Livestock and Animal Specialities Company in ASEAN: Intellectual Capitals and Performances

B C Pratama¹, Ismoyowati² and M N Innayah³

¹Universitas Muhammadiyah Purwokerto, Indonesia
²Universitas Jenderal Soedirman, Indonesia
³Post graduate student, Economic and Business Faculty, Gadjah Mada University, Indonesia

E-mail: pratamabima@gmail.com

Abstract. The purpose of this paper is to examine the role of Intellectual Capital in developing livestock and animal specialties companies’ performance. Intellectual capital is measured using VAIC. In VAIC, intellectual component consists of human capital, structural capital, and capital employed. Panel data regression model analysis is used in this study. The samples for this study is agricultural production companies which are specialties in production-livestock and animal. The samples are taken from companies that operated in ASEAN countries namely Indonesia, Malaysia, Singapore, Thailand and Vietnam during 2008-2018. The final sample used in this study consists of a total of 136 observations. The results showed that only one components of intellectual capital, which is human capital have positive effect in developing livestock and animal specialties companies’ performance. This result indicates that human capital can generate better performance for the companies. Meanwhile, structural capital has a negative effect on livestock and animal specialties companies’ performance and capital employed has no effect on livestock and animal specialties companies’ performance. The overall result implies that companies should utilize and maintain intellectual capital, mainly human capital to maximize their performance.

Keywords: Livestock and animal specialties companies' performance, Human Capital, Structural Capital

1. Introduction

As ASEAN federation was enacting the ASEAN Economic Community (AEC) at the end of 2015, 10 South-East Asian nations are committing to the free movement of goods, services, foreign direct investment (FDI) and skilled labor, and freer flows of capital. This is challenging for the ASEAN companies in order to continue to survive for their business continuity. Going concern principle explained that companies must quickly change their strategy from labor-based business to knowledge-based business in order to survive [1]. Because of the condition, companies will need to improve their ability in processing the resources they have to create corporate value as a competitive advantage. Resource-based theory provides an important framework to explain and predict what resources that can
be underlying for competitive advantage [2]. One of those resources is the company’s intellectual capital (IC) [3] [4]. Intellectual capital in the company is a knowledge-resource based on the employees, customers, processes, and technologies used by companies in value creation [5].

Pulic [6] [7] developed a model to measure how the components of IC can create value and competitive advantage for companies, the model is called the Value Added Intellectual Coefficient (VAIC) model. VAIC offers a relatively simple quantitative approach based on company accounting information to measure ICs and their components [6]. VAIC is a combination of several components or elements, namely Human Capital Efficiency, Structural Capital Efficiency, and Capital Employed Efficiency [6] [7].

Previous empirical studies already showed the role of Intellectual capital components which are human capital, structural capital, and capital employed in improving company performance. Previous studies found that human capital has positive effect toward company performance [8] [9] [10] [11]. Meanwhile, the results are still not consistent with other previous studies which could not find any evidence to support the relationship between human capital and company performance [12] [13]. Because of those results inconsistency, the first purpose of this study is to examine the positive effect of human capital towards company performance. Meanwhile, previous studies also found that structural capital has positive effect toward company performance [8] [9] [10] [13]. However, the results are still not consistent with other previous studies which could not find any evidence to support the relationship between structural capital and company performance [11] [14]. Because of those results inconsistency, the second purpose of this study is to examine the positive effect of structural capital towards company performance. On the other hand, previous studies also found that capital employed has positive effect toward company performance [8] [10] [13] [14]. However, the results are still not consistent with other previous studies which could not find any evidence to support the relationship between capital employed and company performance [11] [15]. Because of those results inconsistency, the third purpose of this study is to examine the positive effect of capital employed towards company performance.

This study used a monetary measurement to measure the company’s IC, namely value added intellectual coefficient (VAIC) developed by Pulic [6] [7], which consisted of Human Capital Efficiency, Structural Capital Efficiency, and Capital Employed Efficiency. Panel data regression model analysis is used for a sample of agricultural production companies which are specialties in production-livestock and animal operated in ASEAN countries, namely Indonesia, Malaysia, Singapore, Thailand and Vietnam during 2008-2018. Agricultural production companies which are specialties in production-livestock and animal are selected for this study because the industry use intellectual capital mostly for innovation of their operation. This study contributes to the literature by testing the effect of IC components towards performance.

