



Intellectual Capital and the Performance of Manufacturing Companies in Indonesia

Rahmat Setiawan¹, Budi Yuda Prawira²

¹Faculty of Economics and Business, Airlangga University, Indonesia.

E-mail: rahmatsetiawan@feb.unair.ac.id

²Faculty of Economics and Business, Airlangga University, Indonesia.

E-mail: budi.yuda.prawira-2017@feb.unair.ac.id

ARTICLE INFO	ABSTRACT
<p>Keywords:</p> <p><i>Intellectual capital, value added capital employed, value added human capital, structural capital value added, return on asset, return on equity, market-to-book ratio.</i></p> <p>How to cite:</p> <p>Yudi Prawira, B, (2018). <i>Intellectual Capital and the Performance of Manufacturing Companies in Indonesia</i> JMM UNRAM, 3(2), 124-137</p> <p>DOI:</p> <p>10.20956/jmm.v3i2.821</p>	<p><i>This study aimed at examining the effect of intellectual capital and its components covering value added capital employed, value added human capital, and structural capital value added on the firm performance. Intellectual capital was measured by using Pulic's model, while the firm performance was measured by return on asset, return on equity, and market-to-book ratio. The samples used in this study were 103 manufacturing industries and we also investigated every subsector of the manufacturing industries including 51 basic and chemical industries, 30 miscellaneous industries, and 22 consumer goods industry listed on Indonesia Stock Exchange during the period of 2012 up to 2016. Multiple regression analysis was used to test the hypothesis. The result of the study showed that intellectual capital had a significant positive effect on return on asset, return on equity, and market-to-book intellectual capital on the firm performance in each subsector of the manufacturing industry. Value added capital employed as a component of intellectual capital was the most influential component on the firm performance. This findings indicated that a firm with great and well managed of capital employed, allowing a firm to improve their performance.</i></p>
	<p><i>Penelitian ini bertujuan untuk menguji pengaruh intellectual capital dan komponennya yang meliputi value added capital employed, value added human capital, dan structural capital value added terhadap kinerja perusahaan. Intellectual capital diukur menggunakan model Pulic, sementara kinerja perusahaan diukur dengan return on asset, return on equity, dan market-to-book ratio. Sampel yang digunakan dalam penelitian ini adalah 103 perusahaan pada industri manufaktur, dan kami juga kami meneliti masing-masing subsektor dari industri manufaktur yang meliputi 51 perusahaan pada industri dasar dan bahan kimia, 30 perusahaan pada aneka industri, dan 22 perusahaan pada industri barang konsumsi yang terdaftar</i></p>

	<p><i>di Bursa Efek Indonesia selama jangka waktu 2012-2016. Analisis regresi berganda digunakan untuk menguji hipotesis. Hasil penelitian menunjukkan bahwa intellectual capital berpengaruh positif signifikan terhadap return on asset, return on equity, dan market-to-book ratio di semua industri. Selain itu, hasil penelitian ini juga menunjukkan bahwa tidak ada perbedaan pengaruh intellectual capital terhadap kinerja perusahaan pada masing-masing subsektor industri manufaktur. Value added capital employed yang merupakan komponen dari intellectual capital merupakan komponen yang paling berpengaruh terhadap kinerja perusahaan. Temuan ini menunjukkan bahwa perusahaan dengan modal yang besar dan dikelola dengan baik, memungkinkan perusahaan untuk meningkatkan kinerjanya.</i></p>
	<p><i>Copyright © 2018 JMM UNRAM. All rights reserved.</i></p>

1. Introduction

The biggest problem of investors is making an appropriate investment decision. An investor must have accurate information related to the target company as a basis for making investment decision. So far, firms listed on the Indonesia Stock Exchange only provide general information through financial statements that are published annually. Meanwhile, there is more important information that should be known by investors that become a competitive advantage of the firms as key success of their performance, it is intellectual capital (Ross et al. 1997). Intellectual capital according to Stewart (1997) is an intangible asset of a firm, it can be knowledge, information, experience of human resources and company organization. Mouritsen et al. (2001) says that the difference between the market value and the book value of a company is a result of the development of the firm's intellectual capital. The existence of a large difference between the book value of the firm and its market value illustrates that the market condition is bad (Chen et al. 2005). Based on data obtained from the IDX Factbook of 2012 up to 2016, average PBV of all firms listed on the Indonesia Stock Exchange was 2.09 times, which means that the average market value of firms in Indonesia was 2.09 times greater than the book value. This study specifically examined the manufacturing industries and the researchers also divided the industries into three subsectors that were basic and chemical industries, miscellaneous industry, and consumer goods industry because the difference between the average of book value and market value in these industries were quite greater than the other industries. In 2012 up to 2016, average market value of all firms in manufacturing industries was 2.6 times. Average market value of their subsectors were 1.7 times for basic and chemical industries, 1.3 times for miscellaneous industry, and 4.8 times for consumer goods industry. This phenomena encouraged the researchers to find out the

intellectual capital as the factor of that differences.

