

factors primary sector

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Factors Affecting Intellectual Capital Disclosures: A Case of Primary Sectors in Thailand

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Abstract

The aim of this paper is to explore the quality of Intellectual Capital Disclosure (ICD) in modern economy era. Using the data from both agricultural sector and resources sector listed in The Stock Exchange of Thailand (SET) between 2013-2017 (15 companies each), the study finds that firm size has an influence on all aspects of ICD (Human Capital Disclosure, Internal Capital Disclosure, and External Capital Disclosure). Meanwhile, profitability affects Human Capital Disclosure and Internal Capital Disclosure. As a contribution to previous researches, the findings support the view in which information asymmetry has a positive relationship with External Capital Disclosure. Furthermore, it finds that market share has significant influence on the quality of Human Capital Disclosure and Intellectual Capital Disclosure. Since the study applies content analysis which investigates companies' annual reports according to ICD terms used in the reports, there is a possibility that the quality of ICD will not be wholly captured. In addition, firms may use other sources of information to communicate their ICD. To sum up, this paper assists in giving some insight about the quality of ICD in Thailand, especially agricultural sector and resource sector, as well as trying to inspect other factors related to ICD that was rarely used in previous research, such as market share.

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Keywords: information asymmetry, intellectual capital disclosure, market share, profitability

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1. Introduction

1.1 Introduction

Intellectual Capital (IC) grows rapidly as a hidden value of a business. A firm's value does not lie only in its physical assets, but also on its database, human competence, firm performance, or any other intangible asset (Huang *et al.*, 2010). The world's economic continuous development is current pushed by the basis of utilization of knowledge and business innovation, while also identifying needs of IC (Kianto *et al.*, 2014; Tzortzaki & Mihotis, 2014). The recognition of intangible assets such as research and development, copyright, license, trademark, patent, product portfolio, and technology, has become the basis for the emergence of IC in financial reporting disclosure as a whole (Joshi *et al.*, 2018). Many of the current research frameworks have started moving towards the matter of human abilities and skills. This means there are various studies of intellectual capital, done either conceptually (Eddine *et al.*, 2015) or empirically.

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Several empirical studies have tried measuring the factors that affect the creation of intellectual capital in an organization; whether in the shape of value added capital as suggested by Pulic in 1998 (Al-Musali & Ismail, 2015; Appuhami & Bhuyan, 2015; Hatane *et al.*, 2017; Nadeem *et al.*, 2017) or as the disclosure of intellectual capital activities (Ousama *et al.*, 2012; Mondal & Ghosh, 2014; Morariu, 2014; Abhayawansah & Azim, 2014; Kamath, 2017). This has become a challenge for further researchers who want to expand on the topic of intellectual capital.

Firm's knowledge and reputation, skills, experience, loyalty, and employee's commitment are several of non-financial information related to intellectual capital activities that firms must communicate to stakeholders. This may become a challenge for companies as this information have no clearly defined standard of presentation and measurement (Branco *et al.*, 2011). Meanwhile, said non-financial information are also points of consideration for stakeholders in making firm-related decisions.

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Guthrie *et al.* in their study of intellectual capital disclosure (ICD) in 2012 developed the framework in order to expand ICD's components. They classify the source of intangible assets into three parts and while they may have different terms, are generally divided into the internal structure commonly known as structural capital, the external structure called relational capital, and human resources (Edvinsson, 2013; Curado *et al.*, 2014). This study will use the same IC classification categories as the previous studies to earn a comparable empirical result. IC classification used are human capital disclosure (HCD), internal capital disclosure (InCD), and external capital disclosure (ECD).

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Human Capital (HC) is a set of skill or expertise, knowledge, or other intangible assets of an individual, that may be used to create economic value in an individual, employee, or community. The most important thing in human capital is education, which becomes a firm's investment. Internal Capital (InC) is the supporting

infrastructure for a firm to do its operational activities. Internal Capital is also known as Structural Capital. This particular capital is firm-owned and will stay inside firm even when employees leave it. External Capital (EC) concerns how a firm relates to its external parties, including among other things, customers, competitors, government, public, firm's reputation, and trademark (Guthrie *et al.*, 2012).

