE$_{i,t}$ + β_3SCE$_{i,t}$ + β_4ROA$_{i,t}$ + β_5ROE$_{i,t}$ + β_6NPM$_{i,t}$ + β_7ICLO$_{i,t}$ β_8Assets$_{i,t}$ as a control variables + $\sum i$
$$\text{(equation 1)}$$

$Y_{1.2i,t}$ PER = α + β_1CEE$_{i,t}$ + β_2HCE$_{i,t}$ + β_3SCE$_{i,t}$ + β_4ROA$_{i,t}$ + β_5ROE$_{i,t}$ + β_6NPM$_{i,t}$ + β_7ICLO$_{i,t}$ β_8Assets$_{i,t}$ as a control variables + $\sum i$
$$\text{(equation 2)}$$

$Y_{1.3i,t}$ PBV = α + β_1CEE$_{i,t}$ + β_2HCE$_{i,t}$ + β_3SCE$_{i,t}$ + β_4ROA$_{i,t}$ + β_5ROE$_{i,t}$ + β_6NPM$_{i,t}$ + β_7ICLO$_{i,t}$ β_8Assets$_{i,t}$ as a control variables + $\sum i$
$$\text{(equation 3)}$$

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The number of N valid samples is 278 based on 122 manufacturing industry companies listed on the Indonesian Capital Market, observation period 2018-2020. In description, variations in VAIC values were observed with a minimum value of -4,760 and a

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maximum value of 106,500 with an average and standard deviation of 1.669730 and 13.647406 respectively, indicating high variation. Next, the VAIC component, namely CEE, has a minimum value of -6,930 and a maximum value of 8,910, an average value of 0.96279 and a standard deviation of 1.567120, The CEE standard deviation value is greater than the average. This condition illustrates high variations. The next description of HCE which is measured using VA compared to the average salary and wages is 1.370870 with a minimum value reaching -5,150 and a maximum of 85,810 and a standard deviation of 12.362788, illustrating the high variation between manufacturing companies in Indonesia. The next description is related to SCE in the VAIC Pulic model concept using mono result criteria (VA-HC) / VA with an average value of 0.86508 with a minimum value of -1.740 and a maximum of 2.640 and a standard deviation of 0.318421 indicating relatively low variation. Overall, the relatively dynamic variations in IC values are predicted to influence company value.

The next explanation relates to the company's performance value. ROA has a minimum value of -0.380 and a maximum value of 0.430 with an average value of 0.03168 and a standard deviation of 0.091627, illustrating the low value variation. Furthermore, it is still related to company performance which is measured using ROE, which has a minimum value of -1,240 and a maximum of 1,550 with an average of 0.06819 and a standard deviation of 0.259002, indicating that the difference in Return on Equity between manufacturing companies is relatively low variation. Furthermore, the company's performance through Net Profit Margin with an average value of 0.01706, with a standard deviation of 0.124250 has a low variation with a minimum value of -0.650 and a maximum value of 0.390. Next, there are variations in the DAR leverage value with a minimum value of 0.000 and a maximum value of 2.060 and an average value of .48376 with a standard deviation below the average value of 0.293122, thus the variation in DAR values between companies is low.

The next description is related to firm value, in this case Tobin'sQ has a minimum value of -17,670 and a maximum value of 44,860 with an average and standard deviation of 3.97571 and a standard deviation above the average, 7.733053, this condition illustrates that the variation in value between companies is quite high. And the condition of firm value that has very high variation is PER with an average value of 1.631150, with a very high standard deviation of 38.171111, while the relatively similar variation is PBV with an average of 1.43780, with a standard deviation that is almost the same as the average is 1.789148. Variations of this firm value that have high predictive value are Tobin's Q and PBV. In detailed descriptive statistical results can be shown in Table 1.

