ESG AND INTELLECTUAL CAPITAL EFFICIENCY: EVIDENCE FROM ASEAN EMERGING MARKETS

Etikah Karyani  
*Universitas Sebelas Maret, etika.karyani@ibs.ac.id*

Muhamad Resa Perdiansyah  
*Ernst and Young Indonesia, muhamad.r.perdiansyah@id.ey.com*

Follow this and additional works at: [https://scholarhub.ui.ac.id/jaki](https://scholarhub.ui.ac.id/jaki)

Part of the Accounting Commons, Business Analytics Commons, Corporate Finance Commons, Finance and Financial Management Commons, and the Management Sciences and Quantitative Methods Commons

**Recommended Citation**

DOI: 10.21002/jaki.2022.08  
Available at: [https://scholarhub.ui.ac.id/jaki/vol19/iss2/2](https://scholarhub.ui.ac.id/jaki/vol19/iss2/2)

This Article is brought to you for free and open access by the Faculty of Economics & Business at UI Scholars Hub. It has been accepted for inclusion in Jurnal Akuntansi dan Keuangan Indonesia by an authorized editor of UI Scholars Hub.
ESG AND INTELLECTUAL CAPITAL EFFICIENCY: EVIDENCE FROM ASEAN EMERGING MARKETS

Cover Page Footnote
This research was presented at: The 15th Bulletin of Monetary Economics and Banking (BMEB) International Conference and Call for Papers (The 15th BMEB). September 2 – 3 2021. We thank K. P. Prabheesh for reviewing our manuscript from the Asia Pacific Applied Economics Association (APAEA).

This article is available in Jurnal Akuntansi dan Keuangan Indonesia: https://scholarhub.ui.ac.id/jaki/vol19/iss2/2
ESG AND INTELLECTUAL CAPITAL EFFICIENCY: EVIDENCE FROM ASEAN EMERGING MARKETS

Etikah Karyani  
Accounting Department, Universitas Sebelas Maret  
etikah.karyani@staff.uns.ac.id

Muhamad Resa Perdiansyah  
Assurance Services, Ernst and Young Indonesia  
muhamad.r.perdiansyah@id.ey.com

Abstract

This study aims to investigate the impacts of Environmental, Social, and Governance (ESG) in total and individual performance (“E”, “S”, and “G”) on firms’ intellectual capital (IC) efficiency. The Value-Added Intellectual Coefficient (VAIC) and Modified Value-Added Intellectual Coefficient (MVAIC) were used to measure IC efficiency. Meanwhile, the annual ESG index data from the ASEAN-4 were used to measure ESG from 2015 to 2020. The results show “E”, “S”, and “G” and total ESG positively affect firms’ efficiency in managing IC. In addition, the industry type moderates these relationships in terms of that banks have a greater influence than non-banks. Our results are robust, indicating consistent results. This paper contributes to the literature by examining whether ESG is a determinant of non-financial performance; as far as our observation and knowledge, it is still very limited.

Keywords: ESG, intellectual capital, value creation, type of industry

Abstrak


Kata kunci: ESG, modal intelektual, penciptaan nilai, jenis industri
INTRODUCTION

In the current era, companies are required to be more transparent and valuable in providing sustainable finance information as per demand from policymakers or stakeholders (Atan et al. 2016). From a non-financial perspective, investors usually view corporate social responsibility (CSR) disclosures as information, showing that the firm supports sustainable finance. However, according to a joint report from the United Nations Environment Program Finance Initiative (UNEPFI) and the World Business Council for Sustainable Development (WBCSD) (UNEPFI and WBCSD 2010), during the 2007, financial crisis investors and companies concluded that CSR disclosures were insufficient to ensure companies’ reliability and capability to deal with current massive developments of sustainability. Furthermore, environmental, social, and governance (ESG) performance is now used as a new measurement of sustainability in corporate decision-making (Nelson 2020).

