Voluntary Intellectual Capital Disclosure and Earnings Forecast in Indonesia-Malaysia-Thailand Growth Triangle's Pharmaceuticals Sector

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Voluntary Intellectual Capital Disclosure and Earnings Forecast in IMT-GT Countries' Pharmaceuticals Sector

Abstract

Purpose - *This study examines the role of intellectual capital disclosure (ICD) on earnings forecasting by analysts in the pharmaceutical industry in emerging countries, particularly in Indonesia, Malaysia, and Thailand. This study specifically examines the role of each component of the ICD on analysts' forecasts, which consists of errors of forecasted earnings, the standard deviation of forecasted earnings, and analyst recommendations.*

Design/methodology/approach - *Panel data analysis is conducted using a sample of 17 companies from pharmaceuticals industries in IMT-GT, which are listed in the Indonesia Stock Exchange (IDX), Malaysia Stock Exchange (MYX), and Stock Exchange of Thailand (SET) from 2010 to 2017. Secondary data is obtained from Bloomberg and Annual report, where they are being analysed to measure the intellectual capital disclosure & gather the control variables.*

Findings - *The results indicate that the three components of intellectual capital disclosure (ICD), namely human capital disclosure (HCD), structural capital disclosure (SCD), and relational capital disclosure (RCD), insignificantly influence average analysts' consensus recommendation and analysts' earnings forecast dispersion. However, the findings show a significant negative influence of relational capital disclosure (RCD) on analysts' earnings forecast error. In contrast, human capital disclosure (HCD) and structural capital disclosure (SCD) have an insignificant impact.*

Practical implications - *Transparency in disclosing activities related to external parties is essential for the pharmaceutical industry. It is found that relational capital disclosure is the only ICD indicator that can strengthen analysts' profit predictions. Transparency about company activities in maintaining customer satisfaction and activities related to strategic alliances with other organizations are two critical things that can help the accuracy of earnings forecasting from analysts in pharmaceutical companies.*

Originality/value - *This study contributes to ICD-related research by discussing the financial analyst's response to this voluntary disclosure in the pharmaceutical industry, particularly in Indonesia, Malaysia, and Thailand. The selected observation period is seven years, starting one year after the global financial crisis. The results showed that the disclosure of IC is not an exciting thing for financial analysts. In forecasting current earnings, financial analysts are more interested in errors than the previous year's estimates.*

Keywords *Intellectual Capital Disclosure, Earnings Forecast, Pharmaceuticals industry, IMT-GT*

Paper type *Research paper*

1. Introduction

A major financial and economic crisis, also known as the Global Financial Crisis, has happened in one of the economic giants, the United States, in 2007-2009. This unfortunate event was due to high-risk loan provision provided by US Banks to borrowers with poor credit history for a mortgage (Iannuzzi & Berardi, 2010). As a result, many banks and investors experienced a significant loss, makes them stop taking a risk, thereby making the credit market freezing. Since then, the decreasing confidence in the credit market led to a decline in economic growth, and many countries entered a recession from the second half of 2008 (Crotty, 2009).

The recession in developed countries had also been delivering a damaging impact on the emerging countries, including countries in South-East Asia. The emerging countries needed to stabilize their economies; thereby, they do not have excess funds for investment. The decline in loans and investments was a primary reason the emerging countries were impacted severely, considering their high dependency on loans for development assistance (Buysse, 2010). Companies might not bear the high cost of voluntary disclosure during financial crisis periods due to related preparation and competitive costs. Thus, companies will diminish voluntary

disclosure after the financial crisis (Haji & Ghazali, 2012). However, voluntary disclosure in the pharmaceuticals sector is relatively needed to assess the competitive advantages, particularly in high research and development activities (Gray & Skogsvik, 2004).

Indonesia Malaysia Thailand – Growth Triangle (IMT-GT) relationship is chosen to represent the condition of emerging countries' economies in this particular study, as it is believed to be the pioneer in developing a bilateral agreement between countries in ASEAN. Also, the relentless growth of "IMT-GT" might positively influence all ASEAN members (Avianto, 2010). The pharmaceuticals are such an exciting industry to be discussed due to the high valuation of intangible capital, including patents creation, the capitalization of R&D, and advertising (Russell, 2016).

The problem is that intellectual capital disclosure has possessed high voluntary disclosure costs, thus disclosing intellectual capital tends to be voluntary. Therefore, companies have the option to disclose or not to disclose it (Vafaei et al., 2011). However, this problem can be solved if the company realizes the advantages of disclosing its intellectual capital in the published annual reports. According to Kamath (2017), disclosing intellectual capital helps companies reduce information asymmetry between firms and promote stock price. Besides, intellectual capital disclosure could also improve transparency in the company's management due to more intangible asset disclosures than tangible assets (Hatane et al., 2019). Therefore, it provides a chance for stakeholders, including investors, to evaluate the company's prospects and the firm's value. It explains this study's objective, which is to verify whether intellectual capital disclosure impacts the earnings forecast that the analysts had on a firm.

There are limited numbers of articles that explicitly discuss the impact of disclosures on earning forecasting. Most of them discuss corporate disclosure in general, and some of them specifically discuss corporate social disclosure. Therefore, this study gives additional value to research topics of intellectual capital disclosure and earning forecasting. In this study, the analysts' earnings forecast is measured using three measurements: average analysts' consensus recommendation, earnings forecast dispersion, and earnings forecast error in listed pharmaceutical firms in the IMT-GT countries. This study finds that the intellectual capital disclosure components have mixed results regarding the analysts' earnings forecast. Human capital disclosure (HCD), structural capital disclosure (SCD), and relational capital disclosure (RCD) insignificantly influence average analysts' consensus recommendation and analysts' earnings forecast dispersion. However, relational capital disclosure (RCD) shows a significant negative influence towards analysts' earnings forecast error. In contrast, human capital disclosure (HCD) and structural capital disclosure (SCD) have an insignificant influence. The significant negative relationship between RCD and earnings forecast error means that the more disclosure made by the company, the lesser the error would be in the earnings forecast made by analysts for firms. Besides, the insignificant result in average analysts' consensus recommendation and earnings forecast dispersion recommendation might be caused by the fact that analysts in pharmaceuticals in IMT-GT still consider more financial performance aspects rather than non-financial.

