INDERSCIENCE PUBLISHERS
Linking academia, business and industry through research

International Journal of Learning and Intellectual Capital

2022 Vol.19 No.3

📄 Editorial: Exploring intellectual capital to increase competitiveness: some insights from Asia and the Middle East

Sign up for new issue alerts

Subscribe/buy articles/issues

View sample articles

Latest issue contents as RSS feed 📶

Forthcoming articles

Journal information in easy print format (PDF)

Publishing with Inderscience: ethical statement

Recommend to a librarian (PDF)

Feedback to Editor

Get permission to reproduce content

Find related journals

Keep up-to-date

📝 Our Blog

🐦 Follow us on Twitter

📘 Visit us on Facebook

📋 Our Newsletter (subscribe for free)

📶 RSS Feeds

🚩 New issue alerts

Return to top

INDERSCIENCE P U B L I S H E R S

Linking academia, business and industry through research

International Journal of Learning and Intellectual Capital

🔓 This journal also publishes Open Access articles

Editor in Chief
Prof. Patricia Ordóñez de Pablos

ISSN online
1479-4861

ISSN print
1479-4853

6 issues per year
Subscription price

Impact factor (Clarivate Analytics) 2025
JIF 1.4
JCI 0.32
CiteScore
2.7 (2024)

Scopus

Strategy management involves understanding the forces and causes that explain performance differences between organisations, a result of different stocks of knowledge-based resources and capabilities. The intellectual capital literature focuses on the measurement of firms'knowledge base. It also addresses building guidelines for the development of ''intellectual capital accounts''. *IJLIC* covers the latest advances on organisational learning, knowledge management and intellectual capital measuring and reporting. It promotes ways in which these impact on firms'competitive advantage in the New Economy.

About this journal | Editorial board | Submitting articles

Editor in Chief

- **Ordóñez de Pablos**, Patricia, Universidad de Oviedo, Spain (patriop@uniovi.es)

Associate Editors

- **Edvinsson**, Leif, Lund University, Sweden
- **Karwowski**, Waldemar, University of Central Florida, USA
- **Lee**, W. B., The Hong Kong Polytechnic University, Hong Kong SAR, China
- **Marques**, José Luís Sales, Institute of European Studies of Macao, Macao
- **Tennyson**, Robert D., University of Minnesota, USA
- **Zack**, Michael H., Northeastern University, USA

Editorial Board Members

- **Ahonen**, Guy, Swedish School of Economics and Business Administration, Finland
- **Ash**, Ruth C., Samford University, USA
- **Bierly III**, Paul Emerson, Zane Showker Professor of Entrepreneurship, USA
- **Bukh**, Per Nikolaj, Aalborg University, Denmark
- **Chakrabarti**, Alok K., New Jersey Institute of Technology, USA
- **Crossan**, Mary, The University of Western Ontario, Canada
- **Dal Mas**, Francesca, Ca' Foscari University, UK
- **Gupta**, Anil K., University of Maryland, USA
- **Haridimos**, Tsoukas, ALBA, UK
- **Holtham**, Clive, City University London, UK
- **Kaliannan**, Maniam, Nottingham University Business School, Malaysia

- **Lepak**, David P., Rutgers University, USA
- **Magni**, Domitilla, Roma Tre University, Italy
- **Magnusson**, Mats, Royal Institute of Technology - KTH, Sweden
- **Mentzas**, Gregoris, National Technical University of Athens, Greece
- **Roos**, Göran, Intellectual Capital Services Ltd., UK
- **Schiuma**, Giovanni, University of the Arts, UK
- **Shanley**, Mark, University of Illinois at Chicago, USA
- **Skyrme**, David J., David Skyrme Associates Limited, UK
- **Snell**, Scott A., Cornell University, USA
- **Sohal**, Amrik, Monash University, Australia
- **Sveiby**, Karl-Erik, Hanken Business School, Finland
- **Thomas**, Howard, Singapore Management University, Singapore
- **Van Den Bossche**, Piet, University of Maastricht, Netherlands
- **Vickery**, Graham, Directorate for Science, Technology and Industry, France
- **Wu**, Xiaobo, Zhejiang University, China
- **Xiao**, Zhu Nai, Jinan University, China
- **Zhao**, Jingyuan, University of Toronto, Canada

Sign up for new issue alerts

Subscribe/buy articles/issues

View sample articles

Copyright and author entitlement

Forthcoming articles

Journal information in easy print format (PDF)

Publishing with Inderscience: ethical statement

Recommend to a librarian (PDF)

Feedback to Editor

Get permission to reproduce content

Find related journals

Keep up-to-date

Our Blog

Join us on Bluesky

Follow us on X

Visit us on Facebook

Our Newsletter (subscribe for free)

RSS Feeds

New issue alerts

Inderscience is a member of publishing organisations including:

SJR 🏛 🔖 SI ᔆᴿᴄᴿ G EPI										SCImag

SJR

Scimago Journal & Country Rank

Enter Journal Title, ISSN or Publisher Name 🔍

Home   Journal Rankings   Journal Value   Country Rankings   Viz Tools   Help   About Us

Fast Publication in Scopus

Riset Publication Service										Visit Si

International Journal of Learning and Intellectual Capital

COUNTRY	SUBJECT AREA AND CATEGORY	PUBLISHER	SJR 2024
United Kingdom	Business, Management and Accounting	Inderscience Enterprises Ltd	**0.258** **Q3**
Universities and research institutions in United Kingdom	Organizational Behavior and Human Resource Management		**H-INDEX**
Media Ranking in United Kingdom	Strategy and Management		**29**

PUBLICATION TYPE	ISSN	COVERAGE	INFORMATION
Journals	14794853, 14794861	2004-2024	Homepage
			How to publish in this journal
			patriop@uniovi.es

SCOPE

Strategy management involves understanding the forces and causes that explain performance differences between organisations, a result of different stocks of knowledge-based resources and capabilities. The intellectual capital literature focuses on the measurement of firms'knowledge base. It also addresses building guidelines for the development of "intellectual capital accounts". IJLIC covers the latest advances on organisational learning, knowledge management and intellectual capital measuring and reporting. It promotes ways in which these impact on firms'competitive advantage in the New Economy. Topics covered include: -Intangible resources- Competitive strategy- Knowledge-based view of the firm- Human/relational/social/organisational capital- Human resource management- Intellectual capital reporting- Organisational learning- Social networks- Innovation and knowledge management- Innovation and leadership- Product and process innovation- Technology and innovation management- Dynamic capabilities and routines- Quality- Case studies

 Join the conversation about this journal

Quartiles

SJR
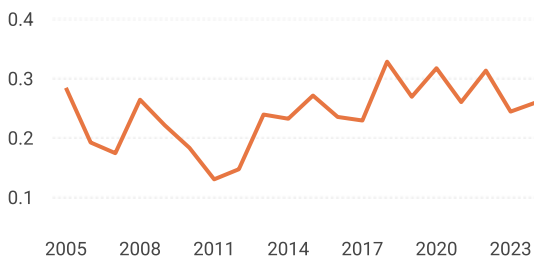
Total Documents
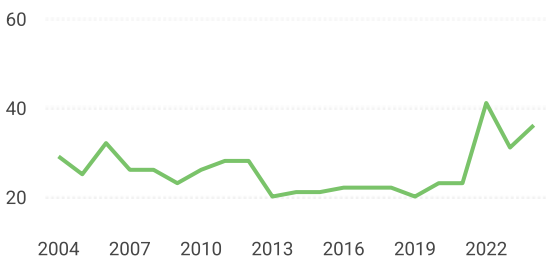
Total Cites   Self-Cites