Table 1: Descriptive Statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation
VAIC	351	-4.760	106.500	1.66973E1	13.647406
CEE	346	-5.040	8.900	1.53737	1.583250
HCE	356	-5.150	85.810	1.37087E1	12.362788
SCE	366	-1.740	2.640	.86508	.318421
ROA	358	-.380	.430	.03168	.091627
ROE	365	-1.240	1.550	.06819	.259002
NPM	360	-.650	.390	.01706	.124250
DAR	354	.000	2.060	.48376	.293122
TobinsQ	340	-17.670	44.860	3.97571	7.733053
PER	342	-142.990	253.330	1.63115E1	38.171111
PBV	346	-2.770	11.190	1.43780	1.789148
ASSET_Conctol_Var	366	3.390	8.470	6.34948	.724162
Valid N (listwise)	277				

4.2. Description of relationship patterns between variables

The pattern of relationships between VAIC variables and VAIC components empirically supports the Pulic model. In this case, the relationship between VAIC and CEE has a correlation coefficient of 0.365 (p=0.000), then the relationship with HCE is 0.972 (p=0.000), and the relationship with SCE has a correlation coefficient of 0.304 (p=0.000). all VAIC components have a significant positive relationship with VAIC. Including the variables Size and Sales have a significant relationship with VAIC of 0.145 (p=0.007) and 0.256 (p=0.000), respectively. then, CEE, HCE, and SCE have a significant interconnected pattern, which means that physical capital and human capital support each other in creating Value Added (VA), and are supported by SCE which represents structural capital outside HC including organizational development costs, Relational Capital (RCE) reflects the extent to which marketing

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programs are effective in generating sales, and Innovation Capital, reflects research and development costs in contributing to VA, and other components of intellectual capital that can be developed in subsequent research (Edvinsson, 1997; Iazzolino and Laise, 2013) The only component of intellectual capital that has a relationship with the dependent variable of firm value is the CEE variable, in this case the company value is represented by the PBV variable resulting from the divide of price by the book value of shares.

The unique relationship pattern, the independent variables ROA, ROE, and NPM have a significant positive relationship with firm value as represented by Tobin'sQ, PER, and PBV. Meanwhile, leverage (DAR) is significantly negatively related to firm value. Thus, descriptively supporting the formulation of the hypothesis, and interesting for further analysis, testing the model with Size and Sales variables as control variables, is expected to obtain a robust model of the relationship between IC variables and company performance with company value. A more detailed description of the pattern of relationships between variables can be shown in Table 2

Table 2: Relationship between Research Variables

	VAIC	CEE	HCE	SCE	ROA	ROE	NPM	DAR	TobinsQ	PER	PBV	ASSET	SALES
VAIC	**1(0.000)*****												
CEE	**0.365(0.000)*****	**1(0.000)*****											
HCE	**0.972(0.000)*****	**0.236(0.000)*****	**1(0.000)*****										
SCE	**0.304(0.000)*****	**0.135(0.012)****	**0.227(0.000)*****	**1(0.000)*****									
ROA	0.009(0.875)	**0.191(0.000)*****	0.027(0.617)	0.064(0.229)	**1(0.000)*****								
ROE	0.069(0.195)	-0.008(0.877)	0.052(0.325)	0.042(0.426)	**0.537(0.000)*****	**1(0.000)*****							
NPM	0.025(0.646)	**0.144(0.008)*****	0.032(0.551)	0.021(0.697)	**0.804(0.000)*****	**0.425(0.000)*****	**1(0.000)*****						
DAR	0.043(0.434)	0.050(0.361)	0.012(0.818)	-0.072(0.175)	**0.375(0.000)*****	0.018(0.739)	**0.420(0.000)*****	**1(0.000)*****					
TobinsQ	0.039(0.482)	0.099(0.078)	0.049(0.371)	0.041(0.455)	**0.145(0.008)*****	**0.113(0.038)****	**0.127(0.020)****	**-0.120(0.029)****	**1(0.000)*****				
PER	-0.007(0.903)	-0.058(0.298)	-0.012(0.831)	0.027(0.625)	**0.181(0.001)*****	**0.158(0.003)*****	**0.201(0.000)*****	**-0.102(0.064)***	**0.180(0.001)*****	**1(0.000)*****			
PBV	0.048(0.380)	**0.097(0.081)***	0.006(0.913)	-0.035(0.513)	**0.301(0.000)*****	**0.117(0.030)****	**0.243(0.000)*****	**-0.219(0.000)*****	0.033(0.556)	**0.255(0.000)*****	**1((0.000)*****		
ASSET	**0.145(0.007)*****	0.051(0.343)	**0.181(0.001)*****	0.026(0.616)	**0.136(0.010)****	**0.181(0.001)*****	**0.148(0.005)*****	-0.030(0.575)	0.039(0.478)	0.033(0.540)	**0.208(0.000)*****	**1(0.000)*****	
SALES	**0.256(0.000)*****	**0.200(0.000)*****	**0.266(0.000)*****	**0.101(0.054)***	**0.235(0.000)*****	**0.253(0.000)*****	**0.274(0.000)*****	0.025(0.642)	**0.094(0.082)***	**0.157(0.004)*****	**0.256(0.000)*****	**0.821(0.000)*****	**1(0.000)*****