Resource-based theory (RBT)
RBT serves as an important framework to explain and predict what can be an underlying for competitive advantage and firm performance of a company [2]. RBT explained that the creation of sustainable competitive advantage is closely related to the firm ability to maintain valuable, rare, and irreplaceable resources also allocate and deploy these resources effectively [16]. Companies will be able to win the competition and also create value added so that it will contribute to the firm’s success by utilizing sustainable competitive advantages from IC [8],[17].

The basic logic of resource-based theory is based on two fundamental assumptions regarding the firm resources and explain how these resources can generate sustainable competitive advantage and why some firms can consistently outperform the others [18]. First, the firm has a different set of resources, even within the same industry [19]. Assumptions regarding the heterogeneity of these resources shows that some firms have better expertise in completing certain activities, because it has unique resources [19]. Second, differences in resources will remain there due to difficulties in exchanging resources between firms (resource immobility assumption), which will lead to the advantage of the heterogeneity of these resources continue to occur from time to time [18].
Valuable, Rare, imperfectly imitable, Organization (VRIO) characteristics shows four conditions to assess how potential a resource will be able to generate sustainable competitive advantage [18]. The following are VRIO characteristics:

a. Valuable
   A firm resource is valuable if the resource enables firms to develop and implement strategies that can reduce corporate costs and/or increase the firm revenue more than when the resources are not present.

b. Rare
   Resources could be said to be rare if those resources only controlled by a small number of competing firms. If these resources are valuable but not rare, the utilization of those resources will produce competitive equality, because the other firms that also having these resources also have the ability to utilize it.

c. Imperfectly imitable
   Imperfectly imitable resources are resources that cannot be obtained through duplication or direct substitution by firms that do not have it.

d. Organization
   The firm resources should be able to be organized so that the potential competitive of those resources can be utilized maximally. Organizations should act as an adjustment factors which allow the firms to fully use the benefits contained in the resource.

Based on the explanation above, according to RBT, IC has great potential to meet the VRIO characteristics so it can create a competitive advantage for the firm. By the competitive advantage from IC, firms can use it to compete in a competitive market and achieve optimal performance.

**Intellectual capital**

Intellectual capital is a set of intangible assets or resources that are owned and utilized by companies to create corporate value and competitive advantage [20]. Some researchers have different explanations regarding this IC, one of which is Bontis [21] which explained that IC is something that is difficult to understand, but when it is discovered and exploited it can give companies new resources that can provide strength for companies to compete and win the competition. Meanwhile, Sullivan and Sullivan [22] stated that IC is knowledge that can be converted into profit, in which not only concerns about the knowledge and skills of employees but also includes the infrastructure of the company, relations with customers, information systems, technology and the ability to innovate and create. Based on these explanations, it can be concluded that IC plays an important role in the value creation and the company's growth sustainability. Pulic [6],[7] suggests a model for measuring IC, namely VAIC (Value added intellectual coefficient). The VAIC method describes three main components of intellectual capital, namely Human capital, Structural capital and Relational capital, and also Capital Employed.

**Intellectual capital and firm financial performance**

IC plays an important role in the value creation and the company's growth sustainability. This is in line with resource-based theory (RBT), which explains that IC is the core of value creation and the company's competitive advantage [16]. From the RBT perspective, the creation of sustainable competitive advantage is closely related to the company's ability to maintain valuable, rare and irreplaceable resource assets and allocate and deploy these resources effectively [16]. Human capital is a component of Intellectual Capital [7]. Human capital is important because there is a combination of skills, talents, expertise, knowledge, and intelligence to increase the profitability of company performance [23]. Previous research had found that human capital is positively related to a company's financial performance proxied by ROA, ROE, MB, Growth Revenue, Employee Productivity [8]. While the other research also supports these results, explaining that Human Capital has a positive effect on firm financial performance [9],[10],[11]. Based on the explanations that have been described above, the hypothesis that can be proposed is:

H$_1$: Human capital has positive effect towards financial performance.