This study adopted the Value Added Intellectual Coefficient (VAIC™) developed by Pulic (1998). This study further investigated whether or not the Intellectual Capital (IC) and its components influenced the performance of basic and chemical industries, miscellaneous industry, and consumer goods industry that were proxied by return on asset, return on equity, and market to book ratio. In the perspective of resource based theory, firms with high intellectual capital also have high performances. Human capital is one of the important components in creating intellectual capital of the firm. The amount of funds spent on employees reflects the amount of value added that the firm will obtain (Meles, et al. 2016). Consistent with the views of other writers, Pulic (1998) argues that the total salary and wage costs are indicators of the firm's human capital. Based on data obtained from Indonesia Stock Exchange (IDX), the total employee costs that are spent by manufacturing industries tends to increase annually. Consumer goods industry is known as the industry that spends greater employee costs than basic and chemical industries and miscellaneous industry. During the period of 2012 up to 2016, the total employee costs spent by consumer goods industry reached 25,580,126,182,123 rupiahs. While total employee costs spent by basic and chemical industries, and miscellaneous industry during the period of 2012 up to 2016 were as much as 23,298,591,082,197 rupiahs and 10,189,664,520,612 rupiahs. This condition showed that the intellectual capital capacities of these industries were different. The amount of the employee costs influenced the employee performance. If the firm has competent human resources, the firm performance will increase because the firm has human resources who are capable to manage assets optimally (Nuryaman, 2015).

Several previous studies showed different results related to the influence of intellectual capital on firm performance. Nimtrakoon (2015), examined the relationship between intellectual capital, market value and financial performance of firms in 5 countries in ASEAN. Intellectual capital was measured by Modifying Value Added of the Intellectual Coefficient (MVAIC) and its components measured by capital employed efficiency, human capital efficiency, structural capital efficiency, and relational capital efficiency. Market value was in accordance with the market to book ratio, financial performance was measured by net profit margins and return on assets. Analysis model used was multiple linear regression. The results showed that intellectual capital and its four components had a significant positive effect on the value and financial performance of the firm.

Different result was shown by Firrer and Williams (2003) who examined the influence of intellectual capital on 75 public firms' performance in South Africa during the period of 2001. The results of this study showed that intellectual capital had no effect on firm performance. But human capital efficiency which was a component of intellectual capital had a significant positive effect on return on assets Diez et al. (2010) determined the relationship between intellectual capital and value creation in 1,911 firms in Spain which had more than 25 employees at the end of 2006. The results showed that intellectual capital and its components had no effect on firm performance. Meles et al. (2016), in their research mentioned that the capacity and contribution of intellectual capital to the firm performance in every country and every industry was different, therefore this research tried to do an investigation related to the influence of intellectual capital on the firm performance in manufacturing industry and its subsectors such as basic and chemical industries, miscellaneous industry, and consumer goods industry listed on Indonesia Stock Exchange.

2. Literature Review

Intellectual capital is intangible assets of an organization, such as brands, trademarks and patents and other assets that are not visible in the financial statements. Intellectual capital is the most important resource for organizations to maintain competitive advantage (Ross et al. 1997). Bontis et al. (2000), identified three main constructs of intellectual capital, such as human capital, structural capital, and customer capital. Human capital represents the individual knowledge stock of an organization represented by its employees such as databases, organizational charts, process manuals, strategies, routines and everything that makes a firm's value greater than its material value. Structural capital is related to the infrastructure of the firm. Customer capital is knowledge that is inherent in marketing channels and customer relationships where an organization develops it through the business that is carried out. Pulic (1998), developed a measurement model of intellectual capital with intellectual ability coefficients that reflects the firm's ability to use physical capital efficiently (value added capital employed), intellectual skills of human resources (value added human capital), and structural capital (structural capital value added) which describes the firm's infrastructure capabilities in generating value added. Pulic named this coefficient as a value added intellectual coefficient (VAIC™) which describes the overall of firm's intellectual ability.

Based on resource based theory perspective, firm is the resources (tangible and intangible resources), and these resources are a source of sustainable competitive advantage if they are valuable, rare, unique, and non-substitutable. Reed et al. (2006), argues that intellectual capital is the only source of competitive advantage that can generate value added to the firm because it is hard to replicate and replace. This perspective is consistent with Ross et al. (1997), Youndt et al. (2004) statements. Nuryaman (2015), revealed that the combination of these three components (capital employed, human capital, an structural apital) will be able to increase productivity and financial performance. Firm with high of financial performance will certainly be attractive to investors to invest in the firm, this condition will increase stock prices and value of the firm. Tan et al. (2007), Zeghal and Maaloul (2010), Nuryaman (2015), Meles et al. (2016), and Onyekwelu et al. (2017), in the results of their research showed that the value added intellectual coefficient has a significant positive effect on firm performance.