*, **, and *** Indicate the level of significance of bold values at 0.10, 0.05, and 0.01, respectively

4.3. Robustness Test

Robustness test of the model, first carrying out a classical assumption test regarding data normality, autocorrelation, hetroscedasticity and multicollinearity, with the Size as a control variable. Because the Sales variable has multicollinearity, Sales is removed from the model. Furthermore, it can be used to test the influence of IC, company performance and leverage on firm value through a model rubustness test that compares the dependent variables Tobin'sQ, Price Earnings Ratio (PER), and Price to

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Book Value (PBV). Based on the results of the robustness test, the influence of IC includes: $X_{1.1}(CEE) = \frac{VA}{Assets}$, $X_{1.2}(HCE) = \frac{VA}{Wage \& Salary}$, and structural capital efficiency $X_{1.3}(SCE) = \frac{VA-HC}{VA}$, financial performance includes; Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM), and Leverage (DAR) with Size as control variable which is able to provide a robust model and is able to explore the influence of intellectual capital, firm performance and leverage on the firm value when the firm value uses Tobin'sQ and Price to Book Value. A robust equation model for the firm value model using Tobin'sQ can be shown as follows: $Y_{1.1i,t}$ Tobin's Q = 2.552 + **0.156**CEE**$_{i,t}$ + -0.047HCE$_{i,t}$ + 0.068SCE$_{i,t}$ + (-0.029)ROA$_{i,t}$ + 0.031**ROE**$_{i,t}$ +0.056NPM$_{i,t}$ + (-0.090)DAR$_{i,t}$ + $\sum i$. The results of Tobin'sQ model show that with Size as control variable, can consistently influence firm value (Tobin'sQ), only the CEE and ROE variables. In this case, CEE reflects the company's physical capital, including fixed assets and working capital, which contribute to generating VA. Meanwhile, Return on Equity reflects the ability of own capital to generate net profit after tax.

The next analysis using PBV Model, can produce a regression equation model as follows: $Y_{1.3i,t}$ PBV= **1.360***** + 0.065CEE$_{i,t}$ + (-0.038)HCE$_{i,t}$ + 0.046SCE$_{i,t}$ + **0.505***ROA**$_{i,t}$ + 0.031 ROE$_{i,t}$ + **(-0.219) **NPM**$_{i,t}$ + **(-0.173)***DAR**$_{i,t}$ + $\sum i$. The results of PBV model were able to reveal three variables that consistently significantly influence PBV, namely ROA with a coefficient of 0.505 (*p*=0.000), then the NPM variable negatively influences PBV with a coefficient of -0.219 (*p*=0.028), and the leverage variable (DAR) was -0.173 (*p*=0.004). This means that when the firm performance (ROA) value increases, which reflects the company's ability to manage all assets to generate profits after tax, investors respond to this, which has an impact on investment decisions which can increase share prices. Meanwhile, the PER model is a measure of firm value, only one variable can influence PER, in this case the ability of the value of earnings per share negatively decrease PER. Based on considerations of suitability and consistency of the model, and reveals a lot of independent variables that contribute to influencing firm value, by using the Size as a control variable, the appropriate model should use Tobin'sQ and Parice to Book Value (PBV), Both have robust models, only producing different investor and creditor behavior in responding to information on intellectual capital, firm performance and leverage. Detailed results of model testing can be seen in Table 3.