Previous studies have analyzed the determinant of IC disclosure. Generally, ICD is significantly affected by size, industry type, profitability, and leverage. This research will add market share as a relatively new variable in ICD studies. Branco *et al.* (2011) state that firm size measured with market capitalization is a significant impetus of ICD; this result supports the study of Taliyang *et al.* (2011). Inversely, Huang *et al.* (2010) find that firm size does not significantly affect ICD in several companies across Malaysia. Morariu (2014) describes that industry type is not a determinant factor of ICD in Romanian firms, while Kamath (2017) instead states that industry type is a determinant. On profitability, research by Haji & Ghazali (2013) shows that there is a correlation between profitability and ICD at a significant level of one percent. Meanwhile, Atan & Rahim (2012) do not find any significant relationship between profitability and ICD. Likewise, different results are present between the studies by Rashid *et al.* (2012), Oliveira *et al.* (2013), Haji & Ghazali (2013), and Whiting & Woodcock's research which finds that leverage is not significantly related with ICD. Other than using size, market share, profitability, and leverage as variables, this study also tries to measure the role of information asymmetry in IC disclosure, as done by Bruggen *et al.* (2009) and Orens *et al.* (2009).

The study uses data from 30 companies in agriculture and resources sectors in 2013-2017, which are listed in the Stock Exchange of Thailand (SET). This period is chosen as it is the start of ASEAN Economic Community, that is, the start of free-trade between ASEAN countries. As a leading agrarian nation in South East Asia, the agricultural sector is expected to be the main livelihood of Thais. The agricultural sector, comprised mostly of small-scale farms, contributes only 10% of GDP but employs about one-third of the labor force (Forbes, 2017). Natural resources is also a developing sector in Thailand; this includes the mining sector with lead being the main result.

This research finds that size, ROA, and information asymmetry has a positive effect on ICD, while market share negatively affects ICD. The result is different from the previous study by Bruggen *et al.* (2009) which finds that there is no relationship between information asymmetry and ICD. This study contributes in adding ICD research in various countries while also answering the question of what factors affect IC disclosure activity.

1.2 Literature Review

IC investment keeps increasing and has currently reached the highest level in the world (OECD, 2013). In this era of knowledge, IC has become the center of new economic growth as the role of intangible assets is more prominent compared to fixed assets and financial assets. Even more specialists support the notion that IC is an important element in reaching an organization's optimal performance (Sydler *et al.*, 2014). However, not all firms consistently disclose it. According to An *et al.* (2011), there are three factors that motivates a firm to disclose IC. First, it is to reduce information asymmetry between firm's management and various stakeholders in the public; then to perform accountability to stakeholders; and finally to signal the legitimacy and advantage (and superiority) of the firm to public.

Firms who acknowledge the importance of IC tend to invest on it and report their annual report to increase their competitive advantage and success (An *et al.*, 2011; Nimtrakoon, 2015). IC disclosure is also seen as an effective means for firms to reduce information asymmetry and to increase their relationship with various stakeholders (Vergauwen *et al.*, 2007; Yi & Datta, 2010).

Several factors determine the quality of IC disclosure. Bruggen *et al.* (2009) in a study in Australia find that industry type significantly affects IC disclosure. Idine *et al.* (2015) reveal that firm size, profitability, and industry type have positive relationship with ICD. In Malaysia, Ousama *et al.* (2012) show that profitability is the key factor for ICD, while Taliyang *et al.* (2011) do not find any significant relationship between profitability and ICD. On a study by Huang *et al.* (2010), firm size does not significantly affect IC disclosure. Karim *et al.* (2017) report that leverage is significantly related to ICD; conversely, Whiting & Woodcock (2017) and Ferreira *et al.* (2012) recognize no significant relationship between leverage and ICD. Orens *et al.* (2009) find that leverage and ICD have a significant relationship but only in the Internal Capital disclosure component. Study by Bruggen *et al.* (2009) show that information asymmetry does not significantly affect ICD; however, on a study by Orens *et al.* (2009), information asymmetry significantly affects ICD. It may be said that, although using the same variables, the determinant in IC disclosure quality differs in each research.

