

INTELLECTUAL CAPITAL AND RETURN ON INVESTMENT: IN MINING COMPANIES

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Abstract. This study investigated the relationship between intellectual capital and its effect on financial performance as measured by return on investment (ROI) using data from mining companies listed in the Indonesia Stock Exchange (IDX), researchers using financial statement data for the period 2011-2015. In this research, the measurement model Intellectual Capital use Pulic's model, with the method of measurement is Value Added Intellectual Coefficient (VAIC), which are a component of Value Added Capital Employed (VACA), Value Added Human Capital (VAHU) and Structural Capital Value Added (STVA). The analysis used was multiple linear regression. The results of the hypothesis test showed that VACA, VAHU and STVA together significantly effect to ROI. The results of t test showed, STVA and VACA significant effect to ROI, while variable VAHU no significant impact to ROI because it being economic downturn that led to the mining business become lethargic. Further research can add a number of samples or a longer period because the result of this research is limited only 6 mining companies into the samples, so that future studies can provide a more perfect. Suggested to reexamine variables during stable economic condition to prove the possibility result which different with this research.

Key words: intellectual capital, return on investment

I. INTRODUCTION

The mining sector is one of the main sector move the wheel of the Indonesian economy. The problems faced by mining company is must be really careful in take into account the cost of energy as the costs energy is part of expenditure of the operational is increasing, of the total needs of company, the cost of energy at 40%. Added on the cost of diesel fuel to the location mining, and problems the availability of and reliability of electricity, provision of electric power and the utilization of renewable energy can be solution chosen by mining company. Renewable energy source that can be used among others hydroelectric power station, the wind, and solar. According to Jim Schnieders "renewable energy able to equip power plants powerful with diesel for mining in Indonesia, that uses a non-subsidi fuel and be a source of enormous. Burden the cost is very significant in remote areas that is not available electricity"^[19].

Minister energy and mineral resources suggest that mining company develop power plant earth heat or renewable energy their own, that we can be in control about the cost of when the market are many changes the demands^[19]. The utilization of renewable energy in industry mine will be developed and optimized, but needed capital cost a great to build its instalation, hence needed investors. Investment this can create the cost savings on the overall in the long term.

In focus group discussion in data center and information the Department of Energy and Mineral Resources, Minister Energy and Mineral Resources Sudirman Said said: "many investors who had been interested in invest in the field of renewable energy and energy conservation. Now how speed up technology transfer to renewable energy included working with some countries such as Denmark, Norway, Austria and America. Forward Indonesia can be moved to partners not consumers technology by buying technology and build its industry here"^[20].

One way to achieve superiority in competition was to exercise a knowledge based business company to continue to hold. The approach that was used in judgment and measurement of intangible assets is intellectual capital that has become attention focus in various fields good technology information, management, and accounting. This creates a challenge for the accountant to identify, measuring and expressing it in a financial filing. A measure to assess the efficiency of added value as a result of intellectual ability of a firm (Value Added Intellectual Coefficient-VAIC)^[14]. A major component VAIC can be seen from resources company, namely Capital Employed Efficiency (CEE) measured by value Added Capital Employed (VACA), Human Capital Efficiency (HCE) measured by Value Added Human Capital (VAHU), and Structural Capital Efficiency (SCE) measured by Structural Capital Value Added (STVA).

In Indonesia, phenomena Intellectual Capital (IC) growing after the statement of the accounting standard (No. 19, revision 2009) about the assets intangible. An intangible asset is assets non monetary cannot be identified without a physical and held for used in yield or surrender goods or services, leased to other parties, or the purpose of administration^[8].

This study investigated the relationship between intellectual capital and its effect on financial performance as measured by Return On Investment (ROI) using data from mining companies listed in the Indonesian Stock Exchange (IDX), researchers using financial statement data (2011-2015). The purpose of this study was to test empirically the effect of intellectual capital developed by Pulic on firm performance measured by ROI on mining companies.

II. LITERATURE REVIEW

A. *The Concept of Intellectual Capital*

Intellectual capital may be interpreted as the intangible assets which are not listed explicitly on a firm's balance sheets but positively impact the performance and success of it [4]. Stewart in^[17] defines intellectual capital as follows: "the sum of everything in your every company knows that gives you a competitive advantage in the market place." It is intellectual material-knowledge, information, intellectual property, experience-that can be put to use to create wealth. Klein and Prusak in^[17] provide a preliminary definition of intellectual capital. According to their intellectual capital is "a material composed, captured and used to generate a higher asset value". From the definition of intellectual capital that has been raised, in general they agree and conclude that the intellectual capital is material composed, captured and used to develop the company and has a value compared to other companies.