Value added capital employed is an indicator of value added created by one unit of capital employed. Pulic (1998) assumes that if one unit of capital employed produces a greater return than another, it means that the firm is better in utilizing the capital employed. Based on the concept of resource based theory, to compete with other firms, firms need an ability to manage their capital employed (equity and net profit), as well as intellectual assets. Firms that are good in managing capital employed, will be able to increase their market value and performance. Tan et al. (2007), revealed that the higher the value of capital employed means that the higher level of efficiency of the firms in using capital employed, so that it can increase firm's revenue. Chen et al. (2005), Al-Musali and Ismail (2014), and Nimtrakoon (2015), show the results that capital employed value added has a significant positive effect on firm performance.

Based on the concept of resource based theory, firms need high quality of human resources to be able to compete with other firms. In addition, firms must be able to manage these quality resources optimally, so that they can create value added and become a competitive advantage to improve the firm's performance. Nuryaman (2015),

revealed that companies that have human capital with high capability, competence and commitment will increase productivity and efficiency both individually and collectively, so that it will increase the firm's ability to generate profits. Value added human capital provides an overview of how the firm performs in managing its human resources to get profits. An employees who is able to use their ability will generate value added to the firm. Firer and Williams (2003), Kamath (2015), Meles et al. (2016), and Ozkan et al. (2016), in the results of his research showed that value added human capital has a significant positive effect on firm performance.

Structural capital reflects the ability of the system, structure, strategy, and corporate culture in achieving organizational goals. If the firm has a good capital structure, it will certainly facilitate the achievement of the firm's target in increasing profitability (Nuryaman, 2015). Bontis et al. (2016), argues that an organization with strong structural capital will have a culture that supports individuals to develop their innovations. If it fails, the individual will continue to learn, and try again. If the organizational culture can not accept failure, then the organization will not get success. Based on resource based theory, human resources will be helped to do their task optimally when the supporting infrastructure, processes and database of the organization are provided by the firms. Structural capital is needed because it is a link between human capital to increase the value added of the firm. This shows that with adequate structural capital, firms will be better to manage their assets. Firms that are good in managing their assets are expected to increase their profits and ultimately increase their market value. Zeghal and Maaloul (2010), Bontis et al. (2016), Onyekwelu et al. (2017), Amin and Aslam (2017), in the results of their research showed that structural capital value added has a significant positive effect on firms performance. Based on the explanation, we hypothesise the following :

- H1: Value added intellectual coefficient positively influences the performance of manufacturing industry, basic industry and chemicals, miscellaneous industry, and consumer goods industry.
- H2 : Value added capital employed positively influences the performance of manufacturing industry, basic industry and chemicals, miscellaneous industry, and consumer goods industry.
- H3 : Value added human capital positively influences the performance of manufacturing industry, basic industry and chemicals, miscellaneous industry, and consumer goods industry.
- H4 : Structural capital value added positively influences the performance of manufacturing industry, basic industry and chemicals, miscellaneous industry, and consumer goods industry.

3. Research Method

3.1 Sample

This study used a sample of 103 firms in manufacturing industry and divided it into three subsectors such as 51 firms in basic industry and chemicals, 30 firms in miscellaneous industry, and 22 firms in consumer goods industry listed on Indonesia stock exchange and consistently published financial statements in Rupiah during period 2012-2016.

3.2 Measurement of Variables

3.2.1 Independent Variables

Here is the measurement of intellectual capital using the VAIC™ model developed by Pulic (1998) :

a. Calculated Value Added (VA)

Value Added is the most objective indicator for assessing success of business and demonstrating the firm ability in value creation. Value added is calculated as differences between output and input. The output represents revenue and includes all products and services sold in the market, while input includes all costs used in obtaining revenue. The important thing in this model is that employee costs are not included in the input because of their active role in the value creation process (Tan et al. 2007). The firm value added could be calculated using the following formula:

$$VA = \text{OUT} - \text{IN} \dots(3.1)$$

b. Calculated Value Added Capital Employed (VACA)

Value Added Capital Employed (VACA) is an indicator for value added created by one unit of human capital. This ratio shows the contribution of utilizing the capital employed to generate value added of the firm. Capital employed is available firm funds, such as equity and net income (Meles et al. 2016).

$$VACA = \frac{VA}{CE} \dots\dots\dots(3.2)$$

c. Calculated Value Added Human Capital (VAHU)

Value added human capital shows how much value added is generated from spending the employee costs. The relationship between value added and human capital indicates the ability of human capital to create value in the firm. The amount of funds spent on employees (such as salaries, allowances, and development costs) reflects the amount of value added that will be obtained by the firm (Ulum, 2015: 126). Consistent with the other writers, Pulic (1998) argues that the total salary and wage costs are the indicators of human capital of the firm.