Similarly, Abeysekera & Guthrie (2005) find different proportion of IC categories (human capital, internal capital, and external capital) in Sri Lanka compared to Guthrie & Petty's findings in Australia. Human

capital proportion reported on firms in the Sri Lankan study (36%) is higher than that in Australia (30%). Meanwhile, internal capital proportion reported in firms in Sri Lanka (20%) is lower than Australia's (30%). In this case, the study used the same framework⁶ but earned different results. The newest research is done by Wagiciengo & Belal (2012) in South Africa. This research surveyed the nature and the rate of IC disclosure on 20 South Africa firms in 2002-2006. The findings show that there is an increasing trend for IC disclosure in South Africa, with Human Capital becoming the most reported IC category. The difference in outcomes may happen as a result of time difference, sample size, and a nation's rules and customs. Based on the above explanation, this research examines firm size, market share, information asymmetry, profitability, and leverage as factors affecting the quality of IC disclosure in agriculture and resources sectors in Thailand.

Stakeholder theory may become the basis of ICD-related information disclosure of a firm. A company will voluntarily report its activities if the management thought of this as something the community expects (Deegan, 2004). According to Harrison and Wicks (2013), stakeholder theory explains that a firm does not operate for its own interest only but should also be able to provide benefits for all stakeholders (shareholders, customers, society, government, suppliers, and all other parties who contribute to the company). Stakeholders hold a right to make management utilize all potential a firm has. This potential may be human capital, structural (internal) capital, and relational (external) capital which can add value for the company as it increases financial information while also increases stakeholders' trust towards the firm (Alcaniz *et al.*, 2011).

Legitimacy theory supports ICD as it is closely related to stakeholder theory. Legitimacy theory is asserted on each organization and makes sure that they operate within boundaries and standard or other public norms where an organization is located (Deegan, 2000). Legitimacy theory helps a firm to analyze the content in IC disclosure (Kamath, 2017). By disclosing IC, a company gives out information related to its activities. Through the report, external parties or investors can assess if said company has applied norms and values that fit society's beliefs.

1.3 Hypothesis Development

1.3.1 Firm Size

Based on studies by White *et al.* (2010), Branco *et al.* (2011), and Ferreira *et al.* (2012), firm size is an important factor that affects IC disclosure. Large-scale firms naturally have bigger resources compared to smaller-scaled firms, so that big firms are capable of funding IC disclosure. Additionally, big firms are respected and monitored by society and government, leading firms to provide more information including that related to IC. Firm size becomes the most used variable and many studies find that there is a significant positive relationship between firm size and ICD (Morariu, 2014). The following hypotheses were made:

- H1a. Firm size affects the quality of human capital disclosure.
- H1b. Firm size affects the quality of internal capital disclosure.
- H1c. Firm size affects the quality of external capital disclosure.

1.3.2 Market Share

Market share is firm's strength in competing on any particular industry sector. Higher market share motivates firms to gain even more trust from external parties. Marisanti (2012) explains that firm with better reputation tend to reduce IC disclosure as they have already earned public's trust and legitimacy. This research explores the effect of market share on IC disclosure, and the following hypotheses were made:

- H2a. Market share affects the quality of human capital disclosure.
- H2b. Market share affects the quality of internal capital disclosure.
- H2c. Market share affects the quality of external capital disclosure.

1.3.3 Information Asymmetry

Stakeholders' trust can be increased with the presence of IC disclosure. This is in line with Martini *et al.* (2016) who state that the existence of information such as external capital can increase firm's legitimacy for its stakeholders. The establishment of trust is most important to ensure stakeholders' commitment on the company's future. Firms with higher IC disclosure are expected to have more committed and loyal customers and employees. Logically, agency problem which enables internal parties to take advantage of the situation by sacrificing external parties may occur if the firm fails to disclose IC information (Thompson & Randall, 2000). Thus, ICD can reduce exploitation from internal parties and would finally reduce information asymmetry (Onyiah & Christian, 2014). The study on the relationship between information asymmetry with ICD has been done by

Bruggen *et al.* (2009), who find that information asymmetry does not affect ICD, while Orens *et al.* (2009) revealed otherwise. Thus the following hypotheses were made:

- H3a. Information asymmetry affects the quality of human capital disclosure.
- H3b. Information asymmetry affects the quality of internal capital disclosure.
- H3c. Information asymmetry affects the quality of external capital disclosure.

1.3.4 ROA (Profitability)

Signaling theory can be used in explaining the relationship between ICD and firm profitability; where the higher the profit a firm makes, the more it gives the signal that it has better performance by providing more information on its IC. This argument is supported by Ousama *et al.* (2012) who study ICD in Malaysia, and by Haji & Ghazali (2013). Another reasoning is that with higher profit margin, managers will be more motivated to give a more detailed information, as this is related to the bonus they could receive. The following hypotheses were then made:

- H4a. Profitability affects the quality of human capital disclosure.
- H4b. Profitability affects the quality of internal capital disclosure.
- H4c. Profitability affects the quality of external capital disclosure.

