Intellectual Capital Reporting and Cost of Debt

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Abstract

This study, which is the first longitudinal study of intellectual capital reporting in Thailand, aims to investigate the relationship between intellectual capital reporting and the cost of debt. A sample of 296 firm-year observations were selected from listed companies in the Market for Alternative Investment of Thailand from 2015 to 2019. Drawing on secondary data, this study applied descriptive analysis, correlation matrix, and panel data analysis. Moreover, intellectual capital reporting was measured by the Modified-Value Added Intellectual Coefficient (M-VAIC) and the number of words, including the cost of debt was measured by the financial expenses. The results showed that intellectual capital reporting, derived from both financial and non-financial information, is statistically significant and negatively correlated with the cost of debt. The findings demonstrate that intellectual capital reporting is useful to mangers of borrowing firms as it helps them to get a lower cost of debt and useful to lenders because they have better understanding financial position. Signaling theory was used to confirm that intellectual capital reporting made by firms can reduce information asymmetry between the two parties. The study highlights that listed firms on the Market for Alternative Investment of Thailand, as debt financing is important initiation for supporting financial structure, should focus on intellectual capital performance and disclosure allowing lenders to assess the opportunity loan.

Keywords : Intellectual Capital Reporting, Cost of Debt, Market for Alternative Investment of Thailand, Alternative Capital Market

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1. Introduction

1.1. Background

Nowadays, the digital economy is driven by knowledge-based resources. Known as intellectual capital (IC) are created from employees' knowledge, organizational processes, and business relationships (Cui & Jin , 2020). IC is the value differentiation of each firm, that is difficult for others to imitate (Kamukama et al., 2011). IC by companies is important information about insight activities in the process of creating value (Nicolò et al., 2020). However, based on accounting standard, it is not required that IC information be disclosed because it is recognized as expenses a company must pay (Nimtrakoon, 2015). Consequently, IC information is voluntarily disclosed or depends on the manager's discretion and appears either in the financial statement or in an annual report (Bhasin, 2012). IC information can affect the decision of users; they can judge the true valuation of firm financial stability (Ousama et al., 2011). Particular, a lender, a financial institution are the crucial finance for supporting loaners' activities (Paukmongkol, 2021). Under debt contracts, lenders will be anxious about the default risks which affects charging the debt expenses (Rattanapongpinyo, 2016). Lenders must be ensured to receive back the principal and interest (Suwansin et al., 2018). Borrowing firms will express the ability to pay back debts if their managers provide comprehensive information to assess better the financial position (Gamayuni, 2015). Therefore, managers should reveal more IC information in order to increase lenders' perception.

IC reporting is interesting for several reasons. Firstly, investing and managing IC cause expense which is uncertainty in the future cash flow (Maaloul & Zéghal, 2015). IC reporting reflects the actual risk which helps to predict bankruptcy (Cenciarelli et al., 2018; Ge & Liu, 2015). Moreover, a firm with efficient IC reporting indicates the firm's financial health (Ousama et al., 2011). IC information relevance significantly effectuates the firm performance, growth, and market value (Xu & Li, 2022). Secondly, IC information is related to business activities managed by companies to keep competitive competency and achieve goals (Soetanto & Liem, 2019; Vanini & Rieg, 2019). Disclosing can help reflect the performance and transparency of firms (Iazzolino et al., 2013). Therefore, IC reporting is material information which can help lenders to understand the capability and risk of firms and may affect the lenders' assessment in terms of the costs of debt (of borrowing firms). The other reason can be mentioned that there were mixed results of related studies on IC reporting. Some studies found that IC information have effect on the lenders' decisions (Bouchareb & Kouki, 2019; Iazzolino et al., 2014). IC reporting reveals uncertainty in future cash flow in a firm and is used as a signal to assess long-term value (Gamayuni, 2015). On the other hand, there are some studies found that information of IC reporting could not signal in repayment ability (Barus & Siregar, 2015; Stropnik et al., 2017), this is because lenders focus on other information regarding the history of credit rating firms. Thus, the lenders' assessment may not understand the true value of IC that incomplete information from an IC report can lead to the information gap between a borrowing manager and a lender (Caputo et al., 2016). A signaling theory is used to explain the relationship between manager and lenders. This theory stated that the behavior of managers who has an information advantage (Spence, 1973).