**Structural capital and firm financial performance**
RBT explained that the company's value and competitive advantage was created from intellectual capital [16]. RBT explained that the company's efforts to maintain valuable, rare and irreplaceable resources are closely related to the creation of sustainable competitive advantage [16]. Structural capital is a component of Intellectual Capital [7]. Structural capital is created from the company's processes and values, which reflect the internal and external focus of the company, plus the development and renewal of values for the future [24]. Previous empirical studies have shown a positive effect of structural capital towards firm performance [8],[10],[13] and found that structural capital has a positive and most significant effect on the company's financial performance [9]. Based on the explanations that have been described above, the hypothesis that can be proposed is:

H2: Structural capital has positive effect towards financial performance.

**Capital employed and firm financial performance**

RBT defines that the main component in the creation of value and the company's competitive advantage is intellectual capital [16]. From the RBT perspective, the creation of sustainable competitive advantage is closely related to the company's efforts to maintain valuable resource and processes when running these resources [16]. Capital employed is a component of Intellectual Capital [7]. Pulic [7] assumes that if one unit of employed capital generates a greater return on a company than another company, then that company makes better use of its employed capital. Better use of CE is also part of the company's IC. When compared with a group of companies, CEE is an indicator of the company's intellectual ability to utilize physical capital more optimally. Previous research stated that capital employed is positively related to the company's financial performance proxied by ROA, ROE, MB, Growth Revenue, Employee Productivity [8]. Previous research also supported the significant positive effect of capital employed on ROA [10],[13],[14]. Based on the explanations that have been described above, the hypothesis that can be proposed is:

H3: Capital employed has positive effect towards financial performance.

### 2. Methodology

**Data and sample**

The type of data used in this study is secondary data. This study uses data which generated from the financial statements of agricultural production companies which are specialties in production-livestock and animal operated in ASEAN countries, namely Indonesia, Malaysia, Singapore, Thailand and Vietnam. Financial report data is obtained from directly from each companies' official website. The sample consists of 19 companies with years of observations during 2008-2018. Due to incomplete data on the variables selected, the final sample observation used in this study is amounted to 136 firm-year observations instead of 209.

**Variables**

Intellectual capital (VAIC). IC measured using VAIC which was developed by Pulic [6] [7]. VAIC measured by the following equation:

\[
VAIC_t = HCE_t + SCE_t + CEE_t
\]

Where:

- \( VAIC_t = \) Value added intellectual coefficient at t
- \( HCE_t = VA_t / HC_t; \) human capital efficiency coefficient at t
- \( SCE_t = SC_t / VA_t; \) structural capital efficiency coefficient at t
- \( CEE_t = VA_t / CE_t; \) capital employed efficiency coefficient at t
- \( VA_t = OUT_t - IN_t = OP_t + EC_t + D_t + A_t; \) VA is the calculation of output (OUT\(_t\)) calculated from total sales reduced by Input (IN\(_t\)) calculated from bought-in materials or cost of goods or services sold; or it could be the calculation of operating income (OP); employee costs (EC); depreciation (D); and amortization (A).
- \( HC_t = \) total salaries and wages at t
- \( SC_t = VA_t - HC_t; \) structural capital at t
- \( CE_t = \) book value of the net assets at t
Human capital efficiency (HCE). HCE is a component of VAIC which represent the efficiency of human capital or the ability to apply the skills and expertise efficiently [6] [7].

Structural capital efficiency (SCE). SCE is a component of VAIC which represent the efficiency of structural capital and relational capital [6] [7].

Capital employed efficiency (CEE). CEE is a component of VAIC that represent efficient use of physical and financial capital [6], [7].

Firm financial performance (Firm_Perf). Financial performance is used as dependent variable. Follows previous studies [3] [4], the firm financial performance is measured by ROA (return on assets ratio). ROA is calculated by the following equation:

\[ \text{ROA} = \frac{\text{Profit before tax}}{\text{Average total assets}}. \]

a. Firm size (Fsize). Firm size is used as control variable. Firm size is measured by using firm’s total assets at year t, then calculated the natural logarithm.

b. Leverage (Lev). Leverage is used as control variable. Leverage is calculated by dividing long-term liabilities to total assets.