1.3.5 Leverage

Higher leverage will drive external parties (e.g. creditors) to ask firms to disclose even more information, such as IC information. A high debt means a higher supervision, which can be done through published disclosure. Firms would want to assure external parties that firm value does not rely only on financial performance, but also other factors like intellectual capital. Rashid *et al.* (2012), Oliveira *et al.* (2013), and Kamardin *et al.* (2017) examine the relationship between leverage and ICD and find them to have a significant relationship. The following hypotheses were made:

- H5a. Leverage affects the quality of human capital disclosure.
- H5b. Leverage affects the quality of internal capital disclosure.
- H5c. Leverage affects the quality of external capital disclosure.

2. Research Method

2.1 Samples

The study uses data from financial and annual reports in 2013-2017, from 30 companies in the agriculture and resources sector listed in Stock Exchange of Thailand (SET). Total population is 59 companies in agricultural sector and 63 companies in resources sector. Final sample is 15 agricultural companies and 15 resources companies. The completeness of financial reporting is also considered as part of sample selection. ICD is measured with an identifying scoring method based on each ICD classification. Finally, this study uses multiple regression panel data to examine IC disclosure.

2.2 IC Reporting Practice Measurement

Table 1. Intellectual Capital: Related Terms

Human Capital	Internal Capital	External Capital
Employee Education	Management philosophy	Brand Recognition
Division Qualification	Corporate culture	Customer
Employee Engagement	Management processes	Company name
Labor Union Activity	Achievements	Profitable contract
Appreciate Employee	Information systems	Value of the company's shares
Employee Performance	Network system	Business Collaboration
Employee training	Intellectual property	Permission Agreement
Employee development	Organizational flexibility	Franchise Agreement

Successful planning	Organizational learning	Financial Relations
Innovative capabilities	Research and development	Brand recognition
Diversity Issues	Patent	Brand development
Employee safety and health	Copyright	Goodwill
Employee know how	Trademarks	Customer appreciation
Employee competency	Leadership	Customer retention
Expert seniority	Innovation	Customer service
Performance and results	Strategy	Customer feedback system
from executives senior	Organizational & management structure	Disabled customer
Motivations	Business model	Market share
Employee expertise	Organizational & business expertise	Corporate image & reputation
Expert teams	Corporate governance	
Specialist	Technology	
Cultural diversity	Quality	
Personnel		
Human resources		
Employee satisfaction		
Employee retention		
Work experience		
Educational qualifications		
and Management team		
Working Environment		
Training & development		
Employee attitudes, commitment & satisfaction		

Source: Author's Compilation

Table 1 shows relevant terms related to IC used in this research. The following are ICD measurement components that have been identified according to the three criteria of ICD quality: human capital, internal capital, and external capital. The scoring of each criteria ranges from 0 to 3. A score of 0 represents no written disclosure of criteria in annual report, 1 means there is some disclosure on the criteria, 2 means there is some disclosure on the criteria backed with numerical data such as percentage or the amount of certain years, and 3 means there is disclosure on the criteria with nominal data in certain currency, in this case, Thai Baht (THB).

2.3 Independent Variables Measurement

- Firm Size (FSIZE) is measured with log Total Assets.
- Market Share (MSHARE) is measured by dividing the Total Firm Sales with Total Industry Sales.
- Information Asymmetry (INFASYM) is measured by the percentage of share ownership not owned by top 10 major shareholders.
- Profitability (PROF) is measured with the Return on Assets (ROA) ratio.
- Leverage (LEV) is measure by dividing Total Debt with Total Equity.

2.4 Multiple Regression Model

The study uses multiple ordinary least square regression model (OLS), a model commonly used on ICD studies, for example by Huang *et al.* (2010). The calculation of OLS regression model is as follows:

$$ICD = \alpha + \beta_1 SIZE + \beta_2 MSHARE + \beta_3 INFASYM + \beta_4 PROF + \beta_5 LEV + e \quad (1)$$

3. Empirical Results and Discussions

3.1 ICD Quality

Table 2 explains firms' average ICD quality from 2013-2017, measured with 0-3 scoring. Information disclosed regarding human capital tends to be just the general, unspecific data. As seen in the table, in the 1st interval from 2013-2017, the average percentage of HCD is 55% from 30 companies. Both internal capital and external capital disclosure show similarities with human capitals, in that disclosure is unspecific on interval 1 with average percentage 58% and 39%, respectively.