The rest of this study is structured as follows: literature review and development of hypotheses in Section 2. Section 3 presents the data and research methodology adopted in this study. Results, discussion, and practical implications are presented in Section 4 and finally closed by concluding remarks and limitations and suggestions for future research in Section 5.

2. Literature review and hypothesis

2.1 Intellectual Capital Disclosure

Intellectual Capital Disclosure (ICD) is a report intended to convey the information needed by the information users who do not have the authority to report compilation to meet their needs for information about intellectual capital (Abeysekera, 2011). Also, *intellectual capital disclosure* can be approved as additional information (Mehrotra, 2018) because these disclosures add complete information to company reports (Bruggen, 2009). Ching & Gerab (2017) also said that this disclosure could reduce information asymmetry by becoming a communication tool between companies and their stakeholders. Disclosure of intellectual capital can also increase stakeholders' trust because more information is available to the public (Bruggen, 2009). Furthermore, there is a finding that intellectual capital disclosure is irrelevant in the capital market (Bukh, 2003). The reason is that capital market players focus too much on particular indicators that standard to be compared among companies, even though they differ significantly in some characteristics. These capital market players do not pay attention to the relationship between the intellectual capital disclosures' indicators and the value creation in the intellectual capital report. Bukh et al. (2005) suggest that analysis of items disclosed in the annual report should provide insight into intellectual capital statements' functions, particularly those related to capital market valuation. Because every information disclosed in the annual report aims to form predictions of its fair value, the information presented must provide the best visualization for investors and analysts to use the information to estimate the company's value creation.

Andreeva & Garanina (2016), Bontis (2010), Abdullah & Sofian (2012), Rehman (2011), Zambon (2015), Guthrie et al. (2012) states that in general *intellectual capital* is categorized in three-part: *human capital, structural capital, and relational capital*. *Human capital* is often referred to as *employee competence* (Nyberg et al., 2015) and is often associated with individuals (Tseng, 2005). Nowadays, companies are encouraged to pay more attention to their employees' ability and quality to react to the industry's transformation (Tarigan et al., 2019). *Human capital* is the intelligence, skills, and expertise of human resources that provide more value to the company (Bontis, 2010). Human capital is a total of competencies, skills, innovation, behavior, commitment, wisdom, and experience of the company's workforce (Obeidat et al., 2017).

Structural Capital is also often referred to as *internal capital* (Tseng, 2005) or *organizational capital* (Obeidat et al., 2017). *Structural Capital* is the company's ability to face external and internal challenges (Gogan, 2015). *Structural Capital* comprises infrastructure, information system, procedure, and company's culture (Gogan, 2015), connection, policy, and other abilities possessed by the company, which will be developed to meet the market's demand (Zangoueinezhad, 2009). *Structural Capital* is believed to be something that the firm possesses (Tarigan et al., 2019).

Relational Capital is also often called and referred to as *external capital* or *relation capital* (Hashim, 2015), which is related to parties' relationships outside the organization, along with loyalty, market share, and level of trust (Zangoueinezhad, 2009). Bontis (2010) says that *relational capital* is capital regarding corporate relationships with stakeholders outside the company, such as customers, distribution channels, business collaboration, franchise agreements, and other external parties' activities.

Prior studies propose that intellectual capital disclosure fail*ure* could worsen the information asymmetry, resulting in the company's misevaluation (Lev et al., 2012). It may lead to higher capital costs (Seow et al., 2016) since the miss valuation of assets values written on the balance sheet related to the intellectual capital (Günther, 2015). As a result, it may cause the firm's stocks to be less liquid (Boone & Raman, 2011). On the other side, intellectual capital disclosure can provide beneficial information for the investors relating to uncertainty in firms' profitability; and help calculate firm value accurately (Hatane et al., 2019). Investors have an interest in the earnings forecast of the company. They want to get the security for their investment by attempting the factual and reliable information about the company, including the intangible assets disclosure (Sheikholeslami, 2011) and the recommendation from the financial analyst about the earnings forecasting. Indeed, forecasting future income growth is believed to be the primary key factor in promising long-term share investing mechanisms (Feldman et al., 2012).

Most researches on intellectual capital disclosures were using the annual report as the media. This study adapted the items used by Yan (2017) and Cabrita (2017) to measure the intellectual capital disclosure variable. Disclosure categories and formats are highly dependent on the level of impression from management. Considering that the qualitative disclosure format is better than not disclosing, this study only uses the number of items disclosed without distinguishing the quantitative and qualitative categories in the form of disclosure. This study also did not check intellectual capital information on the website, as Cabrita (2017) did. The consideration is that the disclosures on the website can only be measured in the most recent year. This study carried out observations over several years and three countries with different languages, so the relevant source for use is the annual report. Therefore, the two sources' elaboration results are 66 disclosure items consisting of 21 HCD items, 24 SCD items, and 21 RCD items. It gives 1 to each point if the statement item is shown in the annual report and zero if not. It is suggested as follows and applies to all the three indicators of intellectual capital disclosure.

$$ICD = \frac{\sum X}{M}$$

(1)

Explanation:

ICD = Company's *Intellectual Capital Disclosure*

X = Disclosed criterion value (value is 1 if disclosed, value is 0 if not disclosed)

M = The maximum quantity of items that the company should disclose.

2.2 Earnings Forecast

The prognoses theory supports the forecasting of the firm's earnings' done by the securities analysts. Prognoses theory indicates the intricacy of predicting future events, such as future profitability, using past or present event factors. The analysts use two approaches when analysing the company, which is through technical or fundamental analysis. Technical analysts usually start with a chart, and they believe that the company's stock price already incorporates all the relevant information (Almujamed, 2013). Contrary, fundamental analysts try to regulate the company's valuation by acknowledging its profit or loss statement, financial position statement, and statement of cash flows. The stock price does not accurately reflect all the possible information (Baresa et al., 2013). In addition to the available financial information that both analysts type base their result, they also can access qualitative information from the managers. Prior studies have advised that analysts can build more precise prognoses than a statistical model merely based on a few quantitative information and access to qualitative information (Brown, 2002).