Citations per document
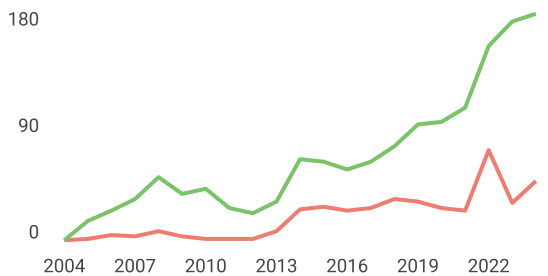
External Cites per Doc   Cites per Doc
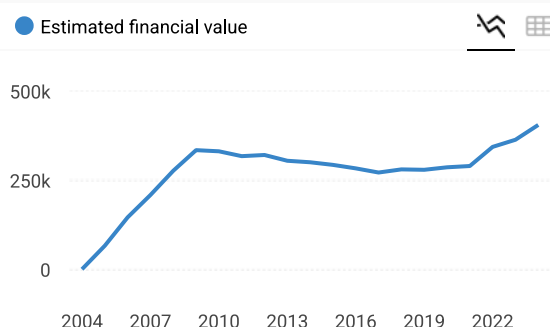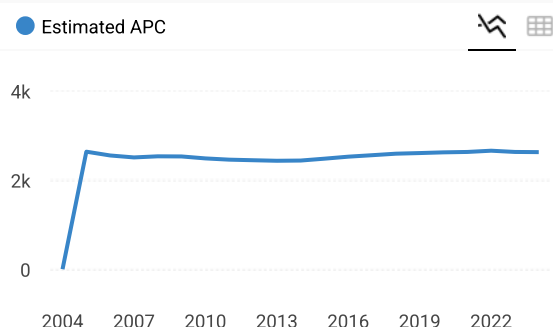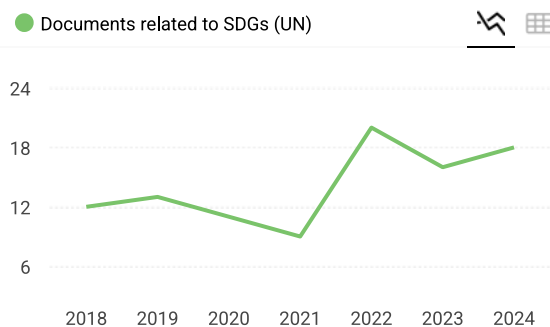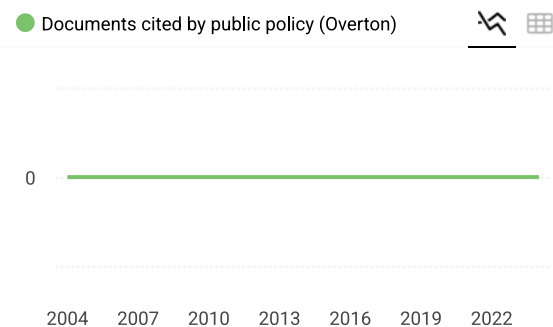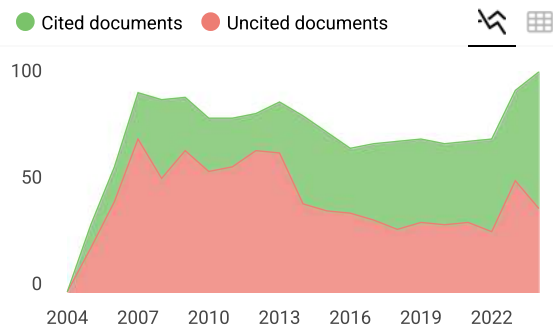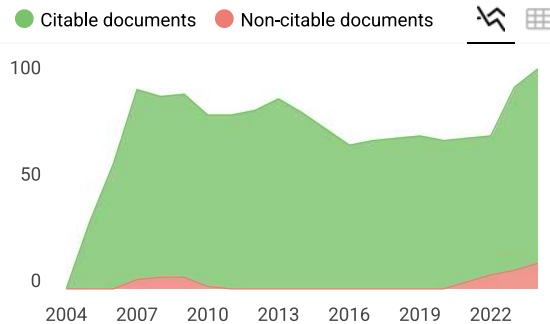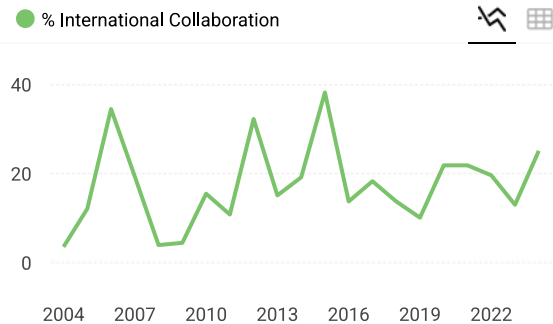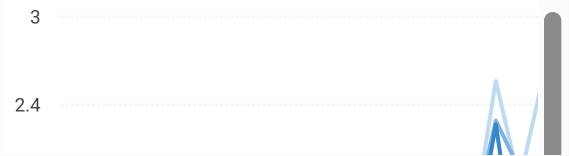
4

2

~~received by the journal's documents.~~

% International Collaboration

40

20

0

2004   2007   2010   2013   2016   2019   2022

3

2.4

Citable documents   Non-citable documents

100

50

0

2004   2007   2010   2013   2016   2019   2022

Cited documents   Uncited documents

100

50

0

2004   2007   2010   2013   2016   2019   2022

% Female Authors

60

40

20

2004   2007   2010   2013   2016   2019   2022

Documents cited by public policy (Overton)

0

2004   2007   2010   2013   2016   2019   2022

Documents related to SDGs (UN)

24

18

12

6

2018   2019   2020   2021   2022   2023   2024

Estimated APC

4k

2k

0

2004   2007   2010   2013   2016   2019   2022

Estimated financial value

500k

250k

0

2004   2007   2010   2013   2016   2019   2022

← Show this widget in
your own website

Just copy the code below
and paste within your html
code:

<a href="https://www.scimag

SCImago Graphica

Explore, visually
communicate and make
sense of data with our
**new data visualization
tool**.

Source details

International Journal of Learning and Intellectual Capital

Years currently covered by Scopus: from 2004 to 2025

Publisher: Inderscience Publishers

ISSN: 1479-4853   E-ISSN: 1479-4861

Subject area: (Business, Management and Accounting: Strategy and Management)

(Business, Management and Accounting: Organizational Behavior and Human Resource Management)

Source type: Journal

View all documents >   Set document alert   💾 Save to source list

CiteScore 2024	ⓘ
2.7	

SJR 2024	ⓘ
0.258	

SNIP 2024	ⓘ
0.539	

CiteScore   CiteScore rank & trend   Scopus content coverage

CiteScore   2024 ⌄

$$2.7 = \frac{316 \text{ Citations } 2021 - 2024}{117 \text{ Documents } 2021 - 2024}$$

Calculated on 05 May, 2025

CiteScoreTracker 2025 ⓘ

$$2.3 = \frac{231 \text{ Citations to date}}{102 \text{ Documents to date}}$$

Last updated on 05 July, 2025 • Updated monthly

CiteScore rank 2024 ⓘ

Category	Rank	Percentile
Business, Management and Accounting └ Strategy and Management	#284/496	42nd
Business, Management and Accounting └ Organizational	#138/234	41st

View CiteScore methodology >   CiteScore FAQ >   Add CiteScore to your site 🔗

Drivers of voluntary intellectual capital disclosure in agriculture companies listed in IMT-GT countries

Josua Tarigan*, Vania Devi and Saarce Elsye Hatane

Universitas Kristen Petra,
Siwalankerto 121-131, Surabaya, Indonesia
Email: josuat@petra.ac.id
Email: vaniadevi24@hotmail.com
Email: elsyehat@petra.ac.id
*Corresponding author

Abstract: This study intends to examine the drivers of disclosing intellectual capital for a sample of agriculture firms listed in Indonesia, Malaysia, Thailand Growth Triangle (IMT-GT) countries. The authors read the annual reports by analysing the content and use quantitative data from the Bloomberg terminal. Ordinary least square (OLS) analysis is conducted to test the hypothesis and identify the correlation between variables. It is revealed that factors affect intellectual capital disclosure, such as firm size, ownership concentration, and auditor type. The findings help regulators understand better and use the factors that explain the company's intellectual capital disclosure in the development of future recommendations. Moreover, it is the first study to explore the IMT-GT relationship for intellectual capital disclosure topics. The cooperation has provided positive signals to the economic growth, thus made it enjoyable to look further at the businesses operating in those countries.