IC reporting may be provide better understanding in risk assessment and its capabilities on a firm's financial position (Gamayuni, 2015). When lenders receive sufficient information, they can enhance their decision making. Therefore, IC information may be a signal for lenders to reduce expected default risks, leading to reduce the cost of debt (Guidara et al., 2014).

This study aims to investigate the benefits from increased voluntary IC reporting can reduce the information gap between a borrowing manager and a lender. The existing research have been limited to the relationship between IC reporting and the cost of debt, particularly, the listed companies in the alternative capital market, namely, the Market for Alternative Investment (MAI). Although companies in the MAI have high and good growth performance, investors do not pay attention to them as they do to companies in the main capital market, namely, the Stock Exchange of Thailand (SET), as there are risks and uncertainty of performance and instability of corporate information in companies of MAI (Suttipun, 2022). This is a reason why MAI firms rely on raising debt financing as a crucial source for supporting finance. Additionally, IC reporting is voluntary in both the SET and the MAI, most prior studies on IC reporting have focused only on the SET (e.g., Sim-im et al., 2019; Nimtrakoon, 2015; Phusavat et al., 2011). Little research has been conducted that examines the relationship between IC reporting and cost of debt in the MAI. Furthermore, the existing literature of IC reporting has chosen to study either only financial information (e.g., Zakariaa et al., 2020; Iranmahd et al., 2014) or only non-financial information (e.g., Barus & Siregar, 2015; Kamel & Shahwan, 2014). Consequently, there is still little research on IC reporting that presents both financial and non-financial information of the borrowing firm along with its cost of debt. Thus, this study expects to contribute to the existing literature by investigating the relationship between IC reporting that contains both financial and non-financial information and the cost of debt in the context of the MAI. Additionally, this empirical research builds on the existing theory which helps to correctly understand IC information of the borrowing firm for lenders' decisions.

1.2. Research Objective

This study examines the relationship between intellectual capital reporting and cost of debt of listed companies in the Market for Alternative Investment of Thailand.

2. Literature Review

2.1 Signalling Theory

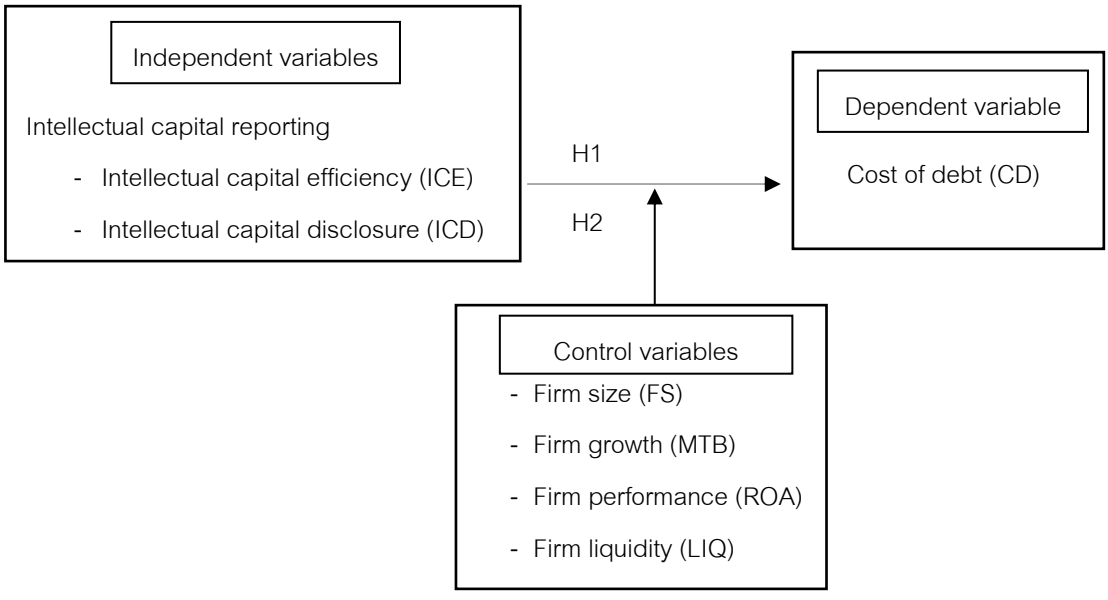
Under the environment of corporate information is explained by the signaling theory (Spence, 1973). The relationship between an internal user, a manager as a signaler, who communicates with an outside user, a lender as a receiver. The two parties have access to different information (Spence, 1973). This causes information asymmetry between them, which can be reduced if the manager can send a trustable signal to the lender. The manager has an information advantage over the lender to signal the firm's ability to repay debt and to reduce the information asymmetry (Kamath, 2014). This information can influence either a strong or a weak signal to the lender, if he can observe and interpret it as a signal for