Table 2. Company's ICD Quality

Years	Score	Human Capital Average	Internal Capital Average	External Capital Average
2013	0	8.2	6.09	9.42
	1	15.63	16.5	10.58
	2	4.17	4.14	3.16
	3	2	3.27	6.84
2014	0	7.63	5.45	9.05
	1	16.2	17.05	10.21
	2	4.07	4.09	3.47
	3	2.1	3.41	7.26
2015	0	6.93	5.05	9.16
	1	16.6	17.05	10.16
	2	4.4	4.23	3.47
	3	2.07	3.68	7.21
2016	0	6.5	4.73	7.84
	1	16.47	17.27	11.53
	2	4.77	4.23	3.37
	3	2.27	3.77	7.26
2017	0	6.33	4.18	7.32
	1	16.47	17.41	11.68
	2	4.77	4.64	3.37
	3	2.4	3.77	7.58

Source : Author's compilation

Human capital and internal capital both have minimum score in the 3rd interval, each 7% and 12%, while the minimum score of external capital is in the 2nd interval with 11%. Thus it is concluded that most human capital, internal capital, and external capital disclosures by firm samples are explained in an unspecific term.

3.2 Multiple Regression Analysis

Table 3. Pooled OLS Model

	HCD	InCD	ECD
Firm Size	0.0006***	0.0007***	0.0043***
Market Share	0.0007***	0.6624	0.8525
Information Asymmetry	0.4157	0.0203**	0.3182
Profitability (ROA)	0.0878*	0.1746	0.0886*

Leverage	0.148	<0.0001***	0.9605
P-Value (F)	0.102899	6.15E-13	0.094636
Adjusted R-Square	0.000898	0.343886	0.001599
Heteroskedasticity	0.097265	0.115991	0.261745

Source : Author's compilation

Table 3 result displays the first step in multiple regression model, continued with panel test model. Information contained in the table shows that HCD and ECD model could not be tested with the pooled OLS model (p-value (F) > 0.05). All three models are free from heteroskedasticity as the significant value is > 0.05. Next, from Table 4 below it may be derived that this study is also free from collinearity, since the VIF score of each independent variable is less than 10.

Table 4. Collinearity Test –Variance Inflation Factor Value (VIF)

	HCD	InCD	ECD
Firm Size	2.456	2.456	2.456
Market Share	2.198	2.198	2.198
Information Asymmetry	1.008	1.008	1.008
Profitability (ROA)	1.395	1.395	1.395
Leverage	1.403	1.403	1.403

Source: Author's compilation

Table 5. Panel Test

	HCD	InCD	ECD
Fixed Estimator	3.37E-25	1.81E-33	1.08E-33
Breusch-Pagan test	2.67E-32	1.64E-25	4.66E-38
Hausman test	0.0555802	2.09E-09	0.00452431
Conclusion	Random Effect	Fixed Effect	Fixed Effect

Source: Author's compilation

Table 5 reveals the result of data panel model test. If the p-value of fixed estimator is < 0.05, the model is fixed, and if p-value of Breush-Pagan test is < 0.05, then the model is random. The final determinant test is the Hausman test; p-value of < 0.05 indicates that model is fixed, whereas a p-value of > 0.05 shows a random model.

Table 6. Panel regression on ICD

	HCD	InCD	ECD
Firm Size	0.2237***	0.5673***	0.5194***
Market Share	-1.075***	-4.777***	-0.3635
Information Asymmetry	0.0062	0.3232	0.7192**
Profitability (ROA)	0.6128**	0.6796***	0.0295
Lev			
Leverage	0.0327	0.0221	0.0184
Panel Model	Random effect	Fixed	Fixed effect
F-test & Asymptotic test Statistic (p value)	0.0004	7.10E-43	2.34E-35
R-Square	12.14%	39.85%	21.88%

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Source: Author's compilation, Note. *, **, *** significant at 10, 5, and 1 percent levels, respectively

From the outcome of regression model above it can be concluded that firm size significantly affects all indicators

of ICD; thus H1a, H1b, and H1c are accepted. The bigger the company leads to higher demand of information disclosure by related external parties e.g. investors and government. Relatively higher resources prompt firms to disclose IC information in a more specified manner. This result supports previous studies such as White *et al.* (2010); Branco *et al.* (2011); Taliyang *et al.* (2011); Ousama *et al.* (2012); and Ferreira *et al.* (2012).