This study aims to investigate the effect of total ESG and its individual ESG components (environmental, social, and governance) on intellectual capital (IC) efficiency by comparing the financial and non-financial sectors. According to Wagner (2021), since the COVID-19 pandemic and the social justice movement over the past year, there has been an increase in awareness of ESG issues. Consumers and investors now expect organizations, including financial firms, to incorporate ESG principles into operations, supply chains, talent management, and other essential business areas, in contrast to the situation before the pandemic. The key concerns include firm reputation, client retention, competitive advantage, revenue prospects, and capital access.

The term 'capital' implies productive resources that can be used. The IC concept is an important factor in production and is often the basis of competitive advantage. Together with physical and financial capital, intellectual capital completes the organization's resource suite. It is also related to terms such as ‘assets’ or ‘resources’, and combined with others such as ‘intangible,’ ‘knowledge-based,’ or ‘non-financial’ (Marr 2018). Particularly in the new economic era, companies worldwide have recognized that intangible assets contribute to obtaining superior performance. Therefore, the effectiveness of IC management has been recognized as a very important resource in shaping the value of modern firms and their competitive advantage for modern companies (Nawaz and Haniffa 2017).

In contrast to the non-financial sector, ESG issues related to opportunities and risks are becoming increasingly relevant for financial institutions (KPMG 2021). One of the reasons why financial companies are so reactive to ESG issues is that they can help restore their credibility and reputation following scandals and financial crises (Miralles-Quirós et al. 2019). It is in line with the European commission's commitment to enhance the integration of ESG parameters in all aspects of the financial system. The financial crisis has also increasingly encouraged banks to adopt ESG practices to increase their trust in, apart from customers, and stakeholders (Menicucci and Paolucci 2022). Therefore, this study investigates how ESG in different sectors (financial and non-financial) can affect IC efficiency.

To reach the research objective, data were gathered from all available integrated reports released by ASEAN-listed firms.
between 2015 and 2020. The empirical findings generated can contribute to the literature. First, our study aims to investigate the effect of the total ESG and individual ESG (ENV, SOC, GOV) on capital investment (IC) (non-financial performance). Most previous studies have generally focused on the association between ESG and firm financial performance (Ahmad et al. 2021; Karyani and Maulina 2021; McKinsey 2019; Taliento et al. 2019; Xie et al. 2019). Meanwhile, the association between ESG and firm’s non-financial performance is limited. Recent studies tested the relationship between IC and CSR (Chang and Chen, 2012; Gallardo-Vázquez et al. 2019; Gangi et al. 2019; Rossi et al. 2021; Yu et al. 2017) with mixed results. Compared to CSR, research on ESG as a determinant of non-financial performance, as far as our observations and knowledge are concerned, is still very limited. Therefore, this study may fill this research gap. ESG provides more measurable indicators (including sustainability, ethics, and corporate governance issues) to measure accountability than CSR. Moreover, ESG is one of the non-financial factors that investors are starting to consider in assessing company performance about their investment decision-making (Agostini and Nosella 2017; Nelson 2020).

Second, we measured IC efficiency with different proxies (Modified value-added intellectual coefficient-MVAIC and Value-added intellectual coefficient-VAIC). Our findings allow comparisons of various measures of intellectual capital across different countries and industries, thus extending the empirical results from various angles. Whereas previous studies prefer to focus on a single measurement of the VAIC model which has been widely used by many developed countries. Nimtrakoon (2015) identified the advantages of VAIC; among others, it is easy to use in determining IC value and more objective because it uses secondary data in the form of audited company financial statements. However, this model has several weaknesses in measuring IC since it does not include relational capital (RC), which is very significant in value creation (Agostini and Nosella 2017; Bayraktaroglu et al. 2019; Reboredo and Sowayt 2022).

Meanwhile, the MVAIC model, based on the previous VAIC model, has a focal point on a different model as an IC measure. The advantage of MVAIC is that it can measure the intellectual capital associated with the company's relationship with external parties from a broader perspective. In addition to including RC, the MVAIC model is able to capture the structural capital efficiency (SCE) of a firm more proficiently than the first model (VAIC) (Maji and Goswami 2017; Nimtrakoon 2015; Saddam and Jaafar 2021).