making a decision (Guidara et al., 2014; Connelly et al., 2011). However, when firms need to enhance their loan opportunities, they give additional information related to financial position, firm performance, and financial risk. Information about these influence lenders' decisions, helping them predict the risk of paying debts (Rattanapongpinyo, 2016). To make a debt contract, lenders verify and assess firm information concerning profitability, future cash flow, liquidity, and future growth of the borrowing firm to ensure the ability to repay (Armstrong et al., 2010).

Thus, the manager can provide more information about the management and utilization in their IC for the superior quality of firm (An et al., 2015). This is because IC Information is a communication tool that provides information about investment, strategic management, and development to increase their capability (Salvi et al., 2020; Ousama et al., 2011). The firm has invested and managed IC resources, its IC improves its capability to generate future growth (Clarke et al., 2011). If lenders do not have sufficient information, they will perceive limited information to assess the actual risk and capability of borrowing firms (Gamayuni, 2015; Ge & Liu, 2015). So, they cannot assess the value on IC reporting by themselves. Managers expect that IC reporting can dissolve information asymmetry, and if lenders could interpret information correctly, they will decide whether to lend money at a high or low cost of debt (Caputo et al., 2016). Based on the conceptual framework was shown in Figure 1.

Figure 1

The Conceptual Framework



2.2 Intellectual capital reporting

Intellectual capital (IC) is the knowledge assets with three components (Akil et al., 2022). Human capital is the ability of employees, and their knowledge embedded in organizational procedures is the company's structural capital (Fathi et al., 2013). And lastly, relational capital is the valuable knowledge derived from relationships with the organization's partners (Akil et al., 2022). According to accounting

standard, IC information is required to recognize as expenses. As a result, disclosing IC information is a voluntary information. When IC information is reported, it appears either financial information in the financial statement or non-financial information in an annual report. Thus, IC reporting is used to explain their actual performance and communicates management strategies to support the user's decisions (Nicolò et al., 2020).

Managers believe that IC reporting will give enough information about their performance (Chang & Hsieh, 2011) and will send a signal assessing to lenders. In the perspective of a lender, they concern about the default risk to influence the interest rate as the cost of debt (Suwansin et al., 2018). The cost of debt is referred as financing expenses arising from debt financing. Lenders will charge the borrower's debt cost based on risk assessment and the stability of a firm's financial position (Guimón, 2005). They must be ensured to receive back the principal and interest, so they expect the borrower's ability to pay. Thus, managers can assess a lower cost of debt capital if they provide the lender with sufficient information. Conversely, if the lender does not have enough information, he will be strict and charge a higher rate of interest.

2.2.1 Intellectual capital reporting quantified by financial information and costs of debt

Financial information on IC reporting describes a firm's monetary investments for long-term economic benefits (Fathi et al., 2013), sometimes displaying intellectual capital in the form of intangible assets that can be measured by market-based valuation (Lim et al., 2017). R&D and advertising expenditures, for example, are part of IC that can support debt contracting (Tsai & Hua, 2013). As firms report IC expenditures to develop the IC resource's capability for future growth.