Regression model

The research which use panel data should be tested by panel data regression model analysis, ie. fixed effect regression or random effect regression [25]. This study was used panel data regression model analysis by doing Hausman test first to decide whether to use the fixed effect regression or random effect regression.

The hypotheses testing in this study were using one equation models. Model (1) was used to examine the effect of VAIC components, which are Human Capital Efficiency, Structural Capital Efficiency, and Capital Employed Efficiency towards firm financial performance (Hypothesis 1, Hypothesis 2, and Hypothesis 3). The equation models used to test all of the hypotheses in this study are as follows:

Model 1. Model to test the effect of IC components towards Firm Financial Performance

\[ \text{ROA} = \beta_0 + \beta_1 \text{HCE} + \beta_2 \text{SCE}_t + \beta_3 \text{CEE}_t + \beta_4 \text{FSize}_t + \beta_5 \text{Lev}_t + \varepsilon_t \]

Where:

ROA = Financial performance

HCE = Human Capital Efficiency

SCE = Structural Capital Efficiency

CEE = Capital Employed Efficiency

FSize = Firm Size

Lev = Leverage

\( \varepsilon_t \) = error term

3. Result and Discussion

Descriptive statistics

Table 1 shows the descriptive statistics of the selected variables in this study. ROA has a mean value of 3.942794 which indicates that the firms have a fairly good profitability. Meanwhile, HCE or the firm’s human capital efficiency has a mean value of 2.504007. Structural capital efficiency (SCE) has a mean value of 0.6322726. While, capital employed efficiency (CEE) has a mean value of 0.4009623. Overall, the descriptive statistics of each variable can be seen in Table 1 below.

| Variable | Mean   | Std. Dev. | Min     | Max   |
|----------|--------|-----------|---------|-------|
| ROA      | 3.942794 | 9.852355 | -52.41  | 44.53 |
| HCE      | 2.504007 | 1.367417 | -0.3784424 | 7.185156 |
| SCE      | 0.6322726 | 2.169917 | -3.324499 | 24.59465 |
| CEE      | 0.4009623 | 0.2298309 | -0.1929947 | 1.058731 |
Hypotheses testing

Fixed-effects (within) regression

|                  |          |          |          |          |
|------------------|----------|----------|----------|----------|
| Group variable:  | perusahaan | Number of obs = 136 |
|                  |          | Number of groups = 10 |
| R-sq:            | within = 0.5067 | Obs per group: min = 1 |
|                  | between = 0.0312 | avg = 7.6 |
|                  | overall = 0.0228 | max = 11 |
| F(5, 17)         | = 20.95 |
| corr(u_i, Xb)    | = -0.7569 |
| Prob > F          | = 0.0000 |

(Std. Err. adjusted for 10 clusters in perusahaan)

Table 2. The results of hypotheses testing

|        | Robust Coef. | Robust Std. Err. | t     | P>|t| | [95% Conf. Interval] |
|--------|--------------|------------------|-------|-----|-------------------|
| HCE    | 4.6030062    | 1.9366509        | 3.36  | 0.004 | 1.74177, 7.65694  |
| SCE    | -2.247205    | 1.000793         | -2.23  | 0.027 | -4.53869, -0.0315717 |
| CCE    | 5.110073     | 5.775475         | 0.88  | 0.389 | -7.083564, 17.3037 |
| LVE    | 0.505051     | 2.704541         | 0.18  | 0.005 | 2.9714, 14.73056  |
| _cons  | -16.62344    | 8.874245         | -1.87 | 0.078 | -35.34646, 2.095685 |

Hypothesis 1 result
The result showed that HCE has a significant positive effect on ROA as the proxy of firm financial performance with a coefficient amounted to 4.688882 at a significance level of α=1% as shown in table 2. This indicates that if a firm can use its human capital more efficiently, it can lead to improved financial performance of the firm. Therefore, hypothesis 1 which stated that human capital has a positive effect on the firm financial performance is supported.