Finally, this study uses firm data from the Association of Southeast Asian Nations (ASEAN); which are interesting for testing due to their commitment to economic stabilization for long-term recovery and growth (OBG 2021). In addition, ESG investment in ASEAN countries shows a growing pattern of encouraging investment changes that prioritize sustainability (Varma and Boulton 2019). Our results can be the basis for future research on ESG and its impact on corporate IC efficiency in corporate and government levels. Furthermore, in 2017, the ASEAN Capital Markets Forum (ACMF) brought together the securities regulators of the 10-member bloc, launched a regional standard based on an international framework to guide the issuance of green bonds, followed in 2018 by standards for both sustainability social ties and ties.
other emerging countries. ASEAN-4 was chosen as the sample because only firms from these countries are listed on the ESG Index.

Figure 1 shows the uptrend of ESG in ASEAN. According to the ASEAN Japan Center (AJC 2019) report, ASEAN regulators were the catalyst for change as they required companies listed on the stock exchange to include ESG in their annual reports (Karyani and Maulina 2021). Furthermore, Thailand has led in terms of average ESG for the past six years, outperforming Philippine, Indonesian, and Malaysian firms. In 2020, ESG experienced its highest level compared to previous years, one of which was due to the demand for investment funds focusing on ESG issues, which increased by 29%, or nearly $1.7 trillion. We found that total ESG and individual ESG should be included as a type of organizational performance that contributes to achieving sustainability by managing IC more efficiently. This paper supports stakeholder theory, the resource-based view (RBV), and the knowledge-based view (KBV). Stakeholder theory seeks to maintain firm value by considering corporate actions such as ESG, while RB and KB theories propose that resources create a firm’s competitive advantages. Otherwise, IC is known as a driver in creating added value for the firm. In addition, stakeholder theory and both views encourage organizational actions to manage their resources more optimally and efficiently. Recently, due to the emergence of the COVID-19 pandemic, investors’ expectations for companies to disclose health and safety metrics are also increasing (ICCR 2020). In addition, companies are required to better maintain the safety of

---

3 For example, based on POJK No.51/POJK.03/2017 and the additional provisions of OJK Letter No. S-264/D.04/2020, Indonesia public companies are required to prepare a Sustainability Report starting in 2021, the Business Sustainability Program by Malaysia, the National Renewable Energy Program 2011-2013 by the Philippines, and the Feed-in premium program by Thailand.

4 According to CFA Institute report, Thailand has established as a regional pioneer in environmental, social, and governance (ESG) reporting. Since 2012, it has risen quickly in the magazine Corporate Knights12’s global ranking of 35 global exchanges, becoming the only Asia-Pacific exchange in the top ten in 2018. The ranking is based on the quality of ESG disclosures by listed companies (Zembrowski et al. 2019).

5 The increase in ESG investment in ASEAN is more due to the region’s increasing focus on building green infrastructure as a way to encourage sustainable recovery from the pandemic, for example building green spaces in densely populated areas for the benefit of public health and the environment (OBG 2021).
workers during the pandemic (Goldberg et al. 2020). Furthermore, the positive effect of ESG (total and individual) was moderated by industry type.

Our findings provide future research with practical and policy implications. This study did not ignore the analysis of the dimensions of both total and individual ESG which many previous researchers have not done. Analysis of each dimension led to our analysis being more in-depth. For practical implication, our study could benefit investors and managers by allowing them to make more accurate investment decisions based on ESG, which reflects the firm’s future value creation capabilities. Regarding policy implications, policymakers and regulators can also better understand whether ESG can be used to control, legislate, and monitor existing operations for their intended purposes.

The rest of this paper is organized as follows. In the second part, a review of the relevant literature is elaborated, and a set of hypotheses is developed. The third part, the methodology, tests the research hypotheses before the empirical results are presented. Finally, the results are discussed, and conclusions are drawn, including suggestions for further research.

**LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

**Resource-Based View (RBV), Knowledge-Based View (KBV), and Stakeholder Theory**

Penrose (1959) proposed the resource-based approach (RBV) for analyzing competitive advantage. It is distinguished by the benefits of a knowledge economy, or an economy based on intangible assets. The assumption of RBV is based on how the firm can compete with other organizations to gain a competitive advantage by managing its resources according to its capabilities. The knowledge-based view (KBV) is a new stakeholder theory, ESG signals information about the company’s version of RBV and provides strong theoretical support for IC. The basic assumptions of KBV originate from the RBV, identifying knowledge as a long-term sustainable competitive advantage for companies that develop the concept of IC. For a more in-depth explanation of the KBV, refer, for example, to (Eisenhardt and Santos 2002) and (Grant 1996). Since ESG is an essential element of a firm’s strategy, it is viewed as a distinct capability by RBV and KBV.

Furthermore, Freeman and Evan (1990) define stakeholders as each identified group or individual which can affect the achievement of organizational goals or which can be influenced by the achievement of goals. The main purpose of stakeholder theory is to help corporate managers understand the stakeholder environment and effectively manage the existing relationships in the corporate environment. Managers have fulfilled the ethical aspects of stakeholder theory when they can optimally manage the organization, especially in creating value for the company.

**Positive Effect of ESG (Total and Individual) Performance on IC Efficiency**

IC is defined as the company’s overall pool of collective knowledge, information, technology, intellectual property rights, experiences, organizational learning and competencies, team communication systems, customer relationships, and brands that add value to it (Stewart 1997). The RBV believes that a company’s competitive advantage stems from its primary resources and capabilities (Barney 1991), as well as its social and environmental responsibility, which can be the main capability used as a competitive advantage (Hart 1995). This study examines how ESG is associated with IC efficiency, in which ESG is split into "E", "S", and "G" dimensions. According to commitment to the welfare and social and environmental issues. ESG information can
improve the firm's reputation and value of intangible assets as reflected in the efficiency of IC, which includes employees' expertise and knowledge contained within the organization (Reboredo and Sowaity 2022).

According to previous studies, IC is influenced by the environmental dimension (“E”), which enables companies to conduct their productive activities in a way that limits damage to the natural environment, and participates in the development of IC (Albertini 2021). Poor environmental performance due to pollution, resulting from inefficient use of resources, reduces productivity (Porter and Linde 1995). Green management allows companies to be more competitive. Those that invest significantly in green management resources cannot only avoid environmental protests or penalties but also to improve their corporate image, develop markets, and increase their competitive advantage (Chen 2008; Lee 2009; Chen et al. 2006). When environmental issues are perceived positively, companies tend to base operations on the interests of shareholders and stakeholders and exhibit more progressive environmental strategies, involving more resources in intellectual capital (Huang and Kung 2011).

Social dimension (“S”) includes the firm’s ability to manage its relationship with its workforce, communities in which it operates, and political environment. Using 83 firms categorized as the world’s most ethical corporations, (Rossi et al. 2021) stated that adopting an ethical and socially responsible approach is related to IC disclosure in a positive way. Firms with good social capital will reduce the need for expensive business activity monitoring processes and lower transaction costs, thus encouraging their creation of added value (Putnam 1994). Social initiatives and activities also assist companies in developing IC, in terms of human capital (HC), by increasing employee loyalty and commitment to achieve a competitive advantage relative to their competitors (Branco and Rodriguez 2006; Kim et al. 2010). In addition, social activities enhanced the firm’s relational capital (RC), one of the components of IC (Shahzad et al. 2021), i.e., its image and reputation (Melo and Garrido-Morgado 2012), and consumer loyalty (Aramburu and Pescador 2019). As a result, we suggest that there might be a relationship between the social dimension and IC efficiency.