Keywords: firm size; auditor type; ownership concentration; intellectual capital disclosure; ICD; agriculture firms; IMT-GT.

Biographical notes: Josua Tarigan is an Associate Professor in Accounting Department, Universitas Kristen Petra. He is also freelance business consultants in strategic and management accounting. He holds a Certified Management Accountant (CMA) as well as other certifications in Finance (CFP) and Sustainability Reporting Assurance (CSRA). He also served as an editorial board and reviewer for several reputable international journals. He has been recently invited as a keynote speakers at Rangsit University (Thailand) international conference 2019 and 2020 and Visiting Lecturer in Germany for Financing and Investment Appraisal course in 2019 (Munich) and 2020 (Berlin).

Vania Devi graduated major in International Business Accounting from the Universitas Kristen Petra. During her study, she managed to secure an Advanced Diploma in Accounting and Business degree from ACCA. She is currently working in Unilever Enterprises Indonesia as an assistant supply chain and importation manager.

Saarce Elsye Hatane is an Assistant Professor in the Accounting Department of Universitas Kristen Petra, Indonesia. Her path as a researcher in managerial accounting fields has been established for ten years. She has published some articles in reputable journals, both international and Indonesian accredited journal publishers. The topics are corporate governance, intellectual capital, and accounting careers. In addition to supporting her career as a Lecturer and researcher, she also concerns to give consultations for small and medium enterprises.

1 Introduction

No single person can stand to live without food, and no further confirmation is needed for this issue. In addition to food supplied by nature, which is not adequate to support the global population, agriculture should bridge the gap and provide enough food for the constantly growing community. However, agriculture has not received the consideration it deserves, despite the critical role (Lakitan, 2018). In 2008, the substantial rise in food prices in East and South Africa had caused severe food shortages and hunger (Mason et al., 2011). This phenomenon had stirred policymakers worldwide to give more consideration and intensify efforts to guarantee food availability in their particular countries, along with Southeast Asian countries, where rice is their primary staple food.

The continuously growing population is driving higher demand for food supply; thus, it is essential to increase food production. The current climate change that is unpredictable has contributed to the problem and made it even harder to achieve the demanded food production. The possible option for increasing the production of food is by increasing productivity. The role of science and technology in agriculture has promoted growth and improved quality (Naseem et al., 2010). In order to maximise agricultural productivity, technological innovation should be essential. Therefore, technology is vital in increasing food production. Rehman et al. (2016) pointed out that technology is required in the agricultural sector as it plays an essential role in increasing productivity.

In today's economy, intellectual capital (IC) has become an organisation's crucial resource. To cope with the changes and high market competition, businesses should make an ongoing investment to update their employees' knowledge and skills development to compete in the market (Tarigan et al., 2019). Companies become dependent on how management manages the owned resources to create the company value, making it its competitive advantage. Along with that development, companies began to use sophisticated technology to make the production process more efficient. In the knowledge-based business practice, IC has gained tremendous attention from researchers, academics, practitioners, and entrepreneurs. Some researchers, such as Sharabati et al. (2016) and Shahzad (2014), found that IC turned out as the essential asset for the company's promising prospect.

Rashid et al. (2012) stated that IC is an essential resource for generating future profits for the company and the physical and financial capital. Moreover, in their research, Ellis and Seng (2015) also state that IC is an essential component in creating value other than physical assets. They see it as an essential resource in creating success, economic benefits, and value to the company.

The agriculture industry in Indonesia, for example, has been experiencing the impact of IC. Agriculture Minister Amran Sulaiman claimed that modern agricultural techniques and human resources had boosted the country's agricultural production (The Jakarta Post, 2016). Moreover, in Thailand, where agriculture has always been one of Thailand's main economic activities, its government support is currently integrating IC to help transform its agricultural industry (Christopher, 2018). Thai governments also worked with the industry to ensure a sufficient supply of highly educated and skilled workers (Thailand Board of Investment, 2012). This effort has brought many Thai farmers into this digital age improving their productivity and quality (Thailand Board of Investment, 2018).

On the other hand, Malaysia's agriculture sector is set to undergo significant modernisation. It seeks to increase mechanisation, human resources, and improving technological and scientific inputs and outputs and a strong focus on green, sustainable growth (Oxford Business Group, 2017). This modernisation is believed to be able to drive growth in the agriculture sector.

As the economy grows with much investment in intangible assets, Ellis and Seng (2015) found that accounting failed to recognise those assets fully. Thus, traditional financial reports have lost their relevance in providing precise information and reflecting the company's actual performance. To solve the problem in the framework of traditional financial accounting, researchers have tried to discover IC reporting measurement models and methods such as IC Index, Intangible Assets Monitor, Skandia Navigator, or Technology Broker (Bruggen et al., 2009). These models, however, are often regarded as being too firmly specific (Bontis, 2001). There are no transparent reporting and measurement standards of IC. Indeed, the complexities of measuring IC make it hard to put it together with the accounting framework (Hassan and Marston, 2010).

The previously mentioned drawbacks of financial accounting standards and existing IC practices lead to discussions on standardising intellectual capital disclosure (ICD. Practically, standardising intangibles is very hard. Furthermore, due to the current rapid change in IC, a voluntary standard would be more suitable. Zeghal and Maaloul (2011) argue that intangible accounting conservatism makes regulators have little chance of developing an IC standard. Bontis (2001) argued that mandating the disclosure of IC is unlikely. In support of the arguments, Vergauwen and van Alem (2005) argue that limiting the definition of assets in current accounting regulations can increase the chance of material misstatement. Thus, the voluntary disclosure of IC is a suitable way for businesses to meet the needs of information by stakeholders.

Despite the adversity associated with ICD, however, firms have several reasons to disclose IC information. Bruggen et al. (2009) stated that ICD assists companies reduce information asymmetry. Besides, it can improve the accuracy of financial statements. Disclosure of IC can also increase the trust and loyalty of employees and other stakeholders (Ferreira et al., 2012).

Prior studies also examined the drivers for ICD. However, this study is the first to cover the cooperation of Indonesia Malaysia Thailand – Growth Triangle (IMT-GT). 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; IMT-GT, 2019). This cooperation is interesting as it has recorded several important achievements for its member during the past years. The

achievement includes economic growth that reached 4.4% in 2016 and GDP per capita that recorded a value of USD 14,557 in 2016 from USD 11,508 in 2011 (Irawan, 2018). The industry being examined is precisely in the agriculture sector company because this sector is one of the priority areas that the IMT-GT cooperation is trying to develop (Centre for IMT-GT, 2017). It has been recorded as the most significant contributor to Indonesia and Thailand's GDP, accounting for 22.6 percent and 24 percent in 2014. Moreover, Malaysia's agriculture sector has developed and settled industries in a broad scope of downstream activities (Centre for IMT-GT, 2017). The sector has also set to undergo significant modernisation (Oxford Business Group, 2017), thus reflecting that more IC is being invested.

This research is expected to be considered by the company that is currently aware of the new economic developments by giving more attention to its characteristics to be developed, thus help increasing its ICD that is useful for the stakeholders. The company should also consider the importance of disclosing non-financial information, for example, IC, to adapt to the current economy and achieve a competitive advantage. The findings can assist accounting regulators in utilising the factors that explain the company's ICD in the development of future recommendations.