From prior studies, the finding on IC financial information associated with lenders remains inconclusive. Some studies suggest that Value Added Intellectual Coefficient (VAIC^{TM}) is a method showing how effectively money is spent in creating IC. Cenciarelli et al. (2018), via the VAIC^{TM} test, reveal that a higher IC performance reflects a lower probability of bankruptcy. Zakariaa et al. (2020), quantifying IC with VAIC^{TM} and M-VAIC methods, find that IC enhances financial health and reduce the likelihood of bankruptcy. Similarly, Iranmahd et al. (2014) quantified IC with VAIC^{TM} and found that IC can reduce financing costs. These studies suggest that IC reporting can decrease the gap information between companies and lender. This can be because financial information shows the expenditure to enhance a value-added firm's IC, thus helping lenders assess risk and predict the ability to pay the debt. Conversely, Gamayuni (2015), measuring IC with the market value of the firm, indicates that the intangible assets which are the combination of human capital, structural capital, and customer capital have no significant influence on debt financing. This is possible that measuring IC information cannot create a valuation for firms to attract lenders.

However, investing in IC is an expense depending on how well the company manages and invests in IC resources to expand its long-term growth (Maaloul & Zéghal, 2015). Providing financial information is an indicator to assess the firms' risks, and future economic benefits, this can help the lender

to make a sound decision and to mitigate the anxiety in the default risk. The current study believes that financial information on IC reporting provides information about the investments and utilizations of their IC for lenders to decide whether to ask for a lower debt cost. Thus, it is hypothesized that:

Hypothesis 1 (H1): Financial information on intellectual capital reporting has a negative association with the cost of debt.

2.2.2 Intellectual capital reporting quantified by non-financial information and the cost of debt

Non-financial information is the narration of business activities regarding the utilization of IC for creating the strategy in a superior position competition (Vanini & Rieg, 2019). Managers can describe the non-financial information of IC in an annual report, as it is produced from each firm's different adds values and resources. Sufficient non-financial information which reveals IC information regarding human rights, employee relations, diversity issues, community relations, product issues, etc. significantly improve credit ratings and lower bond yield spreads. Bondholders use non-financial information to assess creditworthy (e.g., Ge & Liu, 2015; Attig et al., 2013).

Further, the findings of prior studies that non-financial information influences debt financing are still inconclusive. Some studies use the index of balance scorecard such as Orens et al. (2010) and Orens et al. (2009) find that the greater IC disclosure, and the lower rate of interest. Furthermore, there are few studies regarding the number of IC items on corporate reporting in the finding of Bouchareb and Kouki (2019) that the more IC disclosure effect on the cost of finance. Iazzolino et al. (2013) suggest that IC non-financial indicators can improve credit scoring, helping lenders to evaluate the risk of firms better. These studies suggest that the more non-financial information, the lower information asymmetry. Conversely, Barus and Siregar (2015) and Stropnik et al. (2017) find that intellectual capital disclosure has no insignificant impact on costs of debt.

This study believes that IC non-financial information provided by the borrowing manager is comprehensive information as a communication tool to reflect the creditworthiness to track the utilization IC resource in business activities and strategies. IC reporting can be a favorable signal to demonstrate the firm's capability, while avoiding giving an unfavorable signal as it can reduce trust of lenders. Thus, the second hypothesis is:

Hypothesis 2 (H2): Non-financial information on intellectual capital reporting has a negative association with the cost of debt.

3. Research Method

3.1 Samples and data collection

The population of this study were 710 firm-year observations made in listed companies on the Market for Alternative Investment (MAI) in Thailand from 2015 to 2019. All financial industries, or 41 firm-year observations, were excluded as their regulations and characteristics of the cost of debt differ from those of other industries (Dadashi et al., 2013). Also, 25 firm-year observations did not end their

accounting year on December 31, 89 firm-year observations had incomplete data, and 1 firm-year observation with a rehabilitation. 225 firm-year observations were also excluded as their annual reports were not in English. Lastly, 33 firm-year observations found to be outliers were excluded. Thus, the final samples were 296 firm-year observations including seven industries which consist of agriculture and food, consumer product, industrial, property and construction, resource, service, and technology. They were suitable representatives because even if they were high growth firms, investors do not pay attention to them like as companies in the SET. This is because they have risks and uncertainty of performance and instability of corporate information (Suttipun, 2022), they rely on debt financing. Additionally, their financial reports comply with regulations like those of the SET.