Intellectual capital classifies into three categories^[7], namely Structural Capital (SC), Customer Capital (CC), and Human Capital (HC).

B. *Value Added Intellectual Coefficient (VAIC)*

Pulic tried to develop a model of intellectual capital measurement with a coefficient intellectual ability that reflects the firm's ability to use physical capital efficiently (value added capital employed), intellectual skills of human resources (human capital), and structural capital (STVA) that describe the infrastructure capabilities and relationship of firm^[14]. This coefficient as intellectual value added coefficient (VAIC) that describe the firm's intellectual capability as a whole. Earlier researchers^{[11][5]} assumed VAIC is summation of VACA, VAHU and STVA. VACA encompasses the efficiency that Structural capital and Human Capital fail to capture. IC can not create value for the company independently, so it must be combined with other intellectual capital owned and used by the company (physical and financial) (CE).

The calculations begin with the company's ability to create value added (VA). VA is the most objective indicator to assess the success of the business and demonstrate the company's ability to create value (value creation). Value added obtained from the difference between output and input. Value of output (OUT) is revenue and includes all products and services produced by the company to be sold, while the input (IN) covering the entire burden that companies use to produce goods or services in order to generate revenue. Personnel costs are not included in IN because employees play an important role in the value creation process. The process of value creation is influenced by the efficiency of Human Capital (HC), Capital Employed (CE) and Structural Capital (SC).

C. *Value added of Capital Employed (VACA)*

VACA is an indicator for VA created by one unit of physical capital.^[14] in^[17] assumes that if one unit of CE produces a greater return than any other company, it means the company better utilize its CE. Measurement is done by comparing VACA, Value Added by CE, with the VA is obtained from the difference between total sales and other income (OUT) with load and costs. Value added is an indicator used to assess the success of the business and demonstrate the ability of the company in the creation of value^[17]. In other words, value added is the net income of a company. While CE obtained from available funds (equity add up to a net profit).

D. *Human Capital Value Added (VAHU):*

VAHU shows how much the VA can be produced with funds spent on labor. HC indicates the ability to create value in the company. The company can not create knowledge by itself without the initiative of the individuals involved in the organization process. Human capital is very important because it is a corporate asset and a source of innovation and renewal. Employees with high human capital will be more likely to provide quality service in order to retain and attract new customers. If the information about a company's quality of service provided, level of education and experience can act as an indicator of the ability and competence of the company, which is expected in the next era of human capital better care company owned.

VAHU measurements done by comparing the value added by HC, with the VA is obtained from the difference

between total sales and other opinion (OUT) with load and costs other than personnel expenses (IN). While the human capital were taken from the expenses incurred in improving the ability of the employee.

E. Structural Capital Value Added (STVA)

STVA is an organization's ability to meet the company routines and structures that support employee efforts to produce optimal intellectual performance as well as overall business performance, for example: the company's operational systems, manufacturing processes, organizational culture, management philosophy and all forms of intellectual property of the company [15]. Companies with strong structural capital will have the support of a culture that allows the company to try something, to learn and to try to return something. The concept of intellectual capital allows intellectual capital to be measured and developed in a company [17].

STVA measurement is done by comparing the structural capital (SC) against the VA, the value added is obtained from the difference between total sales and other income (OUT) with weights and costs other than personnel expenses (IN). While SC is taken from the difference between the VA with expenses incurred in improving the ability of employees (HC).

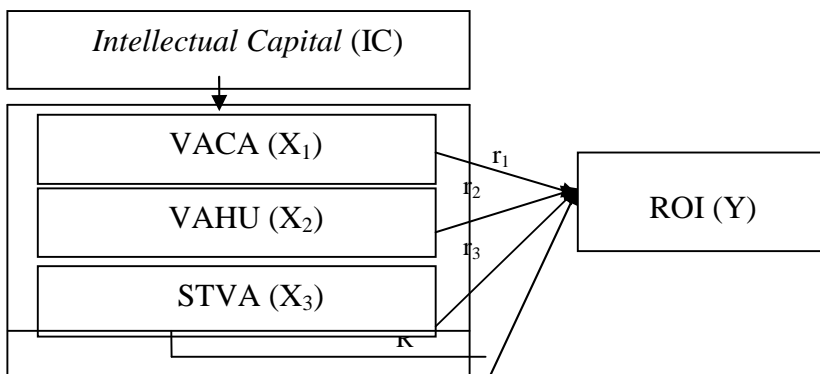


Figure 1. The Framework of the research

III. RESEARCH METHOD

A. Operationalization of the study variables

1) Intellectual Capital

Intellectual capital will be measured by using a model of Value added intellectual coefficient (VAIC) which developed by [14]. Stages of intellectual capital calculation using the model VAIC is as following:

1. Calculate the Value Added (VA). $VA = OUT - IN$. OUT = Output: total sales and other revenue; IN = Input: sales expenses and other costs (not including personnel expenses). VA also can be calculated as follows: $VA = OP + EC + D + A$. OP = Operating profit; EC = Employee costs (personnel expenses); D = Depreciation; A = amortization.
2. Calculate the Value Added Capital Employed (VACA). VACA is a measure of VA produced by a unit of physical capital. The resulting contribution ratio of each

F) Return on Investment (ROI)

Return on Investment including in the ratio profitability. The ratio profitability namely the ratio to inform of ability firm in generate profit by using a number of investments or capital implanted. ROI is the size of or index showing how big profit or the profit gained return on investment who have been planted to companies, in other words how big investment who have been planted can be repaid advantage or profit. ROI is also a measures the overall effectiveness of management in generating profit with its available assets. The higher the firm's return on total assets, the better [10]. Return on investment or net earning power ratio is "the ratio for measuring its capital invested in the overall assets to produce net income" [9]. Of several definition of above can be concluded return on investment is the ratio which the count of the level of repayment investment in assets in obtaining profit or advantage.

The independent variable in this research is value added of capital employed-VACA (X₁), value added human capital-VAHU (X₂) and structural capital value added-STVA (X₃), while independent variable is return on investment (Y). The framework thought that captures the relationship between independent variables and dependent variable can be described as follows:

unit CE for the VA. $VACA = VA / CE$. VACA = Value Added Capital Employed; VA ratio of CE; VA = Value Added; CE = Capital employed; available funds (derived from net income, and equity).

3. Calculate the Value Added Human Capital (VAHU). This ratio is an indicator of the value added generated from each dollar invested in HC. This ratio shows the contribution made by each dollar invested in HC against VA organization. $VAHU = VA / HC$. VAHU = Value Added Human Capital: The ratio of VA to HC. VA = Value Added; HU = Human Capital: personnel expenses.
4. Calculate Structural Capital Value Added (STVA). Ratio indicates the number of SC that companies use to obtain one dollar of VA. $STVA = SC / VA$. STVA = Structural Capital Value Added: The ratio of the SC to the VA; SC = Structural Capital: VA reduced HC (VA-HC); VA= Value Added.

5. Calculate Value added intellectual coefficient (VAIC). VAIC identify an organization's intellectual abilities which can be regarded as a BPI (Business Performance Indicators). VAIC is the sum of the previous three components, namely: VACA, VAHU and STVA. $VAIC = VACA + VAHU + STVA$.

2) *Return on Investment (ROI)*

The ratio which the count of the level of repayment investment in assets in obtaining profit or advantage. The formula in counting return on investment is:

$$\text{Return On Investment} = \frac{\text{Profit After Expense and Tax}}{\text{Total Assets}} \times 100\%$$

B. Population and Sample

The population and sample in this research was the company coal mining sector listed on the Indonesian Stock Exchange in the period 2011-2015. The number of coal mining company sector listed on the Indonesian Stock Exchange were 23 companies that the size of the population in this research. The determination of sample technique in this research use of purposive sampling. The criteria used to sample selection is a company coal mining sector registered at the Indonesian Stock Exchange, in audited financial report from year 2011-2015 as well as having equity value and a positive profit. Based on above criteria, there were six companies that meet the criteria.

C. Analysis Model

Once the data is collected, then analyzed the data. Data processing and data analysis in this study uses multiple regression model.

IV. RESULT AND DISCUSSION

Multiple regression analysis used to know the effect of the independent variable (intellectual capital) to dependent variable (return on investment). Based on the calculation on obtained the results of data processing showing constant value and the regression coefficient (table 1).

Table 1. The results of the T Test

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	,036	,087		,420	,678
VACA	,235	,050	,502	4,704	,000
VAHU	,022	,007	,640	3,211	,004
STVA	-,102	,154	-,128	-,666	,511

a. Dependent Variable: ROI

Source: Output of SPSS Version 20, 2016

Based on the test result that showing by the table above, so get the regression equation:

$$Y = 0,036 + 0,502 X_1 + 0,640 X_2 - 0,128 X_3 + e$$

The result of the determinant coefficient test that showing by the table 2.