Market share reveals a significant relationship with ICD. Market share indicates a significant negative relationship on the component of human capital and internal capital, hence only H2a and H2b are accepted. In this study, market share is calculated using percentage of total firm sales to total industry sales in the same industry. It is determined that there exists a relation with the confidence on firm achievement. Market share also shows a dominantly negative relationship with ICD. It is assumed that the management of an industry giant would have a good reputation and trust in the general public's eyes.

The above regression model also exhibits that information asymmetry significantly affect external capital, meaning only H3c is accepted with H3a and H3b being rejected. This shows that lower information asymmetry leads to more information being kept by firm's internal parties, causing lower disclosure level to external parties. This result is contrary to Bruggen *et al.* (2009) but supports Orens *et al.* (2009), who discover that information asymmetry affect ICD. For this research, information asymmetry is significant to external capital as it is measured from share ownership outside the top 10 major shareholders, with most information being disclosed in the 2nd interval.

The results go against the findings of Marisati & Kiswara (2012) who find that firms with higher profitability tend to reduce IC disclosure. However, there is a possibility that firms with higher profitability would disclose more information compared to firms with lower profitability (Khlif & Souissi, 2010). Thus, higher profitability means higher probability for firms to disclose IC. The result shows that profitability significantly affects HC and InC that only H4a and H4b are accepted. Profitability influences how employees or managers act, as it is related to the bonus they might receive.

Leverage does not significantly affect ICD as a whole. The result is in line with Ferreira *et al.* (2012), Ousama *et al.* (2012), and Muttakin *et al.* (2015) but is conflicting with Rashid *et al.* (2012), Oliveira *et al.* (2013), and Kamardin *et al.* (2017) who find that leverage has insignificant effect of ICD. The insignificant effect of leverage on ICD may be caused by the lack of demand from creditors to disclose firm's non-financial information, especially regarding ICD; since for debtors, firm's capability to service its debts is the most important. According to Cheng (2014), balance sheet is an important tool for creditors to evaluate the financial risk attached to a firm. This study assumes that debtors tend to pay attention only to disclosures with numerical and currency data. As the objects of study mostly disclose IC on 49% level in the 1st interval and 23% in interval 0, this means there is basically no IC disclosure.

4. Conclusion

The main purpose of this study is to explore the quality of ICD in current modern economy. The study chose Thailand, the largest agricultural country in ASEAN and specifically the sectors of agriculture and resources. The findings show that firm size is the variable that consistently affects all aspects of ICD. Higher market share leads to lower HCD and InCD, while information asymmetry increases quality of ECD. ROA as a measurement of firm profit positively affects the quality of HCD and InCD. Leverage is the only independent variable that consistently does not affect any of ICD's components. Other than leverage, all variables used in the study then significantly affect the creation of ICD value. The research aims to encourage firms' awareness of specific, numerical data-supported ICD.

In this modern era access to an entity's information becomes incredibly easy and could become a threat if a firm does not maximize its presentation of information. The disclosure of IC has become a practice that determines a firm's maturity and the vision of firm's management (Joshi *et al.*, 2018). These findings underline the importance of ICD as a form of firm's responsibility to both internal and external parties. Based on Table III, the result of regression panel shows that the ability of firm size, market share, information asymmetry, profitability (ROA), and leverage in affecting each components of ICD are 12.14% for HC, 39.85% for InC, and 21.88% for EC. The three models show the capability of each independent variable in affecting the dependent variable is relatively low.

Edvinsson (2013) asserts the role of IC on individuals, organizations, society, and globally to maximize results. Firms must note and maximize their IC in order to support firm's objectives. Firms are expected to be able to present a specific disclosure of human capital, internal capital, and external capital in annual reporting.

This research has limitations in data processing as it uses scoring method, focusing from financial and annual reports taken from the companies' website and did not consider information from other forms of media. It is also limited to just the sectors of agriculture and resources in Thailand, thus making it incompatible with other sectors and nations. Further research are expected to expand this model in other sectors and other nations, with different time framing. Further research may also use different methods for measuring IC to enrich empirical result on intellectual capital disclosure.

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