Earnings Forecast is the financial analysts' estimate for a company's quarterly or annual earnings per share (EPS) (Bradshaw, 2018). A financial analyst is a professional individual or firm in evaluating the financial and investment information, mainly selling, buying, or holding securities. The financial analysts research the economic condition to determine the most accurate stock recommendation in various business sectors for society to invest in (Small, 2016).
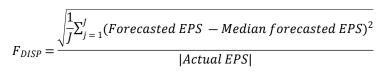
In this study, the earnings forecast is acting as the dependent variable and is divided into three properties: earnings *forecast error, earnings forecast dispersion,* and *average analysts' consensus recommendation* (Maaloul et al., 2016).

The Forecast Error (F_ERROR) is calculated as the absolute result of the difference between actual earnings per share (EPS) and the forecasted EPS divided by the actual EPS (Jones, 2007). Due to the integral use of earnings estimates, most financial analysts tend to overestimate earnings leading to falsified and error information. Financial practitioners often rely on the validity of past analysts' forecast information to predict the future result, which consistently contributes more to the earnings forecast error (Myring & Wrege, 2009).

$$F_{ERROR} = |\frac{Actual\ EPS\ -\ Forecasted\ EPS}{Actual\ EPS}|$$

(2)

Forecast dispersion (F_DISP) is calculated by dividing the standard deviation of EPS forecasts between analysts by the absolute result of actual EPS (Simpson, 2010). Even though the consensus estimates are the primary data mostly adopted by the market participants, it loses its relevancy regarding the forecasts' distribution. For instance, *earnings forecast dispersion* is often perceived as an indicator of leading behaviour between the analysts (Hu, 2015).

$$F_{DISP} = \frac{\sqrt{\frac{1}{J}\Sigma_{j=1}^{J}(Forecasted\ EPS\ -Median\ forecasted\ EPS)^2}}{|Actual\ EPS|}$$

(3)

The Average consensus recommendation (Av. CONS_REC) is measured through accumulated the analysts' suggestions into a number metric from 3 (buy), 2 (hold), to 1 (sell), and the average is being taken (Maaloul et al., 2016). The analysts' earnings forecast is often gathered to generate *average analysts' consensus estimates*. It would then be heavily relied on by the public investors to determine their stock investment choice (Irvine and Liu, 2017).

2.3 Control Variables

The control variable is a variable that is stable in highlighting the relationship between the independent and dependent variables (York, 2018). This study's control variables are the lagged year, analysts' coverage, loss, size, profitability, and growth opportunities.

A lagged year of forecast dispersion (F_DISP), forecast error (F_ERROR), and *average analysts' consensus recommendation (AvCONS_REC)* of the current year are being utilized as effect-controlling on next year forecast dispersion, forecast error, and average analysts' consensus recommendation. *Analyst Coverage* is defined as the number of analysts examining the following firm (Simpson, 2010). The previous study has shown that higher analyst coverage also indicated greater competition among analysts, causing analysts to perform extensive research for the firm and deliver a more accurate forecasting result (Higgins, 2013). According to prior research (Ghosh, 2012), analysts' earnings forecast is more subjective for a firm with losses than a firm with profits. For control, a control variable that gives one of the companies shows negative EPS and otherwise zero for *firm loss* (Higgins, 2013). *Firm Size* is the ratio of the market value of equity on the total asset. Prior studies advocate that analysts make a better forecast for larger firms (Hope, 2003). *Firm Profitability* is also controlled for explaining the analysts' overreaction to these strong characters. (Simpson, 2010). *Firm Profitability* is measured through the firm's return on assets (ROA). *Growth Opportunities* is also controlled for explaining overreaction response from analysts to these company characteristics (Simpson, 2010). For *Growth Opportunities,* it is derived from dividing the equity market value by the book value.

2.4 Hypotheses Development

The previous studies have advised that securities analysts have put so much dependency on the companies' disclosed information to calculate their future income (Higgins, 2013). Besides, analysts will care about their forecast accuracy as it is believed to the crucial dimension that sets off their quality (Lambert, 2004), labels their reputation (Jackson, 2005), and is strongly related to the likelihood of promotion (Groysberg & Healy, 2011). Thus, if the voluntary disclosure serves relevant information and data for the firm's prospects and wealth creation ability, the analyst's forecast accuracy will be enhanced within more intellectual capital disclosure (Günther et al., 2015). As Mouritsen et al. (2004) studied, intellectual capital disclosure can be used as an

internal management tool to communicate the prospect externally, which is a knowledge-based strategy. The *prognoses theory* indicates that the analysts can construct more accurate prognoses than a statistical model based on a few quantitative information and have access to qualitative information. Hence, it is believed that voluntary disclosure has a negative association toward the error in analysts' income forecasts. The more the disclosure is, the lesser the error in the analyst's earnings forecast. This notion is further supported by Orens & Lybaert (2010) that researched non-financial information used by the sell-side financial analysts. They argued that the sell-side analysts who used non-financial information have better earnings forecast accuracy. Besides, research conducted in Taiwan's high-tech industries had proof that firm-specific disclosures on intellectual capital have a negative association with the error of firm revenue forecast (Hsu & Chang, 2011). Dhaliwal (2012) stated that a firm non-financial report's publication could reduce analysts' earnings forecast error. Some prior studies argued that the firm's voluntary disclosure negatively impacts the analysts' error of earnings forecast. However, some researchers also believe that the diverging information quality possessed by voluntary disclosure could exert an erroneous impact on the accuracy of analysts' earnings forecast. It means that the voluntary disclosure may reduce the error in the analysts' earnings forecast (Lang, 2016). Besides, Jones (2007) discovered a restricted effect on the research development area disclosure on the precision negatively impacts before; based on the discussion and analysis, this study's first hypothesis is:

H1(a): *Human capital disclosure* has a negative association with *the error in analysts' earnings forecast.*

H1(b): *Structural capital disclosure* has a negative association with *the error in analysts' earnings forecast.*