The results of human capital variables (HCE) testing are in line with theoretical predictions. Resource-based theory explained that there are two initial assumptions about company resources about why these resources can create competitive advantages that can improve company performance and can consistently be better than other companies [18]. The professional management and utilization of human capital aims to enable human resources to work effectively, efficiently and productively. Human capital is the main asset in a company because the combination of skills, talents, expertise, knowledge, and intelligence of human capital will tend to affect the increase of company performance [23]. The result of this study is consistent with previous studies which found that human capital is positively affect ROA [8],[10].

Hypothesis 2 result
The result showed that SCE has a significant negative effect on ROA as the proxy of firm financial performance with a coefficient amounted to -0.2427205 at a significance level of α=5% as shown in table 2. This indicates that the firm’s structural capital can lead to decreased financial performance of the firm. Therefore, hypothesis 2 which stated that structural capital has positive effect on the firm financial performance is not supported.

The result indicates that the higher structural capital will makes lower financial performance. Pulic [6] stated that structural capital is received if human capital is deducted from value added, or in other words, HC and SC are in reverse proportion. The less HC participates in value creation, the more SC is involved. Hypothesis 1 result showed that human capital is positively affected firm financial performance. Therefore, because the relationship between human capital and structural capital are in reverse position, it is normal that the result of hypothesis 2 testing is also in reverse with the result of hypothesis 1 testing. The result of this study is consistent with previous studies which stated that SC had a negative insignificant effect towards the firm financial performance [26].

**Hypothesis 3 result**

The result showed that CEE has no effect on ROA as the proxy of firm financial performance as shown in table 2. This indicates that the firm’s capital employed cannot have impact to increase financial performance of the firm. Therefore, hypothesis 3 which stated that capital employed has positive effect on the firm financial performance is not supported.

Physical assets in knowledge based companies are not the main assets that can improve company performance [15]. According to resource-based theory, resources must have VRIO characteristics to be able to improve financial performance [18]. Therefore, it is maybe CEE did not meet VRIO characteristics, so it did not increase ROA or performance. The results of this study are consistent with previous studies which stated that capital employed or physical capital has no effect towards the firm's financial performance [11], [12],[15].

4. Conclusion

This study examined the effect of IC components on the firm financial performance of the firms operating in agricultural production companies which are specialties in production-livestock and animal operated in ASEAN countries, namely Indonesia, Malaysia, Singapore, Thailand and Vietnam. The empirical results showed that only human capital has a positive effect on firm financial performance. While, structural capital has a negative effect on firm financial performance and capital employed has no effect on firm financial performance. This indicates that efficient and effective use of human capital will make the firm achieve higher financial performance. This implies that in the era of AEC, companies should be more aware of efficient and effective use of intellectual capital so that they can face AEC challenges.

References

[1] T. Sawarjuwono, and A. P. Kadir. 2003. Intellectual Capital: Perlakuan, Pengukuran dan Pelaporan (Sebuah Library Research). *Jurnal Akuntansi dan Keuangan*. 5 (1): 31-51.
[2] J. B. Barney, D. Ketchen, and M Wright. 2011. The future of resource based theory: Revitalization or decline?. *J.Management*. 37 (5): 1299–1315.
[3] B. C. Pratama and H. Wibowo. 2017. Family Ownership and the Entrenchment Effect on Intellectual Capital Utilization: A Study of High-Technology Companies in Indonesia Dealing with the ASEAN Economic Community (AEC). *Jurnal Akuntansi dan Investasi*. 18 (2): 222-230.
[4] B. C. Pratama. 2018. Family Ownership Role in Strengthening the Relationship Between Intellectual Capital and Financial Performance: Research in High-Tech Firms in Indonesia and Philippines. *Advances in Social Science, Education and Humanities Research*. 231: 326-329.
[5] N. P. Bukh, C. Nielsen, P. Gormsen, and J. Mouristen. 2005. Disclosure of Information on Intellectual Capital in Danish IPO Prospectuses. *Accounting, Auditing & Accountability J..* 18
A. Pulic. 2000. VAIC: an accounting tool for IC management. *Int. J. Technol. Management*. 20 (5-8): 702-714.