Also, the study of the relationship between IC reporting and the cost of debt rely on secondary data. IC reporting was used as an independent variable, divided into financial information and non-financial information. Financial information was analyzed from financial statements and notes to financial statements. Non-financial information was derived from annual reports based on the Securities and Exchange Commission of Thailand's website (www.sec.or.th). The cost of debt was used as a dependent variable. Control variables were firm size, firm growth, firm performance, and firm liquidity. The dependent variable and control variables were collected from the SET Market Analysis and Reporting Tool (SETSMART) database.

3.2 Measurement of variables

The variables used in this study. The dependent variable is the cost of debt is referred that the financial expenses, including interest paid on short-term and long-term loans (Talbi & Omri, 2014). The cost of debt reveals financial costs and interest-bearing liabilities according to the debt contract (Bouchareb & Kouki, 2019). Thus, the cost of debt (*CD*) in this study measured by the percentage of financial costs divided by total liabilities.

This study studied two independent variables, namely, financial information and non-financial information. The financial information is the intellectual capital efficiency (*ICE*) which is the sum of human capital efficiency (HCE), structural capital efficiency (SCE), and relational capital efficiency (RCE) (Ulum et al., 2014). ICE has a formulation from the Modified-Value Added Intellectual Coefficient (M-VAIC) developed by Ulum et al. (2014) to comprehensively measure the components of IC: human capital, structural capital, and relational capital. M-VAIC can reflect the performance of intellectual capital and its components used to create a value from monetary investments (Ulum et al., 2014). If in the measurement the value is above one, it means a firm spent more than one monetary unit out of every monetary unit to create the efficiency of IC and its components (Berzkalne & Zelgalve, 2014). Thus, ICE is calculated as follows:

$$HCE = VA/HC \quad (1)$$

Where HCE is a company's created value through monetary unit investments for human resources (Ståhle et al., 2011); VA is the added value of a company (Pulic, 2000); and HC is employee costs consisting of overall salaries, wages and other employee benefits (Sim-im et al., 2019).

Next steps are the calculation of SCE:

$$SC = VA - HC \quad (2)$$

Where structural capital (SC) is the value added (VA) that is influenced by the efficiency of HC and SC (Clarke et al., 2011); VA is the added value of a company (Pulic, 2000); and HC is employee costs consisting of overall salaries, wages and other employee benefits(Sim-im et al., 2019).

$$SCE = SC/VA \quad (3)$$

Where SCE is the ability of a company' process and its structure (Clarke et al., 2011); SC is structural capital; and VA is added value of a company (Pulic, 2000).

$$RCE = RC/VA \quad (4)$$

Where RCE is the efficiency of investment in the relationships of business connections (Ulum et al., 2014); RC is the selling expense (including marketing and advertising expenses); and VA is the added value of a company (Pulic, 2000).

Non-financial information on IC reporting is intellectual capital disclosure (*ICD*) is the sum of number of key words of human capital disclosure (*HCD*), structural capital disclosure (*SCD*), and relational capital disclosure (*RCD*). ICD is measured by using content analysis, which is a technique to analyze textual data (Ulum et al., 2019). Content analysis was used in this study because this approach is reliable, replicable, and quantitative (Krippendorff, 2004). This study developed keywords from previous studies of Bozzolan et al. (2003), Abeysekera and Guthrie (2005), and Li et al. (2008), which were adjusted to fit Thailand regulations. This study used words as units of analysis and the RapidMiner as a technique to classify numbers of keywords in annual reports of firms to avoid human bias and subjectivity analysis (Gupta et al., 2020). This study identified 31 keywords totally with three components: human capital (11 items), structural capital (10 items), and relational capital (10 items) in English annual reports (Appendix 1).