2   Literature review and hypothesis

2.1   IC disclosure

IC is a non-monetary asset or intangible asset that includes technology, employees, knowledge, management processes in an organisation that is helpful in operational activities, including corporate value creation (Hatane et al., 2019). Nowadays, IC has gained tremendous attention from stakeholders with increased knowledge-based companies in the market (Malkawi, 2018). IC as an intangible asset can increase its value (Ferraro and Veltri, 2011). Moreover, disclosure is an approach to pass on data about companies' prospects. The more extensive the disclosure on IC, it can minimise information asymmetry (Widarjo and Bandi, 2018). Currently, IC is viewed as one of the significant contributors in creating a company's value and performance (Bhatti and Zaheer, 2014).

In general, IC consists of three main components, which are human capital (HC), structural capital (SC), and relational capital (RC) (Ellis and Seng, 2015).

HC can be defined as the knowledge, skills, and experience of each individual and the willingness of the individual to share these attributes among other members within the organisation to create value within the organisation (Ellis and Seng, 2015). In this manner, HC is made out of human capacities related to the capacity to take care of business-related issues and militate their effect on the work quality (Wahyuningtyas et al., 2018). Therefore, measuring HC is measured by how knowledge and its contribution have successfully impacted the values of an organisation.

SC relates to structure, process, procedure, or mechanism in a company that includes the culture and organisation passion, copyright, trademark, patent, internal database, and computer system that process the knowledge (Gamerschlag, 2013). It can be seen as the supporting infrastructure to do the innovation in the company. It can help the company to create value for the organisation (Chu et al., 2011).

RC covers aspects in terms of how the company generates revenue from external. It is part of the human and SC involved within its relationship with stakeholders (investor, creditor, customer, supplier, etc.) and perception about the company (Ellis and Seng, 2015).

Most research on ICDs was using the annual report to analyse such disclosure. Specifically, ICD explains consumer loyalty, the competence of employees, employees' training to increase the competence and knowledge-related jobs their innovations, and over the network and information systems. ICDs play an essential role because they can expand investors' knowledge regarding the company's value-added, which is intangible assets. However, as IC is voluntary disclosure, it is not presented in the balance sheet as no regulations are stating about disclosing IC. Therefore, the disclosure of IC is difficult to be counted and measured.

2.2 Evidence of drivers for ICD

Bruggen et al. (2009) consider 125 publicly listed companies with different industry sizes to examine voluntary disclosure of IC in Australia. Based on the content analysis framework for IC categorisation, Bruggen et al. (2009) discovered that IC is communicated more in larger firms than smaller ones and that no specific framework for reporting IC has been set up. It is as well aligns with the agency theory underlying the relationship between firm size and disclosure. Regardless of its commitment to IC literature in Australia, the research is limited to 125 out of more than 1,600 Australian stock exchange-listed companies.

Several studies have been conducted using the same methodology as Bruggen et al. (2009) in different countries (White et al., 2007; Ferreira et al., 2012; Kateb, 2014; Kamath, 2017). While all these researches show the absence of a framework for reporting ICD, some differences can be found across companies regarding the degree of ICD. For instance, in White et al. (2007), the presence of IC-related items was low in the sample of 70 publicly listed Australian companies than in the sample of Bruggen et al. (2009). Their sample, however, is smaller, so the results need to be considered carefully. Likewise, different extents of IC items (SC, HC, and RC) are found in Sri Lanka contrasted with those found in Bruggen et al. (2009). The researchers utilise a similar structure; in any case, the outcomes are different due to test sizes, country regulations, time contrasts, and culture.

Another research conducted by Rahim et al. (2011) in Malaysia shows that firm size and auditor type are not identified as the drivers of ICD. In contrast, Ferreira et al. (2012) researched Portugal shows that type of auditor and firm size significantly affect the level of ICD. Even so, the ownership concentration, profitability, industry type, and IC level did not altogether impact ICD (Ferreira et al., 2012). On the other hand, the study conducted by Taliyang et al. (2011) in Malaysia shows that ownership concentration and growth rate influence ICD.

Given the above discussion, it ends up evident that the IC exposure drivers are not yet obviously known. Similar to studies by White et al. (2007), Bruggen et al. (2009), Mehrotra et al., 2017 and Taliyang et al. (2011), however, the author suggest that size of the firm is an imperative factor in the disclosure of ICs as IC is more important in larger companies, thus it is crucial information for investors. This results in the first hypothesis:

H1a   Firm size affects HC disclosure (HCD).

H1b   Firm size affects SC disclosure (HCD).

H1c   Firm size affects RC disclosure (RCD).

Besides, ownership concentration could play a significant role in disclosing IC information to a company. The fewer control shareholders have over a company's management, which indicates low ownership concentration, the more critical the disclosure, such as IC information, becomes (Ferreira et al., 2012, Widarjo and Bandi, 2018, Mehrotra et al., 2017).

H2a   Ownership concentration affects HCD.

H2b   Ownership concentration affects SCD.

H2c   Ownership concentration affects .RCD.

In Malaysia (Haji and Ghazali, 2013) and Australia (Oliveira et al., 2006, Mehrotra et al., 2017, White et al., 2007) and, the positive connection between leverage and ICD has been confirmed. While in Portugal, leverage is not a critical factor of ICD (Oliveira et al., 2006; Ferreira et al., 2012). However, this result was affirmed by Kang and Gray (2011), who showed a negative connection between ICD and leverage, based on a sample of large firms belonging to develop markets. With the varying results, thus author third state hypothesis:

H3a   Leverage affects HCD.

H3b   Leverage affects SCD.

H3c   Leverage affects RCD.

The findings of previous research on the ICD and profitability relationship are inconclusive. A positive and significant relationship was proved in studies conducted by Haji and Ghazali (2013), Ferreira et al. (2012), and Garcia-Meca et al. (2005). A negative relationship was affirmed by other researchers (Williams and Firer, 2003).

H4a   Profitability affects HCD.

H4b   Profitability affects SCD.

H4c   Profitability affects RCD.

Based on the varying results of White et al. (2007), Ferreira et al. (2012), and Kateb (2014), with the type of auditor as the determinant for ICD, the author state fifth hypothesis:

H5a   Type of auditor affects HCD.

H5b   Type of auditor affects SCD.

H5c   Type of auditor affects RCD.

3 Research methodology

3.1 Sample

An ordinary least squares (OLS) analysis is used to achieve the aim of the study by collecting secondary data, testing hypotheses, and identifying correlation. The sample firms involve listed agriculture companies in IMT-GT. The agriculture industry is being examined because currently, it is one of the focus industries that the cooperation is trying to develop, and for the past years, the industry has an excellent giving contribution to the economy of the countries member (Centre for IMT-GT, 2017). The IMT-GT cooperation itself has positively impacted its members, reflected by the increase in the economy. The data is retrieved from three stock exchanges which are Malaysia Stock Exchange (MYX), Indonesia Stock Exchange (IDX), and Stock Exchange of Thailand (SET), from 2013 until 2017. It should be companies running their business in the agriculture industry sector. This study uses all secondary data sufficiently provided by annual reports and Bloomberg.

Table 1 Summary of the sample observed

Sampling criteria	Number of observations
Companies in the agriculture industry listed in IDX, MYX, and SET from 2013–2017	76
Companies with incomplete annual report	(11)
Companies without 31st December financial year-end	(18)
Total companies as the population	47
Total period (in years)	5
Number of reports/samples	235

Eventually, as seen in Table 1, the final sample is made up of 47 firms for five years, which is 235 firm-year. The analysis steps are as follows: First, content analysis is used to examine the IC reporting practices of the companies. Then, to test the hypotheses, Ordinary Least Square (OLS) regression model is used.