$$VAHU = \frac{VA}{HC} \dots\dots\dots(3.3)$$

d. Calculated Structural Capital Value Added (STVA)

This ratio measures the amount of structural capital needed to generate one rupiah from value added and an indication of structural capital in generating value creation. Structural capital is not an independent measure like human capital. Structural capital is an independent value creation (Pulic, 1998). The greater the contribution of human capital in value creation, the smaller the contribution of structural capital. Furthermore Pulic (1998), states that structural capital is value added minus human capital.

$$STVA = \frac{SC}{VA} \dots\dots\dots(3.4)$$

e. Calculated Value Added Intellectual Coefficient (VAIC™)

Value Added Intellectual Coefficient (VAIC™) is designed to provide information about the value creation of tangible assets and intangible assets of the firm (Pulic, 1998). Value added intellectual coefficient (VAIC™) is an instrument to measure intellectual capital performance. The assumption is, if the firm high of intellectual capital, and well managed, there will be an impact. Then the impact was measured by Pulic with VAIC™. Pulic (1998), says that value added intellectual coefficient (VAICT™) is the sum of the three previous components, such as VACA, VAHU, and STVA.

$$VAIC^{TM} = VACA + VAHU + STVA.....(3.5)$$

3.2.2 Dependent Variables

Profitability ratio is proxied by Return On Assets (ROA) that is measured by net income divided by total assets, and Return On Equity (ROE) that is measured by net income divided by total equity. While market value ratio is proxied by market-to-book ratio (M/B) that is measured by market price per share divided by book value per share (Sudana, 2015:25-27). Control variables in this research were firm size that was measured by logarithm natural of total assets, and leverage which was measured by debt /total assets.

3.3 Analysis Model

Our base OLS regression model used to examine the relationship between intellectual capital and firm performance is estimated as follows :

Model 1 :

$$Y_{it} = \beta_{0,1} + \beta_{1,1} VAIC^{TM}_{it} + \beta_{2,1} SIZE_{it} + \beta_{3,1} LEV_{it} + e_{it} \quad (3.6)$$

Model 2 :

$$Y_{it} = \beta_{0,1} + \beta_{1,1} VACA_{it} + \beta_{2,1} VAHU_{it} + \beta_{3,1} STVA_{it} + \beta_{4,1} SIZE_{it} + \beta_{5,1} LEV_{it} + e_{it} \quad (3.7)$$

4. Discussion of the Analysis or Results

4.1 Summary Statistics

This study aimed at investigating the effect of intellectual capital measured through VAIC™ methodology and its sub-components, such as VACA, VAHU, and STVA on manufacturing industry performance and its subsectors such as basic and chemical industries, miscellaneous industry, and consumer goods industry. Table 1, reported that the descriptive statistics on the dependent variables (ROA, ROE and M/B), independent variables (VAIC™, VACA, VAHU, and STVA) and control variables (SIZE and LEVERAGE) in manufacturing industry and its three subsectors such as basic and chemical industries, miscellaneous industry, and consumer goods industry, and control

variables referred in 2012 up to 2016 period.

Table 1. Descriptive statistics

All Manufacturing Industry					
Return On Asset (ROA)					
Variables	N	Minimum	Maximum	Mean	Std. Deviation
ROA	440	-.13	.22	.0490	.06153
VAIC ^{1M}	440	-7.51	10.66	2.7856	2.24090
VACA	440	-2.06	5.19	.3273	.63117
VAHU	440	-7.05	8.64	2.0290	1.73655
STVA	440	-7.51	4.57	.4334	.88534
SIZE	440	18.63	32.47	26.6302	2.07232
LEVERAGE	440	.09	.99	.4738	.20806
Return On Equity (ROE)					
ROE	440	-.30	.40	.0942	.10473
VAIC ^{1M}	440	-7.51	10.66	2.7856	2.24090
VACA	440	-2.06	5.19	.3273	.63117
VAHU	440	-7.05	8.64	2.0290	1.73655
STVA	440	-7.51	4.57	.4334	.88534
SIZE	440	18.63	32.47	26.6302	2.07232
LEVERAGE	440	.09	.99	.4738	.20806
Market to Book Ratio (M/B)					
M/B	356	.38	1.89	.9347	.28146
VAIC ^{1M}	356	-7.51	11.51	2.6120	2.49306
VACA	356	-3.12	5.19	.3309	.75262
VAHU	356	-7.05	9.50	1.8049	2.01253
STVA	356	-7.51	9.02	.4845	1.14786
SIZE	356	18.63	29.95	26.1419	1.87865
LEVERAGE	356	.09	.99	.4841	.20332
Basic Industry and Chemicals					
Return On Asset (ROA)					
Variables	N	Minimum	Maximum	Mean	Std. Deviation
ROA	211	-.13	.21	.0370	.06289
VAIC ^{1M}	211	-8.61	13.83	2.5695	2.91399
VACA	211	-2.06	3.84	.1829	.42793
VAHU	211	-7.05	11.82	2.0382	2.18415
STVA	211	-8.70	5.52	.3529	1.36726
SIZE	211	18.63	30.83	26.1482	2.31194
LEVERAGE	211	.09	.99	.4869	.22584
Return On Equity (ROE)					
ROE	211	-.30	.44	.0799	.11654
VAIC TM	211	-8.61	13.83	2.5695	2.9139
VACA	211	-2.06	3.84	.1829	.42793
VAHU	211	-7.05	11.82	2.0382	2.18415