In addition, this study used control variables to reduce the probability of omitted variable bias (Terra, 2011). The control variables employed were firm size (*FS*) is measured by the natural logarithm of total assets (Talbi & Omri, 2014), firm growth (*MTB*) is measured by the equity market value divided by book value (Barus & Siregar, 2015), firm performance (*ROA*) is measured by the net income before interest and tax divided by average total assets (Kamel & Shahwan, 2014), and firm liquidity (*LIQ*) is measured by ratio of current assets divided by current liabilities (Cai et al., 2008).

3.3 Data analysis

The data analysis applied descriptive statistics—means, maximums, minimums, and standard deviations, and a correlation analysis. The relationship between IC reporting and the cost of debt and the control variables were analyzed with panel data analysis from the 296 firm-year observations. The panel

data model was also employed to evaluate group individual effects or time effects, or both to deal with heterogenous or individual effects (Park, 2011). The appropriate model in this study was the fixed effect (FE) model based on the Hausman test (Hausman, 1978). Thus, this study used the following equation:

$$CD_{it} = \beta_0 + \beta_1 ICE_{it} + \beta_2 ICD_{it} + \beta_3 FS_{it} + \beta_4 MTB_{it} + \beta_5 ROA_{it} + \beta_6 LIQ_{it} + \varepsilon_{it} \quad (5)$$

4. Results and Discussion

4.1 Descriptive Statistics

Table 1 presents the values of descriptive statistics used to analyze the basic characteristics of the variables.

Table 1 Descriptive Statistics of Variables

Variable	Mean	Std Dev	Min	Max
CD	2.0387	1.5625	0.0001	10.2367
ICE	2.9811	2.6512	-1.1105	35.2043
ICD	159.42	68.6688	40.0000	332.0000
FS	13.9886	0.8144	12.2919	17.3138
MTB	2.5589	3.0191	0.1809	30.6600
ROA	4.9990	11.1247	-66.8000	59.0700
LIQ	2.4430	2.6732	0.1300	29.2000

The results illustrate that the mean and standard deviation of the cost of debt (CD) are 2.0387 percent and 1.5625, respectively, with minimum and maximum values ranging from 0.0001 to 10.2367. The mean and standard deviation of financial information on IC reporting (ICE) are 2.9811 and 2.6512, with minimum and maximum values ranging from -1.1105 to 35.2043. This indicates that the value of ICE is high (approximately 2.98 million baht of monetary invested), showing that firms can enhance the efficiency of IC and its components based on the actual expenditure for development and management of their resources. Although the minimum and maximum values of ICE show that some firms have a low IC efficiency, most firms can invest in IC to increase IC performance. The mean and standard deviation of non-financial information on IC reporting (ICD) are 159.42 words and 68.6688, with minimum and maximum values ranging from 40 to 332 words. This indicates that numbers of keywords are quite high, showing that firms can integrate IC with strategies for a better understanding in reports (Massaro et al, 2015).

The mean of firm size (FS) is 13.9886, or approximately 1.188 million baht of total asset, standard deviation 0.8144, with minimum and maximum values ranging from 12.2919 to 17.3138, or from 0.217 to 33.057 million baht. The mean of firm growth (MTB) is 2.5589 times, standard deviation 3.0191, with minimum and maximum values ranging from 0.1809 to 30.66 times. The mean of firm performance (ROA) is 4.999 percent and standard deviation 11.1247 with minimum and maximums ranging from -66.8

to 59.07. Finally, the mean value of firm liquidity (LIQ) is 2.443 times, standard deviation 2.6732, with minimum and maximum values ranging from 0.13 to 29.20 times.

4.2 Correlation Analysis

Table 2 demonstrates the Pearson correlation analysis to test the multicollinearity among the seven variables used in this study. The results show statistical significance at two levels, namely at 0.05 level or 0.01 level. The variable values ranging from 0.154 to 0.459 are at 0.01 level while those from 0.133 to 0.136 are at 0.05 level. The maximum correlation is 0.459 at 0.01 level, showing a positive significance between and ICE and FS variables and shows no multicollinearity problem because the correlation is lower than 0.80 (Hair et al., 2010).