H1(c): *Relational capital disclosure* has a negative association with *the error in analysts' earnings forecast.*

The analysts' earnings forecast dispersion is the dispute between the analysts regarding the firm's earnings per share (EPS) (Athanassakos and Kalimipalli, 2003). Indeed, the difference in information will lead to scattered in the analysts' earnings forecast. Each individual will have entry to diverse private data compared to the available one in public. While the information asymmetry exists between these individuals, increased voluntary disclosure is believed to reduce their forecast dispersion due to access to similar information articles (Günther et al., 2015). The stakeholder theory also supports this notion that disclosing intellectual capital could reduce information asymmetry and encourage stakeholders' rights. Besides, a study in firm-specific disclosure provides evidence that voluntary disclosure of non-financial assets has a negative connection to the dispersion data in earnings forecast analysis (Hsu & Chang, 2011). However, the diverse analysts' forecasting models' differences might cause higher dispersion in the earnings forecast. Each individual has a unique forecasting model, even if the same public and private information are available. Hence, an increased voluntary disclosure could contribute to the increased dispersion of earnings forecast, as each analyst could get different findings from the same observation. Therefore, while analysts' forecasting models vary, the increased voluntary disclosure is positively related to the analysts' earnings forecast dispersion (Günther et al., 2015).

Moreover, Athanassakos and Kalimipalli (2003) argued that a firm's stocks with high earnings forecast dispersion tend to possess low returns relative to low forecast dispersion. Although there are contradicting arguments, we are likely to believe that the negative association is logical. Therefore, based on the above discussion and analysis, the second hypothesis of this study is:

H2(a): *Human capital disclosure* has a negative association with *the dispersion in earnings forecasts analysis.*

H2(b): *Structural capital disclosure* has a negative association with *the dispersion in earnings forecasts analysis.*

H2(c): *Relational capital disclosure* has a negative association with *the dispersion in earnings forecasts analysis.*

The analysts' mean recommendation agreement is the analysts' combined estimates in public companies' earnings (Maydybura, 2013). In other words, the analysts provide the data for the company's earnings per share (EPS) and revenue based on the quarter or annual period analysis. The average analysts' consensus recommendation refers to their perspectives on the companies' related stocks. The analysts' argument would be like the following: buy, hold, or sell. Therefore, stocks with a 'large' average consensus recommendation are perceived as the stocks with the best consensus suggestion. In contrast, stocks with 'small' average consensus recommendations are considered the stocks with the least helpful consensus suggestion (Kim et al., 2017). The *signalling theory* suggests that the company's positive signals through disclosures (i.e., non-financial disclosure) could increase investors' confidence and consensus in analysts' stocks recommendation.

Furthermore, as Mouritsen et al. (2004) mentioned, intellectual capital disclosure as part of non-financial disclosure becomes an essential tool in today's organizations to deliver a positive signal to the public. It is believed ICD can cover the limitation of financial statements by providing information about how intellectual resources create future value. Therefore, the increased voluntary disclosure could decrease the information asymmetry level, which could boost the possibility of analysts' most attractive consensus suggestions. It is because more disclosure means a reduction in the firms' earnings uncertainty. Decreased uncertainty will lead to more agreement on the company's stock recommendation. Therefore, the disclosure of intellectual capital has a positive association with the feasibility of the analysts' fairest consensus recommendation (Günther et al., 2015). Based on the above discussion and analysis, the third hypothesis of this analysis is:

H3(a): *Human capital disclosure* has a positive association with the *feasibility of the most pleasing consensus recommendation*

H3(b): *Structural capital disclosure* has a positive association with the *feasibility of the most pleasing consensus recommendation*

H3(c): *Relational capital disclosure* has a positive association with the *feasibility of the most pleasing consensus recommendation*

3. Research methodology

3.1 Sample

To achieve this study's aim, panel data regression that uses crossed time series data by utilizing Gretl software is done by collecting secondary data, testing the hypothesis, and identifying correlation. The sample firms involve listed pharmaceuticals companies in IMT-GT countries listed in the Indonesia Stock Exchange, Malaysia Stock Exchange, and Thailand's Stock Exchange from 2010 until 2017. The pharmaceuticals sectors in IMT-GT are chosen because they have a high valuation of intangibles, particularly in the research and development activities, and represent the economic condition in emerging countries under cooperation

development with IMT-GT financial impact of the global financial crisis. This study uses all secondary data sufficiently provided by annual reports, Bloomberg, and other reliable sources.

Table I The sample observation

Criteria	No. of Observation
Total of listed pharmaceuticals companies in IMT-GT within 2010-2017	23
Companies with the incomplete annual report within the period in Indonesia	(2)
Companies with an incomplete annual report within the period in Malaysia	(2)
Companies with an incomplete annual report within the period in Thailand	(2)
Total companies as the population	17*
Total planned observation period (in years)	8
Trimmed period due to the existence of a lagged variable	(1)
Total observation period (in years)	7
The total sample used in this research* (17x7)	119

Table I shows that the sample observation, which suits the criteria in this research, is 119 firm-year observations from 2010 until 2016.

3.2 Measures

Dependent variable. This measuring the analysts' earnings forecast divided into three variables consists of earnings forecast dispersion, earnings forecast error, and average analyst consensus recommendation. The following year *Forecast dispersion (F_DISP+1)* will be measured through the standard deviation of forecasted EPS from analysts, divided by the absolute actual EPS value (Simpson, 2010). The following year *Forecast error (F_ERROR+1)* is calculated as the absolute result from the difference between actual earnings per share (EPS) and the forecasted EPS and then divided by the actual EPS value (Jones, 2007). The following year *Average consensus recommendation (Av. CONS_REC+1)* will be measured through accumulating the existing practitioner suggestions into a value from 3 (buy), 2 (hold), to 1 (sell), and the average is being taken (Maaloul et al., 2016).

Independent variables. Intellectual capital disclosure is divided into three variables consist of *human capital disclosure (HCD), structural capital disclosure (SCD), and relational capital disclosure (RCD)*. All three components have the same formula. The difference would be in the maximum number of items to be disclosed in the ICD Index list. The formula is explained below.