STVA	211	-8.70	5.52	.3529	1.36726
SIZE	211	18.63	30.83	26.1482	2.31194
LEVERAGE	211	.09	.99	.4869	.22584

Market to Book Ratio (M/B)

M/B	192	.36	1.89	.9139	.26569
VAIC ^{1M}	192	-8.61	13.83	2.8377	3.05536
VACA	192	-1.19	7.42	.3957	.89877
VAHU	192	-7.05	11.82	2.0664	2.31923
STVA	192	-8.70	5.52	.3805	1.41361
SIZE	192	18.63	29.79	25.9285	2.23232
LEVERAGE	192	.09	.99	.4910	.21863

Miscellaneous Industry

Return On Asset (ROA)

Variables	N	Minimum	Maximum	Mean	Std. Deviation
ROA	130	-.09	.21	.0438	.05502
VAIC ^{1M}	130	-8.33	11.70	3.0851	2.51097
VACA	130	-.30	5.19	.4008	.76131
VAHU	130	-3.98	10.44	2.2145	2.01881
STVA	130	-8.44	3.97	.4849	.94833
SIZE	130	22.92	32.47	26.8214	1.77328
LEVERAGE	130	.09	.99	.5275	.19683

Return On Equity (ROE)

ROE	130	-.27	.48	.0923	.11277
VAIC ^{1M}	130	-8.33	11.70	3.0851	2.51097
VACA	130	-.30	5.19	.4008	.76131
VAHU	130	-3.98	10.44	2.2145	2.01881
STVA	130	-8.44	3.97	.4849	.94833
SIZE	130	22.92	32.47	26.8214	1.77328
LEVERAGE	130	.09	.99	.5275	.19683

Market to Book Ratio (M/B)

M/B	140	.29	2.46	1.0436	.42518
VAIC ^{1M}	140	-12.62	11.70	2.8320	3.06353
VACA	140	-1.86	5.19	.4148	.87211
VAHU	140	-11.84	10.44	1.8700	2.57439
STVA	140	-8.44	9.02	.5614	1.27373
SIZE	140	22.84	32.47	26.6553	1.83526
LEVERAGE	140	.09	.99	.5572	.22483

Consumer Goods Industry

Return On Asset (ROA)

Variables	N	Minimum	Maximum	Mean	Std. Deviation
ROA	97	-.07	.30	.0867	.07718
VAIC ^{1M}	97	-.98	13.04	3.0327	1.90073
VACA	97	.11	1.88	.3036	.22346
VAHU	97	-.91	5.92	2.2097	1.33122

STVA	97	-1.51	2.09	.4127	.38718
SIZE	97	24.23	31.38	27.4583	1.62799
LEVERAGE	97	.11	.66	.3491	.12870
Return On Equity (ROE)					
ROE	97	-.17	.52	.1383	.11317
VAIC ^{1M}	97	-.98	13.04	3.0327	1.90073
VACA	97	.11	1.88	.3036	.22346
VAHU	97	-.91	5.92	2.2097	1.33122
STVA	97	-1.51	2.09	.4127	.38718
SIZE	97	24.23	31.38	27.4583	1.62799
LEVERAGE	97	.11	.66	.3491	.12870
Market to Book Ratio (M/B)					
M/B	95	.42	5.93	2.0936	1.39952
VAIC ^{1M}	95	-.98	19.73	3.3828	3.20196
VACA	95	.11	.74	.2720	.14528
VAHU	95	-.91	5.92	2.1004	1.25849
STVA	95	-1.51	2.09	.3864	.39425
SIZE	95	23.89	31.38	27.4825	1.79433
LEVERAGE	95	.11	.66	.3456	.12658