Table 3: Results of Research Analysis

Variables	Description	Panel (Model) 1 Dependent Variable (Y$_{1.1}$: TOBIN'SQ)	Panel (Model) 2 Dependent Variable (Y$_{1.2}$: PER)	Panel (Model) 3 Dependent Variable (Y$_{1.3}$: PBV)
First Stage				
X$_{1.1}$:CEE	$Capital\ Employee\ Efficiency = \frac{VA}{Equity}$	**0.156 (0.012)****	**-0.103 (0.091)***	0.065 (0.260)
X$_{1.2}$:HCE	$Human\ Capital\ Efficiency = \frac{VA}{Wage\ and\ Salary}$	-0.047 (0.463)	0.060 (0.344)	-0.038 (0.510)
X$_{1.3}$:SCE	$Structural\ Capital\ Efficiency = \frac{(VA-HC)}{VA}$	0.068 (0.267)	-0.069 (0.258)	0.046 (0.421)
X$_{1.4}$:ROA	$Return\ on\ Assets = \frac{Earnings\ Before\ Interest\ and\ Taxes}{Assets}$	-0.029 (0.782)	0.025 (0.807)	**0.505 (0.000)*****
X$_{1.5}$:ROE	$Return\ on\ Equity = \frac{Earnings\ afeter\ Taxes}{Equity}$	**0.149 (0.035)****	0.054 (0.451)	0.031 (0.610)
X$_{1.6}$:MPM	$Net\ Profit\ Margin = \frac{Earnings\ after\ Taxes}{Sales}$	0.056 (0.548)	0.161 (0.106)	**-0.219 (0.028)****
X$_{1.7}$: DAR	$Debts\ to\ Assets = \frac{Debts}{Assets}$	-0.090 (0.168)	-0.059 (0.351)	**-0.173 (0.004)*****
Constant		2.552 (0.114)	**24.225 (0.001)*****	**1.360 (0.000)*****
Adj. R^2 (*F*-test)		**0.037 (0.011)****	**0.048(0.003)*****	**0.186 (0.000)*****
Second Stage After entering Interest as a control variabel				
X$_{1.1}$:CEE	$Capital\ Employee\ Efficiency = \frac{VA}{Equity}$	**0.156 (0.012)****	**-0.101 (0.098)***	0.077 (0.172)
X$_{1.2}$:HCE	$Human\ Capital\ Efficiency = \frac{VA}{Wage\ and\ Salary}$	-0.047 (0.472)	0.047 (0.466)	-0.091 (0.115)

X$_{1.3}$:SCE	$Structural\ Capital\ Efficiency = \dfrac{(VA - HC)}{VA}$	0.068(0.267)	-0.067 (0.268)	0.049 (0.377)
X$_{1.4}$:ROA	$Return\ on\ Assets = \dfrac{Earnings\ Before\ Interest\ and\ Taxes}{Assets}$	-0.029 (0.783)	0.028 (0.791)	**0.528 (0.000)***
X$_{1.5}$:ROE	$Return\ on\ Equity = \dfrac{Earnings\ afeter\ Taxes}{Equity}$	**0.148 (0.036)**	0.048 (0.504)	0.015 (0.805)
X$_{1.6}$:MPM	$Net\ Profit\ Margin = \dfrac{Earnings\ after\ Taxes}{Sales}$	0.056 (0.587)	0.156 (0.119)	**-0.257 (0.009)***
X$_{1.7}$:DAR	$Debt\ to\ Assets = \dfrac{Total\ Debts}{Assets}$	-0.090 (0.169)	-0.059 (0.350)	**-0.177 (0.002)***
X$_{1.8}$: Assets	Assets = Log Assets as control variable	0.001 (0.981)	0.049 (0.406)	**-0.215 (0.000)***
Constant		2.453(0.575)	9.231 (0.634)	**-1.991 (0.024)**
Adj. R^2 (F-test)		**0.034 (0.020)***	**0.047 (0.004)***	**0.227 (0.000)***