A. Pulic. 2004. Intellectual capital - does it create or destroy value?. *Measuring Business Excellence*. 8 (1): 62-68.

M. C. Chen. S. J. Cheng, and Y. Hwang. 2005. An empirical investigation of the relationship between intellectual capital and firms’ market value and financial performance. *J. Intellectual Capital*. 6 (2): 159-176.

A. Gozali, and S. E. Hatane. 2014. Pengaruh Intellectual Capital terhadap Kinerja Keuangan dan Nilai Perusahaan Khususnya di Industri Keuangan dan Industri Pertambangan yang Terdaftar di Bursa Efek Indonesia Tahun 2008 – 2012. *Business Accounting Review*. 2 (2): 208-217.

Hamidah, D. P. Sari, and U. Mardiyyati. 2014. Pengaruh Intellectual Capital terhadap Kinerja Keuangan pada Bank Go Public yang Terdaftar di Bursa Efek Indonesia tahun 2009-2012. *J. Riset Manajemen Sains Indonesia*. 5 (2): 186-203

V. Muhanik, and D. F. Septiarini. 2017. Pengaruh Intellectual Capital Terhadap Return On Asset Pada Bank Umum Syariah di Indonesia Periode Q1.2013 – Q4.2014. *J. Ekonomi Syariah Teori dan Terapan*. 4 (1): 1-13.

D. Andriana. 2014. Pengaruh Intellectual Capital Terhadap Kinerja Keuangan Perusahaan. *J. Riset Akuntansi dan Keuangan*. 2 (1): 251-260.

L. D. Jayanti, and S. Binastuti. 2017. Pengaruh Intellectual Capital Terhadap Nilai Perusahaan Dengan Kinerja Keuangan Sebagai Variable Intervening Pada Perusahaan Perbankan Yang Terdaftar Di Bursa Efek Indonesia. *J. Ekonomi Bisnis*. 22 (3): 187-198

R. Simarmata, and Subowo. (2016). Pengaruh Intellectual Capital Terhadap Kinerja Keuangan dan Nilai Perusahaan Perbankan Indonesia. *Accounting Analysis Journal*. 5 (1): 1-9

R. Suhendah. 2012. Pengaruh Intellectual Capital Terhadap Profitabilitas, Produktivitas dan Penilaian Pasar Pada Perusahaan yang Go Public di Indonesia Pada Tahun 2005 – 2007. *Prosiding SNA – Simposium Nasional Akuntansi*. 15.

J. B. Barney. 1991. Firm resources and sustained competitive advantage. *J. Management*. 17 (1): 99-120.

J. C. Wang. 2008. Investigating market value and intellectual capital for S&P 500. *J. Intellectual Capital*. 9 (4): 546-563.

I. V. Kozlenkova, S. A. Samaha, and R. W. Palmatier. 2014. Resource-based theory in marketing. *J. the Academy of Marketing Science*. 42 (1): 1–21.

M. Peteraf, and J. B. Barney. 2003. Unraveling the resource-based tangle. *Managerial and Decision Economics*. 24 (4): 309–323.

J. Nahapiet, and S. Ghoshal. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Rev*. 23 (2): 242-266.

N. Bontis. 1996. There’s a price on your head: managing intellectual capital strategically. *Business Quarterly*. 60 (4): 40-47.

P. H. Sullivan Jr., and P. H. Sullivan Sr. 2000. Valuing Intangible Companies, an Intellectual Capital Approach. *J. Intellectual Capital*. 1 (4): 328-340.

A. Rahim, R. Atan, and A. Kamaluddin. 2017. Human Capital Efficiency and Firm Performance: An Empirical Study On Malaysia Technology Industry. *SHS Web of Conferences* 36, 00026.

P. D. Astuti, and A. Sabilosi. 2005. Hubungan Intellectual dan Business Performance. *Prosiding SNA – Simposium Nasional Akuntansi*. 8.

D. N. Gujarati, and D. C. Porter. 2009. *Basic Econometrics 5th edition*. McGraw Hill/Irwin. New York, USA.

M. Kamal, R. C. Mat, N. A. Rahim, N. Husin, and I. Ismail. 2012. Intellectual Capital and Firm Performance of Commercial Banks in Malaysia. *Asian Economic and Financial Rev*. 2 (4): 577–590.