4.2. Discussion

4.2.1. The Effect of Intellectual Capital on Firm Performance

Linear regression results in Table 2 show the influence of intellectual capital proxied by Value Added Intellectual Coefficient (VAICTM) on firm's performance that was measured by ROA, ROE, and M/B. VAICTM positively influences the performance of manufacturing industry and its subsectors such as basic and chemical industry, miscellaneous industry, and consumer goods industry. The better the firms in utilizing their intellectual capital, the higher the return that the firms will get. In the perspective of resource based theory, firms will only be able to survive in competition if the firms has valuable, rare, incomparable, and non-subsitutable resources. Intellectual capital is the only source of competitive advantage that can provide value added to the firm because it is hard to imitate and replace (Ross et al. 1997, Youndt et al. 2004, Reed et al. 2006). firms with high intellectual capital will be able to improve productivity and financial performance well (Nuryaman, 2015). Firm with high of financial performance will certainly be attractive the investors to invest in the firm, this condition will increase stock prices and firm value. The results of this study are consistent with the research of Tan et al. (2007), Orens et al. (2009), Zeghal and Maaloul (2010), Meles et al. (2016), and Onyekwelu et.al (2017), which showed that intellectual capital proxied by VAICTM positively influences the firm's performance. The other hand, this study also found that there is no differences about contribution of intellectual capital in the creation of value added from the three industrial sectors in manufacturing industries. Because the characteristics of those industries are similar. The contribution of intellectual capital in the creation of added value depends on how firms utilize their intellectual resources.

4.2.2 The Effect of VACA on Firm Performance

Based on Table 3, Value Added Capital Employed (VACA) in line with the hypothesis positively influences firm's performance measured by ROE, ROE, and M/B in all industries. Based on the concept of resource based theory, to compete with other firms, firms need an ability in managing their assets, both physical assets (capital employed) and intellectual assets. Firms that are able to manage capital employed properly will be able to improve their financial performance and market value. Tan et al. (2007), revealed that the higher the value added capital employed, the higher efficiency level of the firm in using capital employed, so that it can increase the firm's revenue. The results of this study in line with previous research conducted by Chen et al. (2005), Al-Musali and Ismail (2014), and Nimtrakoon (2015), that VACA positively influenced the performance of the firm.

4.2.3 The Effect of VAHU on Firm Performance

Based on Table 3, Value added human capital (VAHU) in line with hypothesis that VAHU positively influences firm's performance measured by ROA and ROE in manufacturing industry, and its subsectors such as basic and chemical industry and miscellaneous industry. In consumer goods industry VAHU positively influences firm's performance measured by ROA, ROE, and M/B. This means that any increasing in VAH will increase revenue and firm value.

Table 2. Result from OLS regressions model 1

Variable	All Manufacturing Industry			Basic Industry and Chemicals			Miscellaneous Industry			Consumer Goods Industry		
	ROE	ROE	M/B	ROA	ROE	M/B	ROA	ROE	M/B	ROA	ROE	M/B
	VAIC TM	.015*	.027*	.012**	.011*	.018*	.012**	.011*	.029*	.025**	.030*	.036*
	(.000)	(.000)	(.037)	(.000)	(.000)	(.046)	(.000)	(.000)	(.021)	(.000)	(.000)	(.017)
SIZE	.007*	.007*	.018**	.006*	.009*	.018**	.006**	-.006	.062*	.000	.011	.297*
	(.000)	(.000)	(.022)	(.000)	(.003)	(.037)	(.020)	(.240)	(.001)	(.887)	(.062)	(.000)
LEV	-.049*	-.002	-.096	-.034**	.001	-.058	.015	.127*	.667*	-.094**	-.066	-2.088**
	(.000)	(.904)	(.190)	(.034)	(.986)	(.509)	(.495)	(.003)	(.000)	(.017)	(.338)	(.032)
Adj. R ²	.386	.362	.023	.304	.221	.029	.385	.448	.263	.650	.487	.309

Note : * significance at 1%, ** significance at 5%

Table 3. Result from OLS regressions Model 2

Variable	All Manufacturing Industry			Basic Industry and Chemicals			Miscellaneous Industry			Consumer Goods Industry		
	ROA	ROE	MB	ROA	ROE	MB	ROA	ROE	MB	ROA	ROE	MB
	VACA	.009**	.018*	.045**	.025*	.048*	.060*	.018*	.026*	.216*	.065*	.146*
	(.012)	(.005)	(.025)	(.005)	(.006)	(.005)	(.001)	(.008)	(.000)	(.003)	(.000)	(.001)
VAHU	.019*	.033*	.007	.013*	.020*	.006	.013*	.034*	.001	.038*	.013**	.635*
	(.000)	(.000)	(.374)	(.000)	(.000)	(.475)	(.000)	(.000)	(.920)	(.000)	(.034)	(.000)
STVA	.006**	.013*	.016	.001	.006	.011	.002	.008	.004	.008	.180*	.195
	(.026)	(.005)	(231)	(.576)	(.218)	(.438)	(.599)	(.272)	(.851)	(.588)	(.000)	(.487)
SIZE	.006*	.006*	.018**	.005*	.008**	.017**	.005**	-.005	.054*	.005	.010**	.238*
	(.000)	(.001)	(.025)	(.003)	(.013)	(.046)	(.036)	(.253)	(.001)	(.125)	(.019)	(.000)
LEV	-.047*	.001	-.106	-.032**	.003	-.096	.014	.119*	.704	-.122*	-.076	-.461
	(.000)	(.964)	(.149)	(.040)	(.935)	(.277)	(.519)	(.005)	(.000)	(.002)	(.147)	(.528)
Adj. R ²	.409	.378	.025	.348	.240	.047	.383	.473	.418	.645	.707	.631