3.2 Measurement

- *Dependent variable*. ICD is divided into three variables: disclosure of SC, HC, and RC. The checklist is a combination from Yan (2017) and Cabrita et al. (2017), as it is better to have more than one source to ensure completeness. A total of 44 items contains HC 20 items, SC 12 items, and RC 12 items. The formula to calculate the disclosure is as follow:
  - a *IC disclosure*. Items disclose in the annual report over the maximum number of disclosure items that should be disclosed multiply by 100%

  b *Independent variables*. An independent variable is a variable that provides the
     foundation of estimation (Lind et al., 2015). An Independent variable can be
     interpreted as a variable that influences and causes other variables, which serve
     as the basis for the result estimated in research. There are five variables: the
     firm's size, the concentration of ownership, leverage, profitability, and auditor
     type. The natural log of total assets calculates the size of the firm. Ownership
     concentration is calculated by dividing the shares owned by the major
     shareholders with the total outstanding shares.

Meanwhile, leverage is calculated from the total debt divided by total equity. At the same
time, profitability measures the return on assets which is net income over total assets.
Lastly, the type of auditor sees the external auditor conduct audit for the company.

Table 2   Definitions of variable and source of data

Variable(s)	Definitions	Data source
Firm size (SIZE)	Natural log of total assets	Annual Report and Bloomberg
The concentration of ownership (OWN)	Percentage of share held by significant shareholder over total outstanding share	Annual Report
Leverage (LEV)	Total liabilities over total assets	Annual Report and Bloomberg
Profitability (PROF)	Net income over total assets	Annual Report and Bloomberg
Auditor type (AUDITOR)	Auditor responsible for auditing the company financial report	Annual Report
Human capital disclosure (HCD)	Human capital items disclosed by a company based on the checklist	Annual Report
Structural capital disclosure (SCD)	Structural capital items disclosed by a company based on the checklist	Annual Report
Relational capital disclosure (RCD)	Relational capital items disclosed by a company based on the checklist	Annual Report

3.3 Model

This paper would like to show whether firm-possessed characteristics impact ICD
components (SC, RC, and HC). A detailed examination is conducted to see the
correlation between the characteristics and disclosure. Regression models are formulated
as follows.

$$HCD = \alpha + \beta_1 SIZE + \beta_2 OWN + \beta_3 LEV + \beta_4 PROF + \beta_5 AUDIT + \varepsilon_{it} \tag{1}$$

$$SCD = \alpha + \beta_1 SIZE + \beta_2 OWN + \beta_3 LEV + \beta_4 PROF + \beta_5 AUDIT + \varepsilon_{it} \tag{2}$$

$$RCD = \alpha + \beta_1 SIZE + \beta_2 OWN + \beta_3 LEV + \beta_4 PROF + \beta_5 AUDIT + \varepsilon_{it} \tag{3}$$

where

HCD	human capital disclosure
SCD	structural capital disclosure
RCD	relational capital disclosure
α	constant
SIZE	firm size
OWN	concentration of ownership
LEV	leverage
PROF	profitability
AUDIT	auditor type
ε	error

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ coefficient regression of each variable.

4 Research results and analysis

It is necessary to perform the classical assumption test in the regression model. The tests include the multicollinearity test and heteroscedasticity test. The reliability of variables must be examined by looking at complete collinearity variance inflation factor (VIF) values. A multicollinearity test is conducted to examine the linear correlation between independent variables and the regression model. A high association between the independent variables will cause a disturbance that threatens data reliability (Wooldridge, 2012). To fulfil the multicollinearity test, VIFs must be less ten in a more relaxed criterion (Wooldridge, 2012). As pictured in Table 3, all variables have passed the multicollinearity.

Table 3 Collinearity test

	Size	Ownership	Leverage	Profitability	Auditor
Full collinearity VIFs	1.229	1.201	1.067	1.104	1.044

Source: Author's compilation

Heteroskedasticity is a condition when the variances of errors are not the same with all observations (Wooldridge, 2012). Heteroskedasticity is an issue for research. Therefore, a test needs to be conducted in order to test the variability. When the p-value is less than 5%, the implication is that the model contains heteroscedasticity. If there is a heteroscedasticity issue, a weighted least square must be conducted to overcome the heteroskedasticity problem. As shown below in Table IV, the regression models have heteroskedasticity issues.

Table 4   Heteroskedasticity test

	HCD	SCD	RCD
p-value	0.000395	0.000877	0.000026

Source: Author's compilation

Panel diagnostic is used to determine the regression model used in this research: panel diagnostic yield FE estimator, Breusch-Pagan test, and Hausman test. The panel diagnostic results are shown in Table 5. From Table 5, the result shows that the fixed effect is suitable for the model. However, the previous test shows that the regression models have heteroskedasticity issues. It means that fixed effect cannot be used. Therefore, to overcome the problem of heteroscedasticity, researchers used weighted least square (WLS).

Table 5   Panel test

	HCD	SCD	RCD
Fixed estimator	6.13524e-43	1.88942e-51	6.13524e-43
	Fixed effect	Fixed effect	Fixed effect
Breusch-Pagan test	1.14675e-54	9.75957e-6	1.14675e-54
	Random effect	Random effect	Random effect
Hausman test	0.0368289	0.0232947	0.036828
	Fixed effect	Fixed effect	Fixed effect
Conclusion	Fixed effect	Fixed effect	Fixed effect

Source: Author's compilation

4.1   Sample description

Table 6 explains the variable's descriptive statistics, consisting of the mean, minimum, maximum, and standard deviation values.

Table 6   Descriptive statistics

Variable	Mean	Min	Max	Standard deviation
Firm size	10.444	8.181	13.524	1.817
Concentration of ownership	0.373	0.018	0.972	0.215
Leverage	0.721	–20.390	27.192	2.428
Profitability	0.028	–0.433	0.280	0.070
Auditor type	0.651	0	1	0.478
HCD	0.669	0.400	0.900	0.125
SCD	0.664	0.333	1.000	0.168
RCD	0.670	0.333	0.917	0.141

Source: Author's compilation

Firm size as an independent variable shows an average value of 10.444 and a standard deviation of 1.817. The minimum value of 8.181 is obtained from SHL in Malaysia, which shows this company has the slightest return of assets. While the maximum value of

13.524 is obtained from SIMP in Indonesia, which shows that SIMP gives the maximum return on its assets. Ownership concentration has an average value of 0.373 and a standard deviation of 0.215. On average, there is no one primary owner within the companies as the average value is below 50%. The standard deviation shows the dispersion of data is 21.5%. The minimum value is 0.018 belongs to UNSP, and the maximum value is 0.972 belongs to SMAR; both are companies from Indonesia. Leverage as an independent variable has an average value of 0.721 and a standard deviation of 2.428. The average is relatively high, which shows that companies have more dependency on debt. The minimum value of -20.390 is from UNSP from Indonesia.

On the other hand, the maximum value of 27.192 is from CPRO from Indonesia. The leverage ratio is the most dispersed data reflected from the minimum and maximum value; thus, the standard deviation is more than 100%. Profitability as an independent variable has an average value of 0.028 and a standard deviation of 0.070. The minimum value of -0.433 is obtained from GZCO from Indonesia. In contrast, the maximum value of 0.280 is obtained from HARN from Malaysia. The type of auditor as an independent variable has an average value of 0.651 and a standard deviation of 0.478. The minimum value of 0 is derived from 7 companies. On the other hand, the maximum value of 1 is derived from the other 40 companies. It shows that more of the agriculture listed companies use top external auditors to do the auditing job.

4.2 Hypothesis and research result

Each hypothesis is divided into 3, a, b, and c. a represents the disclosure of HC, b represents SC disclosure, and c the disclosure of RC.