Intellectual Capital Disclosure = items disclosed in the annual report / maximum number of disclosure items that should be disclosed and finally multiply by 100%

Control variables. This study's control variable is the lagged year, analysts' coverage, loss, size, profitability, and growth opportunities. *A lagged year of forecast dispersion (F_DISP), forecast error (F_ERROR), and average analysts' consensus recommendation (AvCONS_REC)* of the current year will be utilized as effect-controlling on next year forecast dispersion, forecast error, and average analysts' consensus recommendation. *Analyst Coverage (AN_COV)* is defined as the number of analysts examining the following firm (Simpson, 2010). *Firm Loss* will be measured through a controlling variable that gives 1 for companies with negative EPS and 0 (zero) for the positive EPS (Higgins, 2013). *Firm Size* is derived from the division between the market

equity value to the total assets (Hope, 2003). *Firm Profitability* is measured through the firm's return on assets (ROA). *Growth Opportunities* will be derived from the market value of equity divided by the book value.

Table II Variable lists and source of the data

Variable(s)	Definitions
Human Capital Disclosure (HCD)	Human capital items disclosed by the company
Structural Capital Disclosure (SCD)	Structural capital items disclosed by the company
Relational Capital Disclosure (RCD)	Relational capital items disclosed by the company
Forecast Error (F_ERROR+1)	Next year's absolute value of the difference between actual and forecasted EPS divided by actual EPS
Forecast Dispersion (F_DISP+1)	Next year's standard deviation of forecasted EPS
Average Analysts' Consensus Recommendation (AvCONS_RECt+1)	Next year of average analyst's suggestion aggregation
Lagged Forecast Error (F_ERROR)	Current year's absolute value of the difference between actual and forecasted EPS divided by actual EPS
Lagged Forecast Dispersion (F_DISP)	Current year's standard deviation of forecasted EPS
Lagged Average Analysts' Consensus Recommendation (AvCONS_REC)	Current year of average analysts suggestion aggregation
Analysts Coverage (AN_COV)	The number of analysts examining the following firm
Firm Loss (LOSS)	A controlling variable that gives one for companies with negative EPS and zeroes for those who do not
Firm Size (SIZE)	The market value of equity over the total asset of the firm
Firm Profitability (PROF)	The net income over the total asset of the firm (ROA)
Firm Growth Opportunities (GR_OPP)	The market-to-book value of equity ratio

3.3 Model

This study would like to show whether the three intellectual capital disclosure (ICD) components affect analysts' earnings forecast properties. A detailed examination is conducted to see the correlation between the characteristics and disclosure. Regression models are formulated as follows.

$$F\_ERROR_{i,t+1} = \beta 0 + \beta 1\ HCD_{i,t} + \beta 2\ SCD_{i,t} + \beta 3\ RCD_{i,t} + \beta 4\ F\_ERROR_{i,t} + \beta 5\ AN\_COV_{i,t} + \beta 6$$
$$LOSS_{i,t} + \beta 7\ SIZE_{i,t} + \beta 8\ PROF_{i,t} + \beta 9\ GR\_OPP_{i,t} + \varepsilon_{i,t+1} \tag{4}$$

$$F\_DISP_{i,t+1} = \beta 0 + \beta 1\ HCD_{i,t} + \beta 2\ SCD_{i,t} + \beta 3\ RCD_{i,t} + \beta 4\ F\_DISP_{i,t} + \beta 5\ AN\_COV_{i,t} + \beta 6\ LOSS_{i,t}$$
$$+ \beta 7\ SIZE_{i,t} + \beta 8\ PROF_{i,t} + \beta 9\ GR\_OPP_{i,t} + \varepsilon_{i,t+1} \tag{5}$$

$$AvCONS\_REC_{i,t+1} = \beta 0 + \beta\ \beta 1\ HCD_{i,t} + \beta 2\ SCD_{i,t} + \beta 3\ RCD_{i,t} + \beta 4\ AvCONS\_REC_{i,t} + \beta 5\ AN\_COV_{i,t}$$
$$+ \beta 6\ LOSS_{i,t} + \beta 7\ SIZE_{i,t} + \beta 8\ PROF_{i,t} + \beta 9\ GR\_OPP_{i,t} + \varepsilon_{i,t+1} \tag{6}$$

Where:

F_ERROR_{t+1}	= Error in earnings forecast analysis for year t+1;
F_DISP_{t+1}	= Dispersion in earnings forecast analysis for year t+1;
$AvCONS\_REC_{t+1}$	= The mean of consensus suggestions from analysts for year t+1;
F_ERROR_t	= Error in earnings forecast analysis for year t;
F_DISP_t	= Dispersion in earnings forecast analysis for year t;
$AvCONS\_REC_t$	= The mean of consensus suggestions from analysts for year t;

HCD_t = Human Capital Disclosure for year t;

SCD_t = Structural Capital Disclosure for year t;

RCD_t = Relational Capital Disclosure for year t;

AN_COV_t = Analyst coverage for year t;

$LOSS_t$ = Company loss for year t;

SIZE t   = Company size for year t;

$PROF_t$ = Company profitability for year t;

GR_OPP_t = Company growth opportunities for year t;

$\varepsilon_{i,t+1}$ = the residual

β0   = constant of the linear regression

β1, β2, β3, β4, β5, β6,
β7, β8, β9   = regression coefficient of each variable

t denotes periods.

Validity and Reliability

Assessing the classical assumption test in the regression model is crucial. The reliability of variables must be conducted by examining the collinearity variance inflation factor (VIF) values. A multicollinearity test is performed to examine the linear correlation between independent variables and the regression model. Besides, a high correlation between the independent variables will cause a disturbance that threatens data reliability (Wooldridge, 2012). VIFs must be less than 10 in a more relaxed criterion (Wooldridge, 2012). As pictured below in Table III, all variables have passed the multicollinearity.