4.4. Discussion

4.4.1. Intellectual Capital terhadap Firm Value (Tobin'sQ)

The nexus of Intellectual Capital (IC) with firm value shows that CEE directly influences firm value (Tobin'sQ). CEE represents the company's physical capital, including land, buildings, machinery and the company's working capital. This physical capital information will be responded by investors and influence investors' investment decisions, which in the end can influence the formation of share prices in the capital market, or can increase company value. This supports the results of previous research (Maditinos *et al.*, 2011; Smriti and Das, 2018).

4.4.2. Firm Performance terhadap Firm Value (Tobin'sQ)

The influence of firm performance on firm value using the Tobin'sQ measurement is represented by the return on equity (ROE) variable, meaning that ROE information is the result of dividing profit after tax compared to equity, emphasizing own capital in contributing to generating net profit after tax. On the other hand, Tobin'sQ is market capitalization plus the book value of debt divide by assets, reflecting the ability of all assets to produce stock market value and book value of debt. Thus, empirically, it is logical that ROE affects Tobins'Q. This result is consistent with research (Kim, Kim and Lee, 2011; Smriti and Das, 2018). When the research model uses the Tobin'sQ indicator, the findings of the variables that influence company value are CEE which represents intellectual capital and ROE as an indicator of firm performance, which is robust through testing the model with the Size as control variable.

4.4.3. Relationship between IC, Firm Performance, Leverage on Firm Value (PBV)

When the model developed using the dependent variable Price to Book Value (PBV) shows an exploration of the results of the most variables that contribute to influencing PBV include Return on Assets (ROA), Net Profit Margin (NPM) and Debt to Asset Ratio (DAR). Conceptually, ROA and NPM are indicators of company performance in generating profits compared to total assets and NPM net profit after tax compared to sales positively influences PBV. This is in line with previous research (Chen, Cheng and Hwang, 2005; Liow, 2010).

On the other hand, company performance as reflected by management's ability to determine the optimal funding structure by measuring the Debt to Assets Ratio (DAR) negatively affects PBV. This means that investors respond to funding performance when debt funding is low, attracting investors to invest which can increase the value of the PBV company, see the optimal capital structure theory. At a certain optimum point, perhaps an increase in DAR can positively influence firm value depending on the condition of the optimal capital structure (Liow, 2010; Vo and Ellis, 2017; Cheng, Liu and Chien, 2010).

When the model uses the dependent variable PER (Price / EPS) it is only able to reveal 1 (one) independent variable that contributes to influencing the firm value of the PER, namely CEE which represents the physical capital of the company's fixed assets and working capital. Thus, a model that can represent firm value indicators should use Tobin'sQ which can reflect the interaction between management, investors and creditors. Then, Price to Book Value which describes the share price itself divided by book value, reflects investor response only.

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5. CONCLUSION

5.1. Intellectual Capital and Firm Value

Based on the discussion of the research results, it can be concluded that: the Pulic 2000 VAIC components consist of CEE, HCE, and SCE, their relationship with firm value, can only be revealed when measuring firm value using Tobin'sQ. in this case CEE affects Tobin'sQ positively. And CEE affects PER negatively. Because PER is obtained from Price devide by EPS. This means that when the EPS value increases, PER decreases, while CEE positively affects EPS and negatively affects PER. In this case, investors are still oriented towards the company's physical capital when considering investment decisions.