Table 7 Panel regression

	HCD	SCD	RCD
Firm size	< 0.0001 ***	< 0.0001 ***	< 0.0001 ***
Ownership concentration	< 0.0001 ***	< 0.0001 ***	0.6063
Leverage	0.4764	0.2535	0.7203
Profitability	0.5187	0.1755	0.1122
Type of auditor	< 0.0001 ***	0.0091 ***	0.0010 ***
P-value (F)	0.000	9.29e-97	1.24e-51
Adjusted R-square	0.501	0.860186	0.652341

Notes: statistical significance at the following levels: *** = 1% (highly significant);
** = 5% (significant); * = 10% (weakly significant).
Source: Author's compilation

The first hypothesis stated that firm size impacts SCD, HCD, and RCD. The analysis resulted in that firm size has a significant relationship toward all three components of ICD. Hence, hypotheses 1a, b, and c are accepted. This result is consistent with Eddine et al. (2015) found that the size of firms has an impact on disclosure of IC. It is also consistent with the agency theory that states agency costs from the increasing proportion of external capital can be reduced by disclosing the company's information. Monitoring cost can be minimised while shareholders can have a broader knowledge about the company's condition, including the prospects for creating corporate value in the future.

The larger a company, the higher the chance company will disclose more information, including IC. It is because more influential organisations will generally have more assets and activities to be disclosed. Also, large companies involved more complex relationships between agents and principals so that disclosures are needed. Stakeholders usually give extra attention and supervision to larger companies. Therefore, the company chooses to disclose information about its capital to try fulfilling stakeholders' interests through the information provided. These results supported the previous research done by Taliyang et al. (2012) and Ferreira et al. (2012).

The second hypothesis stated that ownership concentration impacts disclosure of HC, SC, and RC. The analysis showed that ownership concentration has a relationship with HC and SC disclosure and no impact on RCD. Hence, hypotheses 2a and 2b are accepted, and hypothesis 2c is rejected. This finding is appropriate with Oliveira et al. (2006) and Nurunnabi et al. (2011), which demonstrates that more significant size of firms with a higher concentration of ownership will, in general, unveil more data about their IC, but different from Taliyang et al. (2011) finding. It probably happens because the significant shareholder instead puts pressure on the managers to disclose information on IC rather than limiting the manager to disclose important information. Thus, the more concentrated share ownership will increase supervisory actions and pressure on managers in disclosing IC information. The result shows that within the IMT-GT countries, HC and SC become the main focus, as only both components show a significant result. For example, in Indonesia, which focuses on improving HC, and in Thailand, that encourages the development of technology (machine), new methods, and research development to find new and superior seeds.

The third hypothesis stated that leverage impacts disclosure of HC, SC, and RC. The analysis resulted from that leverage has an insignificant relationship toward all three components of ICD. Hence, hypotheses 3a, b, and c are rejected. This result is consistent with Ferreira et al. (2012), Taliyang et al. (2011), and Whiting and Woodcock (2011); however, not quite the same as the research directed by Rashid et al. (2012) and Kamath (2017). It might happen because creditors tend to pay more attention to the company's financial reports than ICD s. It is because the financial statements can better reflect the financial data and the risks the company has. Therefore, non-financial data such as IC became unattractive to the creditor. Besides, contracts such as debt covenants that monitor manager activity are one reason the ICD is not a solution to the conflict of interest between debt holders and management (Nazir et al., 2012; Silva et al., 2013). Companies may use other media for communication with the debt holder to mitigate conflicts and reduce agency costs (Ousama et al., 2012).

The fourth hypothesis stated that profitability has no impact on disclosing HC, SC, and RC. Hence, hypotheses 4a, 4b, and 4c are rejected. For profitability, even though organisations are roused to unveil extra data to help the quality of earnings in high performing year, there might be some information protected because it contains corporate secrets (Isnalita and Romadhon, 2018). It means that whether a company's profitability is high or low does not affect the extent of ICD. However, in line with stakeholder theory which states that all stakeholders have the right to be given information about company activities that affect them so that profits generated by the company is large or small, it does not affect the disclosure of company information, including ICD. Although sometimes companies are motivated to disclose additional information to support the quality of earnings in a high-performance year, there might be information that they

thought to be confidential; thus, they choose not to disclose it and protect it (Fan and Zhang, 2012). Thus, the result can differ between the strategy of each company.

The fifth hypothesis stated that the type of auditor impacts HCD, SCD, and RCD. Therefore, hypotheses 5a, 5b, and 5c are accepted. This outcome is consistent with Whiting and Woodcock (2011) and Ferreira et al. (2012). Companies hired by an associated big four audit firm are proven to have higher ICD. The extensive audit firms need to maintain, urging their clients to provide more wilful disclosure instead of limiting exposure.

Figure 1 Average disclosure of ICD components (see online version for colours)
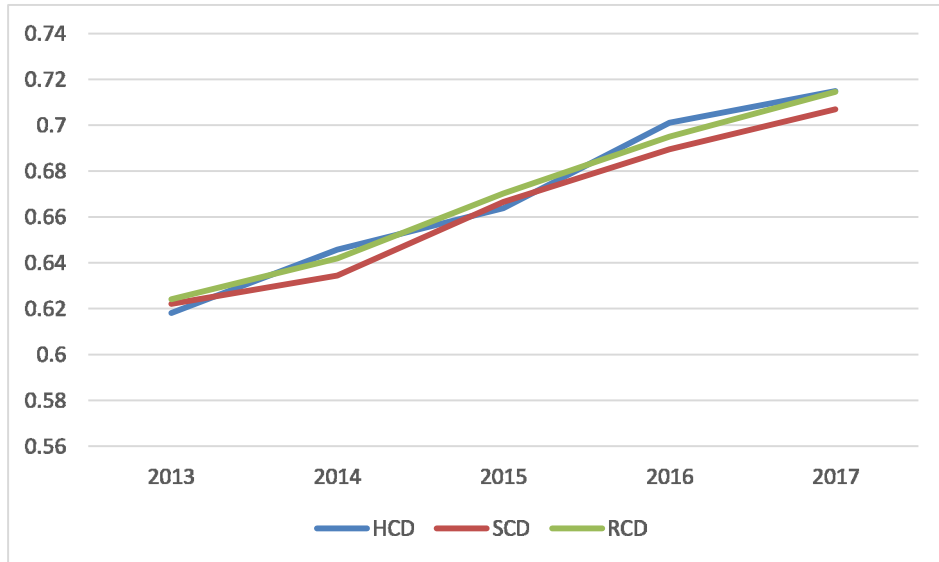

Figure 1 is showing the trend of disclosure within the period of analysis. Throughout the year, the increasing trend is seen from 2013 to 2017. The mean, However, the average disclosure of each component in the data are varied. The most fluctuating disclosure components would be HCD, while the most stagnant could be shown in the RCD disclosure data. Besides, the SCD seems to indicate a steep incline from 2014, with a total of 3.5% more disclosed items. The average disclosures for all components are considered high as it is above 50%. Thus it shows a positive signal that the companies realise the importance of ICD. Among all the three disclosure, RCD is the highest disclosed item, followed by HCD and SCD. However, this result contradicts hypothesis 2c, where RCD has no impact on ownership concentration than the other two components. It possibly happens because, within the IMT-GT, HCD and SCD are the two components being discussed more. For example, in Indonesia, which focuses on improving HC, and in Thailand, that encourages the development of technology (machine), new methods, and research development to find new and superior seeds.