Table III Collinearity Test

Full Collinearity VIFS	HCD	SCD	RCD	F_ERROR	F_DISP	AvCONS_REC	AN_COV	LOSS	SIZE	PROF	GR_OPP
Model 1	1.379	1.741	1.629	1.108	-	-	1.575	2.9	2.45	3.021	1.239
Model 2	1.35	1.736	1.627	-	1.068	-	1.576	2.955	2.423	3.096	1.252
Model 3	1.346	1.749	1.7	-	-	1.486	2.069	2.902	2.455	3.006	1.231

Source: Author's compilation

Heteroskedasticity is another situation when the variances of errors are not the same with all observations (Wooldridge, 2012). Heteroskedasticity is might become a problem in a study. When the p-value is less than 5%, the implication is the model contains heteroscedasticity. If there is a heteroscedasticity issue, the weighted least square must be conducted to overcome the problem. As shown below in Table IV, the first and second regression models have a heteroskedasticity issue.

Table IV Heteroskedasticity Test

	Model 1	Model 2	Model 3
p-value	0.000001 (hetero)	0.000001 (hetero)	0.925 (homo)

Source: Author's compilation

Panel diagnostic is used to determine the regression model used in this research. Panel Diagnostic yield Fixed Effect estimator and Hausman Test. The panel diagnostic results are shown in Table V. From the table below; the output indicates that the fixed-effect is suitable for the model. However, the previous test shows that the

regression models have a heteroskedasticity issue. It means that a fixed effect cannot be used. Therefore, to overcome heteroscedasticity, this study applied the Weighted Least Squares model (WLS).

Table V Panel Test

	Model 1	Model 2	Model 3
Fixed Estimator	0.0598936	0.0471	0.0069
	OLS	Fixed effect	Fixed effect
Breusch-Pagan test	0.0836262	0.142387	0.991351
	OLS	OLS	OLS
Hausman test	6.52149e-005	3.59043e-005	1.14644e-005
	Fixed effect	Fixed effect	Fixed effect
Conclusion	OLS	Fixed effect	Fixed effect

Source: Author's compilation

4. Research Results and Analysis

4.1 Sample Description

Table VI provides each variable's descriptive statistics, comprising the minimum, maximum, mean, and standard deviation values.

Table VI Descriptive statistics

Variable	Mean	Min	Max	Standard Deviation
HCD	0.52	0.19	0.86	0.15
SCD	0.57	0.21	0.75	0.11
RCD	0.70	0.43	0.95	0.13
ICD	0.60	0.37	0.83	0.10
F_ERROR	0.50	0	14.98	1.61
F_ERRORt+1	0.55	0	14.98	1.69
F_DISP	2.87	0.02	93.60	11.17
F_DISPt+1	3.26	0.16	93.60	11.67
AvCONS_REC	0.97	0.00	3.00	1.29
AvCONS_RECt+1	1.04	0.00	3.00	1.32
AN_COV	1.82	0.00	27.00	4.82
LOSS	0.08	0.00	1.00	0.27
SIZE	1.66	0.36	10.80	1.63
PROF	8.10	-36.78	45.36	8.75
GR_OPP	4.12	-6.48	184.55	17.32

Source: Author's compilation

In Table VI, the HCD as an independent variable shows an average value of 0.52 and a standard deviation of 0.15. It means that the average disclosure for human capital items in pharmaceuticals companies in IMT-GT is 52%, which is slightly above 50%. A standard deviation of 15% means that the annual reports' HCD data do not disperse much. A low standard deviation indicates that most of the data numbers are very close to the

average. The minimum value of 0.19 is obtained from TSPC Indonesia in 2010, the maximum value of 0.86 is derived from INAF Indonesia in 2016.

In comparison, SCD has an average value of 0.57 and a standard deviation of 0.11. As same as HCD, the average value in SCD is relatively higher, above 50%, and indicates that the pharmaceuticals companies in IMT-GT have disclosed as much as 57% on average for the structural capital items, such as the company's vision & mission, R&D, ethical codes in their annual reports. The minimum value is 0.21 belongs to AHEALTH Malaysia in 2010 and 2011, respectively, and the maximum value is 0.75 belongs to KLBF Indonesia in the year 2014-2016. Besides, as the last independent disclosure variable, RCD has an average value of 0.70 and a standard deviation of 0.13. The average disclosure for relational capital items by pharmaceuticals companies in IMT-GT is the highest compared to HCD and SCD, 70% on average. The minimum value of 0.43 is derived from PYFA Indonesia in the year 2010 and 2011 consecutively.

On the other hand, the maximum value of 0.95 belongs to INAF and MERK in Indonesia for 2016 and S&J in Thailand for 2015 and 2016. The maximum value even reached out to 95%, which is the highest than any other disclosures items made in the human and relational capital. Also, ICD, as the accumulative independent disclosure variable, has an average value of 0.60 and a standard deviation of 0.10. The minimum value of 0.37 is obtained from one company in Malaysia, CCMDBIO, in 2010. In contrast, the maximum value of 0.83 is detected only in one company in Indonesia: INAF, within 2016.

4.2 Hypothesis and Research Result

Table VII Panel regression result summary

Independent variables	Dependent Variables		
	F_ERROR1	F_DISP1	AvCONS_REC1
Constanta	0.00092	0.6847	0.9496
HCD	0.0160	-0.1400	0.6648
SCD	0.4619	-0.4410	1.4160
RCD	-0.2300*	-0.0295	0.8830
F_ERROR	0.2541***	-	-
F_DISP	-	0.5116***	-
AvCONS_REC	-	-	0.6118***
AN_COV	-0.0063	-0.0021	0.0483*
LOSS	0.6245	5.5356***	-0.1610
SIZE	0.0146	0.1024	-0.0749
PROF	-0.0080*	-0.0022	0.0014
GR_OPP	0.0002	-0.058	-0.0011
Adjusted R-Square	0.2241	0.2498	0.4662
Notes: statistical significance at the following levels: *** = 1% (highly significant); ** = 5% (significant); * = 10% (weakly significant)			

Source: Author's compilation

Each hypothesis is divided into 3, which are a, b, and c. A represents disclosure in human capital assets, b represents disclosure in structural capital assets, and c represents disclosure in relational capital assets.