Table 2. The Result of The Determinant Coefficient Test

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	,867 ^a	,751	,722	,05389

a. Predictors: (Constant), STVA, VACA, VAHU

b. Dependent Variable: ROI

Based on the results in the table it is known that the coefficient of determination (Adjusted R²) is 0.722 or 72.20%. It means the combination of independent variables (Value Added Capital Employed/VACA, Value Added Human Capital/VAHU, and Structural Capital Value Added/STVA) can explain the dependent variable (ROI)

was 72.20%, while the remaining 27.80% explained by other variables outside of this research.

B. The Effect of Value Added Capital Employed (VACA) to Return on Investment

VACA having sig-t of 0,000 and = 0,05 so, sig-t < and having t_{count} of 4,704 with t_{table} 1,705. So, t_{count} > t_{table},

then H_a accepted. It means there are a significant positive impact between Value Added Capital Employed (VACA) against Return on Investment (ROI). The result of study is consistent with [18] of those who deduce variabel Value Added Capital Employed it has some positive effects and significantly to profitability. VACA against profitability measured using ROI denoting a company samples for this is building on research funding available as equity and on its net income in improving the added value which eventually improve the company profitability.

B. The Effect of Value Added Human Capital (VAHU) to Return on Investment

Variabel VAHU having sig-t of 0,002 dan $\alpha = 0,05$ so, sig-t < α and having t_{count} of 3,211 with t_{table} 1,705. So, $t_{count} > t_{table}$, so H_a accepted. Means Value Added Human Capital have had a positive and significant impact on Return on Investment. The result of this research consistent with research stated variable value added human capital have had a positive impact and significant to profitability [16]. The influence of VAHU to ROI show knowledge and skills owned employees have to exert an influence upon profitability, as the motivation to innovate them and processes improve business to be more efficient that eventually can be increase profitability company.

C. The effect of Structural Capital Value Added (STVA) to Return on Investment

Based on the calculation, known variable STVA having sig-t of 0,2555 and $\alpha = 0,05$. So, sig-t > α and having t_{count} of -0,666 with t_{table} 1,705. So, $t_{count} < t_{table}$, then H_0 accepted. It means Structural Capital Value Added has proven to be not have had a positive impact that significant to Return on Investment. The result of this research consistent with research [16][18] found that Structural Capital Value Added not have had a positive impact and significantly to profitability. No impact of STVA to ROI denoting a company sample have not been able to in fulfilling the process routine and its structure that supports business employees to produce performance intellectual optimal and performance business as a whole. With not far error company transformed knowledge or intellectual employees into a supporting structure of employee performance, the company have not been able to develop structure capital that produces excellence compete relatively small can increase [1].

D. The Effect of VACA, VAHU dan STVA to Return on Investment

Based on the calculation on variable VACA, VAHU and STVA simultaneously having sig-t of 0.000 and $\alpha = 0.05$. So, sig-t < α and f_{count} of 26.13 and f_{table} with 2.98, so $f_{count} > f_{table}$. So H_a accepted, it means value added capital employed, value added human capital, and structural capital value added simultaneously have had a positive impact that significant to return on investment. The result of this research consistent with research [12], stated that intellectual capital has a positive impact on profitability. The influence VACA, VAHU and STVA to profitability measured by ROI showed that the company sample have

used equity and net profit, knowledge and skill employees to innovate and have lived up the process routine companies and structure that supports business employees to improve their *intellectual capital* performance.

V. CONCLUSIONS

1. Value Added Capital Employed proven have had a positive and significant impact on return on investment of 0.000. This research result indicates mining company has rely on their funds are as equity and its net profit increase the value added who had increased profitability company.
2. Value Added Human Capital proven have had a positive and significant impact on return on investment of 0.002. This indicates mining company have used knowledge and skill owned employees as the motivation to innovate them and processes improve business to be more efficiency that eventually can be increase profitability company.
3. Structural Capital Value Added has proven to be not have had a positive that significant impact on return on investment of 0.256. This indicates company sample have not been able to in fulfilling the process routine companies and its structure that supports business employees to produce performance intellectual optimal and performance business as a whole.
4. Value Added Capital Employed, Value Added Human Capital and Structural Capital Value Added proven simultaneously have had a positive impact that significant to return on investment in mining company, with adjusted R^2 of 0.722. It means 72.20% variable ROI can be explained by VACA, VAHU and STVA, the rest 27.80% described by the other factors that are not pursuing in this research. Variable VAHU the most dominant influence ROI.
5. The sample of this research only 6 coal mining companies. Limited the result of this research allow the presence of different results if added that the number of sample or a period more long, so that research will come can showing results more accurate. In addition suggested to reexamine variables on the coal mining companies when conditions economic stable to prove the possibility that different results with this research.

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