Notes : * significance at 1%, ** significance at 5%

Firms that have human capital with high capability, competence and commitment will increase productivity and efficiency both individually and collectively, so that it will increase the company's ability to generate profits (Nuryaman, 2015). Firms with competent human capital will be assessed positively by the market. In investor's perspective, firm will have good prospects in the future if the firm is managed by people who have adequate ability and knowledge. Edvinsson and Malone (1997), revealed that employees who are able to use their ability will generate value added to the firm. In line with the concept of resource based theory, firms need high-quality human resources to compete with other firms. If a firm can manage these quality resources optimally, the firm will be able to generate value added and create competitive advantages that will ultimately improve the firm's performance. The results of this study are consistent with the research of Firer and Williams (2003), Kamath (2015), Meles et al. (2016), and Ozkan et al. (2016), that VAHU has a significant positive effect on company performance.

4.2.4 The Effect of STVA on Firm Performance

Based on Table 3, Structural capital value added (STVA) in line with hypothesis that STVA positively influences firm's performance measured by ROE and M/B in manufacturing industry. In consumer goods industry, STVA positively influences firm's performance measured by ROE. This means that each increasing in STVA will increase the firm's revenue. Based on resource based theory, human resources will be helped to do their task optimally when the supporting infrastructure, processes and database of the organization are provided by the firm. Structural capital is needed because it is a link between human capital to increase the value added of the firm. This shows that firm with adequate structural capital, will be better to manage their assets. Firms with the good managing in assets were expected to increase their profits and ultimately increase their market value. Nuryaman (2015), revealed that companies with good structural capital will facilitate the firm in increasing profit. This results is consistent with the research of Zeghal and Maaloul (2010), Bontis et al. (2016), Onyekwelu et al. (2017), Amin and Aslam (2017), that STVA positively influenced the firm's performance.

Structural capital value added (STVA) has no effect on the performance of manufacturing's subsectors such as basic industry and chemicals, and miscellaneous industry. This means that during period 2012-2016, the income in this sector was not influenced by structural capital, but was influenced by other factors such as capital employed and human capital. Structural capital is not an independent measure as human capital. Structural capital is independent of value creation (Pulic, 1998). It means that the greater the contribution of human capital in value creation, the smaller the contribution of human capital on it. In addition, structural capital during the observation period did not influence market value of the firm, but market will give more attention to the firms with high of capital employed and human capital. The results of this study are consistent with the research of Fire and William (2003), Chen et al. (2005), Maditinos et al. (2011), Al-Musali and Ismail (2014), that STVA has no effect on firm performance.

5. Conclusion

Intellectual capital proxied by value added intellectual coefficient (VAICTM) positively influences firm's performance measured by ROA, ROE, and M/B in manufacturing industry and

its subsectors such as basic and chemical industry, miscellaneous industry, and consumer goods industry. Value Added Capital Employed (VACA) positively influences firm's performance measured by ROE, ROE, and M/B in all industries. Value added human capital (VAHU) positively influences firm's performance measured by ROA and ROE in manufacturing industry, and its subsectors such as basic and chemical industry and miscellaneous industry. In consumer goods industry VAHU positively influences firm's performance measured by ROA, ROE, and M/B. Structural capital value added (STVA) positively influences firm's performance measured by ROE and M/B in manufacturing industry. In consumer goods industry, STVA positively influences firm's performance measured by ROE. Meanwhile, STVA has no effect on the performance of manufacturing's subsectors such as basic industry and chemicals, and miscellaneous industry.

This study also found that there is no differences about contribution of intellectual capital and its components in the creation of value from basic and chemical industry, miscellaneous industry, and consumer goods industry. This study found that VACA is a component of intellectual capital which has the largest contribution to financial performance and market value of all industries. This finding supports the results of previous research which stated that firms will generate high returns if the firms are eable to utilize their capital properly (Nimtrakoon, 2015). This study shows empirical evidence that intellectual capital is a factor that greatly influences firm performance. The better the firms in managing their intellectual capital, the better the performance of the firm. The results of this study indicate that in manufacturing industry, firms will obtain high value added if the firms are able to utilize their capital properly. Thus, it has implications for managers to pay attention of their intellectual capital, especially in the component of intellectual capital which become the strengths and weaknesses of the firm. So that firm will be able to maximize its resources properly and obtain high value added.