Table 2 Pearson correlation matrices

Variables	CD	ICE	ICD	FS	MTB	ROA	LIQ
CD	1						
ICE	-.015	1					
ICD	-.007	.026	1				
FS	.272***	.459***	.154***	1			
MTB	-.037	.133**	-.032	-.065	1		
ROA	-.229***	.300***	.057	.044	-.047	1	
LIQ	-.136**	-.080	-.032	-.297***	-.105	.107	1

Note: ***, ** indicate statistical significance at the 0.01, 0.05 levels, respectively.

4.3 Results and Discussion

Based on panel data analysis, the FE model was used in this study to test the hypotheses. Besides, this study aimed to detect the problems of heteroskedasticity and autocorrelation that lead to FE estimator variances, such as underestimated standard errors and overestimated t-statistics (Baltagi, 2008). In order to provide correct inference, this study applied the robust standard errors command to improve the FE model's efficiency (Wooldridge, 2010).

Table 3 presents the results of the FE regression analysis including industrial fixed effects on control omitted time-invariants with the cost of debt (CD), as dependent variables, IC reporting (ICE and ICD), as independent variables, and four control variables (FS, MTB, ROA, and LIQ). The FE model can predict the relationship between independent variables and one dependent variable, where the R squared value is 0.226. Moreover, the F-test value of the FE model was statistically significant at the 0.05 level and could appropriately predict the dependent variable. The variance inflation factor (VIF) of debt capital and IC reporting were used to test multicollinearity among the independent and control variables. The maximum VIF value in this model, as shown in Table 3, is 1.483.

Table 3 Results of hypotheses testing

Independent Variables	Hypotheses	Dependent Variable: CD		
		Coef.	t-test	p-value
Intercept		-3.096	-0.76	0.449
ICE	H1	-0.183	-2.12	0.037**
ICD	H2	-0.005	-2.11	0.038**
FS		0.432	1.53	0.130
MTB		-0.085	-2.44	0.016**
ROA		0.001	0.10	0.923
LIQ		0.239	6.22	0.000***
R^2			0.226	
F-test			7.97	
p-value			0.000**	
Hausman test			95.97	
p-value			0.000**	
Maximum VIF			1.483	

Note: Results are derived from multiple regression analysis with firm and year fixed-effects. All regressions are estimated with robust standard errors clustered at the firm level. Symbols mean significance at: *** p<0.01, ** p<0.05 ,* p<0.10.

The tests of hypotheses 1-2 show that the coefficient value of ICE and ICD is negatively and significantly associated with CD (H1: β = -0.183; $p < 0.05$, H2: β = -0.005; $p < 0.05$). Thus, hypotheses 1 and 2 are supported. This result implies that the lender is interested in IC reporting giving both financial information and non-financial information. The lender knows that a company reveals its monetary investments and expenses for enhancing IC efficiency to promote future growth and firm wealth (Zakariaa et al., 2020). They can track the investments of firms to evaluate their financial positions and decide whether to lend money at a low cost of debt (Cenciarelli et al., 2018). Moreover, the non-financial IC reporting provides additional information illustrating the firm's ability to manipulate IC for value creation. The lender can observe the business activities and strategic managements and help lenders assess the creditworthiness of managers (Iazzolino et al., 2013). With a comprehensive measure of IC information, the lender receives more information and understands risks through voluntary IC reporting and thus can make a decision (Kamath, 2014).

As can be seen, IC reporting allows the lender to estimate risks, assess the ability to repay of the company, and write careful debt covenants (Gamayuni, 2015; Ge & Liu, 2015). IC reporting represents how borrowing managers can commit to repaying debt financing following to the lender's requirements. Signaling theory shows a negative relationship between IC reporting and the cost of debt, stating that IC reporting provided by managers is an effective signal for lenders' decision making. Financial information

on IC reporting reveals the firm performance based upon IC efficiency investment, while non-financial information discloses its strategies in integrating IC resources for market competition (Caputo et al., 2016). IC reporting has an informative value; it improves credibility and reduce asymmetric information problems between borrowing firms and lenders (Kamath, 2014; Guimón, 2005). Thus, if managers give more information of IC reporting that is beneficial to lenders, it will contribute to a better evaluation and increase their credibility to lenders. This is because lenders are interested in voluntary information on IC reporting that leads to reducing anxiety about the default risk.