For hypothesis one, according to the regression results, as shown in Table VII, the relational capital disclosure has a partial negative association with the analysts' earnings forecast error. This negative relation is mainly supported by the relational disclosure component (p-value = 0.0961) at the 10 percent statistical significance level. Simultaneously, other items such as human and structural are not associated with the error in the firm's earnings forecast. Thus, hypothesis 1(a) and 1(b) are rejected while hypothesis 1(c) is accepted. The result of hypothesis 1(c) is consistent with prior studies that believe these disclosure components negatively affect analysts' earnings forecast error (Orens & Lybaert, 2010; Hsu & Chang, 2011; Dhaliwal, 2012). It is also in line with the prognoses theory that states analysts can compose more accurate prognoses than a statistical model based on a few quantitative information and access qualitative information. The more intellectual capital items are disclosed, the lesser the error in the analysts' earnings forecast as the comprehensive information, both financial and non-financial, is readily available in the annual report.

For hypothesis two, according to the regression results, as illustrated in Table VII, the three components of the intellectual capital disclosure are statistically insignificant on the dispersion in an earnings forecast analysis. Thus, hypotheses 2(a), 2(b), and 2(c) are rejected. The result is contrary to the prior studies that believe these disclosure components negatively affect analysts' earnings forecast dispersion (Vanstraelen et al., 2003; Hsu & Chang, 2011; Günther et al., 2015). This finding contradicts the stakeholder theory that disclosing intellectual capital could reduce information asymmetry and encourage stakeholders' rights.

For hypothesis three, based on the regression results, the three indicators of the intellectual capital disclosure are statistically insignificant to the mean of consensus suggestion between the analysts. This finding is incoherent with previous studies that believe these disclosure components negatively affect average analysts' consensus recommendation (Günther et al., 2015). This result is also not parallel with the signalling theory that suggests that the company's positive signals through disclosures (i.e., non-financial disclosure) could help increase investors' confidence and consensus in analysts' stocks recommendation.

In the first regression model results (Table VII), the outputs depict that the earnings forecast error of the current year, as the control variable, possesses a significant positive association with the firm forecasted revenue error of the subsequent year. It is parallel with studies from Jones (2007) and Simpson (2010). The firm's loss and the firm's revenue forecasted error also include a positively significant association. This result is in the same boat as previous studies (Gu & Wang, 2005; Dhaliwal, 2012) and suggests that analysts' earnings forecast error has more tendency and not too accurate for companies with losses than profits. Moreover, the results show that the relationship between firm growth opportunities and firm revenue forecasted error is positively significant. Higher overreaction among analysts will lead to a higher probability of error in the analysts' earnings forecast.

The second regression model in Table VII also depicts that the earnings forecast dispersion of the current year and control for their effects next year significantly impact the earnings forecast dispersion in the subsequent year. It is following the research from Jones (2007) and Simpson (2010). The relationship between the firm's loss variable and earnings forecast dispersion is positively and statistically associated.

For the third regression model, it shows that the average consensus suggestions of the analysts in the recent year, as the control variable, has a significant positive effect on the average consensus suggestions of the analysts in the subsequent year, which is parallel with studies from Jones (2007) and Simpson (2010). Moreover, the relationship between the firm's analyst's coverage variable and average consensus suggestions among the analysts is also positively associated (Simpson, 2010).

5. Managerial Implication

Most intellectual capital disclosure's components and analysts' earnings forecasts have an insignificant relationship. Intellectual capital disclosure is a voluntary disclosure by the company to convey the information needed by the information users who do not have the authority to report compilation to meet their needs for information about intellectual capital. Toward the analysts, these kinds of information could be incorporated when forecasting the firm's earnings and could increase accuracy due to lower forecast error and dispersion. However, for the intellectual capital disclosure, only relational capital disclosure has a significant negative influence towards the earnings forecast error, while human capital and structural capital do not. The intellectual capital disclosure also appears insignificant toward the earnings forecast dispersion and average analyst's consensus recommendation in this study.

Through this study, the investors may better understand the company's voluntary disclosure and factors that influence analysts' earnings forecast. Therefore, this study is expected to provide useful information for investment decision-making and avoid information asymmetry in the company. While intellectual capital disclosure can give related information to the investors of the company's reliability of profit in the on-going period, financial analysts' forecast on firm earnings is a valuable tool for analyzing the promising probability in their stock investment option.

This study indicates that the more disclosure of relational capital, the more accurate the analyst's profit forecasting. It implies that analysts in the pharmaceutical industry emphasize information in management reports relating to external parties, such as buyers, investors, the public, and other stakeholders. Producing and selling pharmaceutical products is not only physical products but also information about these products because buyers of pharmaceutical products hope to obtain health and improve quality of life. Pharmaceutical products are products with a slow sales life cycle and are closely related to technological developments. Indonesia, Malaysia, and Thailand are developing countries that have limitations in new drug discovery skills. Pharmaceutical companies in developing countries generally establish strategic alliances to build reengineering skills to have the ability to independently develop new products in producing bulk drugs and ultimately be able to produce active pharmaceutical ingredients. Pharmaceutical company transparency in disclosing its activities with consumers, partners, and other stakeholders signals that it can generate profits and maintain its business sustainability. The quantity and quality of this external relationship information help analysts produce more accurate profit predictions; therefore, investors can make more profitable investment decisions.

6. Conclusion and limitation

This paper aims to examine further the association of intellectual capital disclosure using content analysis toward the analysts' earnings forecast for 117 annual reports of pharmaceuticals companies listed in Indonesia, Malaysia, Thailand - Growth Triangle (IMT-GT). The period is from 2011-2017. Intellectual capital disclosure (ICD) is being examined in detail based on three components, which are human capital disclosure (HCD), structural capital disclosure (SCD), and relational capital disclosure (RCD). The main earnings forecast analysis features are average analysts' consensus recommendation, earnings forecast dispersion, and earnings forecast error.