References

- Al-Musali, M. A. K., & Ismail, K. N. I. K. (2014). Intellectual capital and its effect on financial performance of banks: Evidence from Saudi Arabia. *Procedia-Social and Behavioral Sciences*, 164, 201-207.
- Akhavan, P., Mehralian, G., Rasekh, H., & Sadeh, M. (2012). The impact of intellectual capital efficiency on market value: An Empirical Study from Iranian Pharmaceutical Companies.
- Amin, S., & Aslam, S. (2017). Intellectual capital, innovation and firm performance of pharmaceuticals: A study of the London Stock Exchange. *Journal of Information & Knowledge Management*, 16(02), 1750017.
- Bharathi Kamath, G. (2008). Intellectual capital and corporate performance in Indian pharmaceutical industry. *Journal of Intellectual Capital*, 9(4), 684-704.
- Bontis, N., Chua Chong Keow, W., & Richardson, S. (2000). Intellectual capital and business performance in Malaysian industries. *Journal of intellectual capital*, 1(1), 85-100.
- Dženopoljac, V., Janošević, S., & Bontis, N. (2016). Intellectual capital and financial performance in the Serbian ICT industry. *Journal of Intellectual Capital*, 17(2), 373-396.

- Chen, M. C., Cheng, S. J., & Hwang, Y. (2005). An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of intellectual capital*, 6(2), 159-176.
- Edvinsson, L., & Malone, M. S. (1997). Intellectual capital: realizing your company's true value by finding its hidden brainpower.
- Firer, S., & Mitchell Williams, S. (2003). Intellectual capital and traditional measures of corporate performance. *Journal of intellectual capital*, 4(3), 348-360.
- Ghosh, S., & Mondal, A. (2009). Indian software and pharmaceutical sector IC and financial performance. *Journal of Intellectual Capital*, 10(3), 369-388.
- Maditinos, D., Chatzoudes, D., Tsairidis, C., & Theriou, G. (2011). The impact of intellectual capital on firms' market value and financial performance. *Journal of intellectual capital*, 12(1), 132-151.
- María Díez, J., Lizet Ochoa, M., Begona Prieto, M., & Santidrián, A. (2010). Intellectual capital and value creation in Spanish firms. *Journal of intellectual capital*, 11(3), 348-367.
- Meles, A., Porzio, C., Sampagnaro, G., & Verdoliva, V. (2016). The impact of the intellectual capital efficiency on commercial banks performance: Evidence from the US. *Journal of Multinational Financial Management*, 36, 64-74.
- Mouritsen, J., Larsen, H. T., & Bukh, P. N. (2001). Intellectual capital and the 'capable firm': narrating, visualising and numbering for managing knowledge. *Accounting, organizations and society*, 26(7-8), 735-762.
- Nimtrakoon, S. (2015). The relationship between intellectual capital, firms' market value and financial performance: Empirical evidence from the ASEAN. *Journal of Intellectual Capital*, 16(3), 587-618.
- Nuryaman. (2015). The influence of intellectual capital on the firm's value with the financial performance as intervening variable. *Journal of Global Conference on Business and Social Science*, 292-298.
- Onyekwelu, U.L., Okoh J.I., & Iyidiobi F.C. (2017). Effect of intellectual capital on financial performance of banks in nigeria. *European journal of accounting, auditing and finance research*, 5(2), 28-57.
- Orens, R., Aerts, W., & Lybaert, N. (2009). Intellectual capital disclosure, cost of finance and firm value. *Management Decision*, 47(10), 1536-1554.
- Ozkan, N., Cakan, S., & Kayacan, M. (2017). Intellectual capital and financial performance: A study of the Turkish Banking Sector. *Borsa Istanbul Review*, 17(3), 190-198.
- Pew Tan, H., Plowman, D., & Hancock, P. (2007). Intellectual capital and financial returns of companies. *Journal of Intellectual capital*, 8(1), 76-95.
- Pulic, A. (1998, January). Measuring the performance of intellectual potential in knowledge economy. In *2nd McMaster World Congress on Measuring and Managing Intellectual Capital by the Austrian Team for Intellectual Potential*.
- Roos, J., Roos, G., Dragonetti, N.C., Edvinsson, L. 1997. Intellectual Capital: navigating in the new business landscape. London: McMillan Press.
- Stewart, T. A. 1997. Intellectual capital. London: Nicholas Brealey Publishing.
- Sudana, I. M. (2015). Manajemen Keuangan: Teori dan Praktik. Erlangga. Jakarta.
- Ulum, I. (2015). *Intellectual Capital: Model Pengukuran, Framework Pengungkapan & Kinerja Organisasi*. UMMPress.

Zeghal, D., & Maaloul, A. (2010). Analysing value added as an indicator of intellectual capital and its consequences on company performance. *Journal of Intellectual capital*, 11(1), 39-60.