Next, the coefficient values among four control variables and the cost of debt (CD) show that firm growth (MTB) is negatively significant with debt capital (β = -0.085; $p < 0.05$), which is consistent with the research of Barus and Siregar (2015), who stated that the greater firm growth reduces the cost of debt, reflecting that a company growing well has a better opportunity to access debt funding. However, the study shows that firm liquidity (LIQ) is positively significant with debt capital (β = 0.239; $p < 0.01$), meaning that a firm with high liquidity has lower current liabilities than long-term debts in its capital structure. Therefore, lenders are strict with firms with inadequate liquidity when making loan covenants (Cai et al., 2008). Conversely, this study shows no effect of firm size (FS) and firm performance (ROA) on debt capital.

5. Recommendation and Contribution

5.1 Recommendation for future research

This study reveals some limitations. Firstly, the keywords from the non-financial data in this study quantifying IC reporting were obtained only from secondary data in the firms' annual reports. Thus, future research can examine keywords that are primary data by interviewing lending institutions for developing and increasing keywords to create an informative value on IC reporting. Secondly, even though this study has used M-VAIC as a proxy to measure financial information and the number of overall keywords of non-financial information on IC reporting, this study does not investigate the components of IC, namely, human capital, structural capital, and relational capital. Future research should consider these components both from financial and non-financial information that is associated with lending institutions.

5.2 Contribution

This study expands the theoretical contribution on IC reporting in an emerging economy, while most prior literature has focused on either financial information or non-financial information, not both. Also, this study highlights the importance of voluntary IC reporting and its relationship with lenders.

This study provides managerial implications for companies registered in the capital market. Firstly, it is first longitudinal study on IC reporting from firms in the alternative capital market in Thailand, while prior studies focused only on the main capital market. Secondly, this study provides more comprehensive information by simultaneously examining both financial and non-financial data from listed firms on the alternative capital market in Thailand. The finding shows that IC reporting can provide valuable insights

beneficial both to lenders who make decisions and to managers who take loans at a lower rate of interest because they give comprehensive information.

6. Conclusion

This study investigates whether intellectual capital (IC) reporting can provide information useful for lenders' decisions. The main objective is to examine the relationship between IC reporting and debt capital of listed companies in the Market for Alternative Investment (MAI) in Thailand, which is one of the emerging economies. The data were collected from 296 firm-year observations from 2015 to 2019. This study finds a negative relationship between IC reporting that contains both financial and non-financial information and the cost of debt. This finding supports the signaling theory, which can be used to explain the action of managers who have more information than lenders and who can choose information for obtaining benefits from lenders. This confirms that more information on IC reporting as a signal can help lenders to assess the ability repay debt, and it also helps reduce the information gap between managers and lenders.

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Appendix

Appendix 1 Keywords of intellectual capital reporting

Keywords of Human capital (11 items)	Keywords of Structural capital (10 items)	Keywords of Relational capital (10 items)
Know-how	Intellectual property	Brands
Employee teamwork	Management philosophy	Business collaborations
Employee training	Corporate culture	Customers
Entrepreneurial spirit	Management processes	Customer loyalty
Employee welfare	Information/Networking systems	Distribution channels
Employee commitment	Financial dealings	Contracts
Employee equality	Research and development	Relationship with stakeholders
Employee capability	Knowledge-based infrastructure	Relationship with suppliers
Employee productivity	Organization structure	Market share
Working knowledge	Quality improvement	Franchise/ Licensing agreements
Work-related competencies		

Note: The keywords were developed from previous studies of Bozzolan et al. (2003), Abeysekera and Guthrie (2005), and Li et al. (2008).