5.2. Firm Performance and Firm Value

Investors will respond to firm performance in their decision to invest in the capital market. The results of this research show that firm performance ROE influences company value as measured using Tobin'sQ. Then ROA affects firm Value by measuring PBV, and NPM negatively affects PBV. Thus, it can be concluded that firm performance can influence firm value. And no firm performance variables influence PER. The inconsistency in the results of the relationship between firm performance and firm value is more due to measurement models looking at it from different angles. In principle, firm performance can influence firm value.

5.3. Firm Performance Leverage and Firm Value

Leverage measured by the debt to assets ratio (DAR) illustrates contribute of management intellectual capital in determining optimal funding policies. In this case, DAR negatively affects Firm Value (PBV). In this case, what is able to reveal the relationship between the funding structure and firm value is using the PBV measurement. Based on the results of this research, it can be concluded that the variables intellectual capital, firm performance and leverage can be revealed to be related to firm value when using Tobin'sQ and Price to Book Value. In principle, leverage affects firm value (PBV) negatively.

The novelty of the research findings, is able to robustly show that the conditions of manufacturing companies in Indonesia, CEE positively influence firm value when using the Tobin'sQ measurement. On the other hand, the company's ROA and leverage (DAR) performance can be revealed in its contribution to influencing firm value (Tobin'sQ and PBV).

The implications of the research, for academics, are that the results of this research measuring Intellectual Capital are still limited to the Pulic model, therefore, it needs to be developed using multidimensional IC including Relational Capital, Innovation Capital, and Intangible Asset Capital in relation to company value.

Research limitations, and for future research, the sample is still limited to the manufacturing industry, it is recommended for further researchers to add multi-dimensional dimensions of SCE and develop it by comparing the conditions of the manufacturing industry with the conditions of Banking Industry, or Others Industries.

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APPENDIX:

DAR	Debt to Assets Ratio describes the composition of the capital structure as a measurement variable to detect optimal capital structure signals (financial leverage)
PBV	Price to Book Value describes the firm value based on share price compared to book value of shares
PER	Price Earnings Ratio explains the market value based on price of share divide by Earnings per share
ROA	Return on Assets is the company's ability to get a net profit after tax compared to investment (Debt + Capital), as a measure of profitability that is likely to be responded to by creditors and investors
ROE	Return on Equity is the ability of a company to make a profit after taxes compared to equity, thus focusing its attention on the owners of capital
VAIC	Value Added Intellectual Capital is obtained from Earnings Before Interest and Taxes + Depreciation + Amortization
CEE	Capital Employed Efficiency reflects physical capital including capital for land, buildings, machinery and working capital to support company operations
HCE	Institutional Ownership representing many investors to invest in shares, including non-bank financial institutions, pension fund insurance, foundations, WAQF bodies, and other non-financial institutions
SCE	Structural Capital Efficiency is obtained from (VA-HC) divided by VA) in this case SCE is the contribution of intellectual capital to the company's added value other than HC. Therefore, SCE can be developed in relational capital efficiency related to marketing costs, innovation capital related to research and development costs, and intangible assets capital related to patents, goodwill, franchise and others.
Firm Value	Firm Value is a concept of firm value that is reflected by stock prices as a result of the demand and supply in stock trading transactions in the capital market
Tobin's Q	Tobin's Q is one indicator of firm value that can reflect and represent the firm in one year or a specified period. Tobin's Q is calculated based on Market capitalization plus book value of debt divided by Market net book Assets in Period t. it can describe the firm value that is reflected by the market in period t
Leverage	Leverage is often measured through debt to equity ratio or debt to assets to illustrate the leverage of achieving profits based on debt capital invested. In this case, there is operational leverage and financial leverage
Size	Firm size as a control variable is measured using total assets (natural logarithm)