5   Conclusions and limitation

This paper intends to examine further the drivers of ICD using content analysis for 235 annual reports of agricultural industry listed in Indonesia Malaysia Thailand – Growth Triangle (IMT-GT). The period is from 2013-2017. ICD is being examined in detail based on three components which are HCD, SCD, and RCD. The drivers chosen are firm size, ownership concentration, leverage, profitability, and type of auditor. The results demonstrate a high rate of ICD, about 67% from all the samples. The outcome indicates that most of the companies know about the importance of disclosing intellectual capital. Within five variables tested, two are identified as an essential driver for ICD, and one only has partial involvement. The factors are firm size and concentration of ownership, while the type of auditor only partially impacts. These findings support the outcomes from Bruggen et al. (2009), White et al. (2007), and Ferreira et al. (2012), who expressed that size of firms, ownership concentration, and type of auditor are essential in determining the ICD.

The results of this study are expected to be considered by agriculture companies that are currently facing new economic developments. It is suggested that companies should pay more attention to particular characteristics that are proven to have a relationship with ICD. Therefore, focusing on that part can help increase its disclosure on intellectual capital demanded nowadays by the financial statement users. As agriculture companies' existence is crucial for the world, they should adapt to the current environment. The importance of paying attention to non-financial disclosures is another aspect to consider, as non-financial information is proven to gain a competitive advantage. Therefore, it can help the company to experience growth of the company in the future.

Furthermore, investors and stakeholders can consider the extent of disclosure done by companies for seeking profit opportunities and evaluating risk in the company. Another thing to be monitored is the firm characteristics that contribute to the disclosure of intellectual capital. Investors and stakeholders can also find companies that can provide potential added value by paying attention to the intellectual capital part. The benefits that can be gained for ordinary people are to know the existence of intangible assets hidden in the disclosure in financial statements. Besides, investors could also consider the firm characteristics before making any decision of investment. The greater ICD also enables the company to create transparency with its stakeholders and give confidence to potential investors (Hatane et al., 2021). Therefore, the government can encourage business players to disclose IC through implementing regulations to face competitiveness in facing business competition.

This research contributes to previous studies related to IC, especially in agriculture, that have not paid enough attention. This research used several years of observation, contributing to previous research, which uses only a single year. The greater ICD enables the company to create transparency with its stakeholders and give confidence to potential investors. Therefore the government can begin to encourage business players to disclose IC through implementing regulations, in order to face the competitiveness in facing business competition.

At last, the results in this paper are subject to certain limitations. A defined checklist of IC items might not be able to capture the whole ICD practice. Future studies might probably consider additional methods such as interviewing managers on their rationale for disclosure and distributing questionnaires. A more excellent sample may help further

enhance the extrapolation of the results. Lastly, the subsequent research can consider the relationship between ICD and other possible drivers to extend the analysis area.

References

Avianto, B.R. (2010) 'Distortion of capacity on inter-regional trade of IMT-GT: study cases on four selected provinces in Sumatra, Indonesia', *Journal of Indonesian Economy and Business*, Vol. 25, No. 3, pp.308–324.

Bhatti, W.A. and Zaheer, A. (2014) 'The role of intellectual capital in creating and adding value to organizational performance: a conceptual analysis', *The Electronic Journal of Knowledge Management*, Vol. 12, No. 3, pp.187–194.

Bontis, N. (2001) 'Assessing knowledge assets: a review of the models used to measure intellectual capital', *International Journal of Management Reviews*, Vol. 3, No. 1, pp.41–60.

Bruggen, A., Vergauwen, P. and Dao, M. (2009) 'Determinants of intellectual capital disclosure: evidence from Australia', *Management Decision*, Vol. 47, No. 2, pp.233–245.

Cabrita, M.d., Silva, M.d., Rodrigues, A.M. and Dueñas, M.d. (2017) 'Competitiveness and disclosure of intellectual capital: an empirical research in Portuguese banks', *Journal of Intellectual Capital*, Vol. 18, No. 3, pp.486–505.

Centre for IMT-GT (2017) *IMT-GT Implementation Blueprint 2017–2021*, 29 April, Manila, Philippines.

Christopher, M. (2018) *Smart Farming: How Thailand's Advancing Technology is Transforming Its Agriculture Industry*, 19 July [online] https://www.opengovasia.com/smart-farming-how-thailands-advancing-technology-is-transforming-its-agriculture-industry/ (accessed 23 March 2019).

Chu, S., Chan, K. and Wu, W. (2011) 'Charting intellectual capital performance of The Gateway to China', *Journal of Intellectual Capital*, Vol. 12, No. 2, pp.249–276 [online] https://web.hku.hk/~samchu/docs/Chu-2011-Charting-IC-Performance-of-Gateway-to-China.pdf (accessed 23 March 2019).

Eddine, C.O., Abdullah, S.N., Hamid, F.A. and Hossain, D.M. (2015) 'The determinants of intellectual capital disclosure: a meta-analysis review', *Journal of Asia Business Studies*, Vol. 9, No. 3, pp.232–250.

Ellis, H. and Seng, D. (2015) 'The value relevance of voluntary intellectual capital disclosure: New Zealand evidence', *Corporate Ownership & Control*, Vol. 13, No. 1, pp.863–879.

Fan, Q. and Zhang, X. (2012) 'Accounting conservatism, aggregation, and information quality', *Contemporary Accounting Research*, Vol. 29, No. 1, pp.38–56

Ferraro, O. and Veltri, S. (2011) 'The value relevance of intellectual capital on the firm's market value: an empirical survey on the Italian listed firms', *International Journal of Knowledge-Based Development*, Vol. 2, No. 1, pp.66–84 [online] https://ssrn.com/abstract=2187229 (accessed 23 March 2019).

Ferreira, A.L., Branco, M.C. and Moreira, J.A. (2012) 'Factors influencing intellectual capital disclosure by Portuguese companies', *International Journal of Accounting and Financial Reporting*, Vol. 2, No. 2, pp.278–298.

Gamerschlag, R. (2013) 'Value relevance of human capital information', *Journal of Intellectual Capital*, Vol. 14, No. 2, pp.325–345.

Garcia-Meca, E., Perra, I., Larran, M. and Martinez, I. (2005) 'The explanatory factors of intellectual capital disclosure to financial analysts', *The European Accounting Review*, Vol. 14, No. 1, pp.63–94.

Haji, A.A. and Ghazali, N.A.M. (2013) 'A longitudinal examination of intellectual capital disclosures and corporate governance attributes in Malaysia', *Asian Review of Accounting*, Vol. 21, No. 1, pp.27–52.

Hassan, O. and Marston, C. (2010) *Disclosure Measurement in the Empirical Accounting Literature: A Review Article*, Working Paper No. 10-18, Economics and Finance Working Paper Series, Brunel University, London

Hatane, S., Rembulan, T. and Tarigan, J. (2019) 'Intellectual capital disclosure and audit components in non-discretionary income', *Mix: Jurnal Ilmiah Manajemen*, Vol. 9, No. 1, pp.124–140.

Hatane, S.E., Diandra, J.C., Tarigan, J. and Jie, F. (2021) 'Voluntary intellectual capital disclosure and earnings forecast in Indonesia-Malaysia-Thailand growth triangle's pharmaceuticals sector, *International Journal of Emerging Markets*, EarlyCite [online] https://www.emerald.com/insight/content/doi/10.1108/IJOEM-01-2020-0028/full/html.

IMT-GT (2019) *About IMT-GT* [online] http://imtgt.org/about-imtgt/ (accessed 12 January 2019).

Irawan. (2018) *25 Years of Cooperation, IMT-GT Important Achievements Successfully Achieved*, April [online] https://presidentpost.id/2018/04/28/25-tahun-kerja-sama-imt-gt-capaian-penting-berhasil-diraih/ (accessed 23 March 2019).

Isnalita, I. and Romadhon, F. (2018) 'The effect of company characteristics and corporate governance on the practices of intellectual capital disclosure', *International Research Journal of Business Studies*, Vol. 11, No. 3, pp.217–230 [online] [online] http://www.irjbs.com/index.php/jurnalirjbs/article/view/1324.