Eventually, several characteristics, such as RCD, are significantly associated with earnings forecast error, as presented in H1 (c). However, some other elements, such as HCD and SCD, are not significant with the earnings forecast error properties. The figures of 0.52 for HCD and 0.57 for SCD are relatively lower than relational capital, which has an average of 70% disclosure in the annual reports of pharmaceuticals companies in IMT-GT countries. The minimum disclosure reaches 19% and 21% for disclosure in human capital and structural capital. That is why it means that the human capital disclosure and structural capital disclosure of pharmaceuticals companies in IMT-GT countries cannot explain the analysts' earnings forecast error, making an insignificant relationship.

ICD delivers the same insignificant results when associated with the dispersion in the earnings forecast and average analysts' consensus suggestion. Besides, this may suggest that the analysts for pharmaceuticals companies in the IMT-GT countries might still consider their analysis based on financial information in the annual report rather than non-financial information (i.e., intellectual capital) determine their earning forecasting result. Although profitability as the financial control variable used in this study is insignificant, the single metric of profitability, which is the return on assets (ROA), could not be justified not to explain the financial information used for observation between the analysts. Besides, analysts might use other financial metrics to see the dispersion in their earnings forecast and recommend favourable stocks for a particular company. It can be leverage, return on equity (ROE), current ratio, and other metrics not covered in this study.

This research contributes to previous studies related to Intellectual Capital (IC), especially in the pharmaceuticals sector that has not been put sufficient spotlight, though having high intellectual capital assets, in the IMT-GT countries soon after the global financial crisis happened. This research used several years for observation, thus contributing to previous research that used only a single year in the S&P 500 (Maaloul et al., 2016). It can be seen from the highest number of relational capital disclosures compared to other ICD components; the results of this study suggest that pharmaceutical companies are very concerned about their relationships with external parties. Pharmaceutical products are products that are closely related to human health and quality of life. The accuracy of profit forecasting from analysts in the pharmaceutical industry is influenced by the size of the company's relational capital disclosures. The trust of consumers and society in general and partnerships with other organizations are positive signals for pharmaceutical companies' profitability.

Finally, the findings in this study are subject to certain limitations, which can be a reference for improving future research. This study covers a limited time, which is seven years from 2010 to 2017, the observed period after the global financial crisis happened. Future studies might want to study for a more extended period, which might lead to different results. This study observes the pharmaceutical industry in IMT-GT countries categorized as industries with high intellectual capital assets. Therefore, it is possible to earn different results if the study observed other sectors. Several ICD measurement methods can be carried out by further research, such as using the word count method, tone, and disclosure through the company's website. These recommendations can enrich the research results in this area of intellectual capital.

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Appendix

Appendix 1. The Items of Human Capital Disclosure

HUMAN CAPITAL (HC)

HC 1 *Professional Skills*	*Qualified Employees*	Number of employees per position level (1)
		Number of employees per education status (2)
		Number of employees per salary level (3)
	Continuous Training	Number of training hours (4)
		Training Themes (5)
		Number of training participants (6)
	Contract	Number of new employees (7)
		Number of permanent employees (8)
		Number of non-permanent employees (9)
		Number of intern employees (10)
HC 2 *Social Competencies*	*Social/Cultural Activities*	Social/cultural activities in the company (11)
		Social/cultural activities with the community (12)
HC 3 *Motivation*	*Promotions and Incentives*	Number of promoted employees (regional, national and international) (13)
		Incentives and bonus for employees (14)
		Incentives plan to maintain employees (15)
		Employees' salary increase (16)
		Employees' satisfaction and attachment (17)
	Stability	Job rotation level (18)
		Employees' absence level (19)
		Average employees' ages (20)
		Employees' identification based on average age (21)

Appendix 2. The Items of Structural Capital Disclosure

STRUCTURAL CAPITAL (SC)		
SC 1 *Corporate Culture*	*Mission and Strategic Objectives*	Vision, Mission, Strategical Objective (1)
		Organization's Functional Structure (2)
		A best practice used in the company (3)
		Company ethical codes & Declaration of missions or principles (4)
	Operational Objectives	Company's management condition (5)
		Company's performance evaluation existence (6)
		Company's performance indicator (7)
	Investigation and Development	Research and development expenses (8)
		Existing project on research-development (9)
	Recognition	*Formal Recognition* in the company and description of the context of the received bonuses (10)
		Company's *Market share* (11)
SC 2 *Internal Cooperation and Transference of Knowledge*	*Team Work and Cooperation Between Departments*	Number of projects (12)
		Employees' flexibility in working (13)
		Plans for competencies management & development of leadership (14)
	Sharing of Tacit Knowledge	Informal activity to share knowledge (15)
		Programs for internal mobility and working flexibility (16)
SC 3 *Technologies of Information and Explicit Knowledge*	*Internal Systems of Communications and Control*	Internal communication media (17)
		External communication media (18)
		Audit system and internal control (19)
	Protocols and Partnerships with Other Organisms	Information technology and communication (20)
		Information technology development and communication (21)
	Quality Evaluation	Certification and achievement obtained (22)
		Internal evaluation methods and results for goods/services (23)
		Results of external evaluation of goods/services (24)

Appendix 3. The Items of Relational Capital Disclosure

RELATIONAL CAPITAL (RC)		
RC 1 *Customer Relations*	*Accessibility and Client Support*	Total branches and location of the branch (1)
		Online Customer service media (2)
		Other *customer service* media (3)
		Offered products /services for clients (4)
	Group Relations	The countries' location of company group (5)
		Goods/services offered by companies in a group of companies (6)
		Strategic alliances for the group (7)
	Client Satisfaction	Number of clients (8)
		Information about systems for managing suggestions and complaints (9)
		Measurement of customer satisfaction (10)
RC 2 *Relations with Investors*	*Future-Oriented Information*	Company growth (11)
		Projects in the future (12)
	Importance of the Investor	Company's investor network (13)
		Investor relationship (14)
RC 3 *Relations with Other Stakeholders*	*Actions in Social and Environmental Fields*	Company's organizational connection (15)
		Social responsibility activities and human rights protection (16)
		Commitment to protecting the environment (17)
	Protocols and Partnerships with Other Organisms	Description of the company's cooperative relations (18)
		Form of the partnership developed or will be developed (19)
	Other Stakeholders	Identification of stakeholders (20)
		Form of communication and company relationships (21)