Kamath, B. (2017) 'Determinants of intellectual capital disclosure: evidence from India', *Journal of Financial Reporting and Accounting*, Vol. 15, No. 3, pp.367–391.

Kang, H. and Gray, J. (2011) 'Reporting intangible assets: voluntary disclosure practices of top emerging market companies', *The International Journal of Accounting*, Vol. 46, No. 4, pp.402–423.

Kateb, I. (2014) 'The determinants of intellectual capital disclosure: evidence from French stock exchange', *International Journal of Accounting and Financial Reporting*, Vol. 4, No. 2, pp.626–646.

Lakitan, B. (2018) 'Research and technology development in Southeast Asian economies are drifting away from agriculture and farmers' needs', *Journal of Science and Technology Policy Management*, Vol. 10, No. 1, pp.251–272.

Lind, D.A., Marchal, W.G. and Wathen, S.A. (2015) *Statistical Techniques in Business and Economics*, McGraw-Hill, New York.

Malkawi, N.M., Omari, K.A. and Halasa, A. (2018) 'Intellectual capital as a core competency for competitive advantage: a case study', *Journal of Digital Information Management*, Vol. 16, No. 4, pp.192–202.

Mason, N., Jayne, T., Chapoto, A. and Donovan, C. (2011) 'Putting the 2007/2008 global food crisis in longer-term perspective: trends in staple food affordability in urban Zambia and Kenya', *Food Policy*, Vol. 36, No. 3, pp.350–367.

Mehrotra, V., Malhotra, A. and Chauhan., A (2017) 'Determinants of intellectual capital disclosure – Indian companies', *International Journal of Learning and Intellectual Capital*, Vol. 14, No. 4, pp.366–387

Naseem, A., Spielman, D. and Omamo, S. (2010) 'Private-sector investment in R&D: a review of policy options to promote its growth in developing-country agriculture', *Agribusiness*, Vol. 26, No. 1, pp.143–173.

Nazir, M.S., Saita, H.K., Ahmed, I. and Nawaz, M.M. (2012) 'The impact of financial leverage on agency cost: empirical evidence from non-financial sector on Pakistan', *Science Series Data Report*, Vol. 4, No. 6, pp.79–94.

Nurunnabi, M., Hossain, M. and Hossain, M. (2011) 'Intellectual capital reporting in a South Asian country: evidence from Bangladesh', *Journal of Human Resource Costing & Accounting*, Vol. 15, No. 3, pp.196–233.

Oliveira, L., Rodrigues, L.L. and Craig, R. (2006) 'Firm-specific determinants of intangibles reporting: evidence from the Portuguese stock market', *Journal of Human Resource Costing & Accounting*, Vol. 10, No. 1, pp.11–33.

Ousama, A., Fatima, A. and Hafiz-Majdi, A. (2012) 'Determinants of intellectual capital reporting: evidence from annual reports of Malaysian listed companies', *Journal of Accounting in Emerging Economies*, Vol. 2, No. 2, pp.119–139.

Oxford Business Group (2017) *The Report: Malaysia 2016*, London, UK [online] https://oxfordbusinessgroup.com/overview/modern-field-new-technology-and-techniques-are-being-implemented-help-grow-sector's-viability (accessed 12 January 2019).

Rahim, A., Atan, R. and Kamaluddin, A. (2011) 'Intellectual capital reporting in Malaysian technology industry', *Asian Journal of Accounting and Governance*, Vol. 2, pp.51–59 [online] http://journalarticle.ukm.my/5440/.

Rashid, A.A., Ibrahim, M.K., Othman, R. and See, K.F. (2012) 'IC disclosures in IPO prospectuses: evidence from Malaysia', *Journal of Intellectual Capital*, Vol. 13, No. 1, pp.57–80.

Rehman, A., Jingdong, L., Khatoon, R. and Hussain, I. (2016) 'Modern agricultural technology adoption its importance, role and usage for the improvement of agriculture', *American-Eurasian Journal of Agriculture & Environmental Science*, Vol. 16, No. 2, pp.284–288.

Shahzad, U. (2014) 'The impact of intellectual capital on the performance of universities', *European Journal of Contemporary Education*, Vol. 10, No. 4, pp.273–280.

Sharabati, A.A.A., Shamari, N.S. and Nour, A.N.I. (2016) 'The impact of intellectual capital on business performance in Kuwaiti telecommunication industry', *International Journal of Business Performance Management*, Vol. 17, No. 4, pp.428–446.

Silva, V.A.B., Saito, R. and Barbi, F.C. (2013) 'The role of bond covenants and short-term debt: evidence from Brazil', *Brazilian Administration Review*, Vol. 10, No. 3, pp.323–346.

Taliyang, S.M., Mustafa, N.H. and Latif, R.A. (2012) 'The determinants of intellectual capital disclosure among Malaysian listed companies', *International Journal of Management and Marketing Research*, Vol. 4, No. 3, pp.25–33.

Tarigan, J., Listijabudhi, S., Hatane, S.E. and Widjaja, D.C. (2019) 'The impact of intellectual capital on financial performance: an evidence from Indonesian manufacturing industry', *Indonesian Journal of Business and Entrepreneurship*, Vol. 5, No. 1, pp.65–76.

Thailand Board of Investment (2012) *Thailand to become a Knowledge-based Economy* [online] https://www.boi.go.th/tir/issue/201204_22_4/211.htm (accessed 23 March 2019).

Thailand Board of Investment (2018) *How Thailand is Bringing Technology to the Table*, CNBC [online] https://www.cnbc.com/advertorial/2018/06/18/how-thailand-is-bringing-technology-to-the-table.html (accessed 23 March 2019).

The Jakarta Post (2016) *Modern Agriculture Development Boosts Production of 11 Commodities: Minister* [online] https://www.thejakartapost.com/news/2016/10/21/modern-agriculture-development-boosts-production-of-11-commodities-minister.html (accessed 23 March 2019).

Vergauwen, P.G.M.C. and van Alem, F.J.C. (2005) 'Annual report: IC disclosure in The Netherlands, France and Germany', *Journal of Intellectual Capital*, Vol. 6, No. 1, pp.89–104.

Wahyuningtyas, R., Astuti, Y. and Anggadwita, G. (2018) 'Identification of intellectual capital (IC) within micro-, small- and medium-sized enterprises (MSMEs): a case study of Cibuntu Tofu Industrial Center in Bandung, Indonesia', *International Journal of Learning and Intellectual Capital*, Vol. 15, No. 1, pp.51–64.

White, G., Lee, A. and Tower, G. (2007) 'Drivers of voluntary intellectual capital disclosure in listed biotechnology companies', *Journal of Intellectual Capital*, Vol. 8, No. 3, pp.517–537.

Whiting, R.H. and Woodcock, J. (2011) 'Firm characteristics and intellectual capital disclosure by Australian companies', *Journal of Human Resource Costing & Accounting*, Vol. 15, No. 2, pp.102–126.

Widarjo, W. and Bandi (2018) 'Determinants of intellectual capital disclosure in the IPOs and its impact on underpricing: evidence from Indonesia', *International Journal of Learning and Intellectual Capital*, Vol. 15, No. 1, pp.1–19.

Williams, S.M. and Firer, S. (2003) 'Association between the ownership structure of Singapore publicly traded firms and intellectual capital disclosures', *Conference AFAANZ*, Australia.

Wooldridge, J. (2012) *Introductory Econometrics: A Modern Approach*, 5th ed., Cengaga Learning, USA.

Yan, X. (2017) 'Corporate governance and intellectual capital disclosures in CEOs' statements', *Nankai Business Review International*, Vol. 8, No. 1, pp.2–21.

Zeghal, D. and Maaloul, A. (2011) 'The accounting treatment of intangibles – a critical review of the literature', *Accounting Forum*, Vol. 35, No. 4, pp.262–274.