Finally, prior studies have emphasized the importance of understanding the corporate governance (CG) or “G” in successfully employing, preserving, and maintaining an organization’s IC (Alfraih 2018; Appuhami and Bhuyan 2015; Gangi et al. 2019). (Aslam and Haron 2020) and (Reboredo and Sowaity 2022) also reported that releasing information on the governance dimension improves IC efficiency in terms of HC, social capital (SC), and RC. The higher the level of CG in managing its IC, the higher the chances of achieving organizational goals (Makki and Lodhi 2014). In accordance with stakeholder theory, firms continue to ensure their survival so that stakeholders believe in their performance and have undertaken the necessary responsibilities, especially regarding the firm’s business activities related to their surrounding community and environment.

This paper suggests the following hypothesis based on the above understandings:

H1: ESG (total) is positively associated with intellectual capital efficiency.

H1a: Environmental dimension is positively associated with intellectual capital efficiency.

H1b: Social dimension is positively associated with intellectual capital efficiency.

H1d: Governance dimension is positively associated with intellectual capital efficiency.
Industry Effect on IC Efficiency

The following section investigates industry-type influences on the positive relationship between ESG and firm IC. Previous studies examined the relationship between ESG and a firm’s performance by comparing a particular sector with other sectors because it is evident that ESG aspects are homogeneous across sectors (see (Garcia et al. 2017); (Johnson et al. 2019)). We considered financial companies (banks) as a moderating variable due to the specificity of their operational activities and the level of regulation differences (Johnson et al. 2019). In addition, financial firms are becoming increasingly reactive to ESG issues (Cash 2018). It was due to the many recent scandals and financial crises that have clashed with the prevailing tendency to value the triple bottom line (Escrig-Olmedo et al. 2019) that can be a turning point for financial firms to restore their credibility and reputation in the eyes of public opinion (Miralles-Quirós et al. 2019). Firer and Williams (2003) also reported that the banking industry is one sector that has intensive IC, and its employees have a more homogeneous intellectual concept compared to other economic sectors.

Thus, the second hypothesis of this study is:

**H2:** ESG–IC association is different in different types of industries

**RESEARCH METHOD**

**Study Sample and Data Collection**

After eliminating outliers, the final sample of observation is 267 firm years of the MVAIC model and 268 firm years for the VAIC model. The sample includes 45 listed companies and ten different sectors of stock exchanges in four ASEAN emerging market countries: Indonesia, Thailand, Malaysia, and the Philippines (ASEAN-4), which have an ESG index covering the 2015-2020 period. Furthermore, Figure 2 compares ESG by sector or industry type.

---

6 According to (Johnson et al. 2019), the business case for ESG practices in South Africa was evaluated by focusing on a sample of JSE-listed companies in six distinct industries (a considered sector: consumer goods, consumer services, healthcare, technology, telecommunications and industrials sectors). Meanwhile, Garcia et al (2017) investigated ESG performance in sensitive industries (those that are more prone to create social and environmental harm and are susceptible to systematic social taboos, moral disputes, and political pressures). The industries' groups of companies that are regarded to be sensitive (oil, gas, chemicals, mining, steel making and paper and pulp). Even after controlling for the firm's size and country, they found that firms in sensitive industries do better in terms of environmental performance than other industries.

7 We observed listed companies in the emerging markets, as a selected market. Stock exchanges
Figure 2 shows the average ESG based on ten sectors during 2015-2020, with the energy sector having the highest performance, followed by real estate, telecommunications, and finance. Lawson (2020) stated that, supported by ASEAN government regulations, energy companies are rapidly improving their ESG values by regulating and manufacturing renewable energy sources and greening environmental projects. Furthermore, energy projects have been funded by around one-third of the allocation of various green bond instruments. On the other hand, the lowest ESG corresponded to the utility sector. This might be due to its difficulty in implementing ESG, as companies are just starting out by setting clear ambitions that aim for short-term operational emission reduction targets (Gaasman and Kelly 2021). This sector is also still having problems with several issues, such as waste disposal and water pollution due to this industry.

Description of Variables

We analyzed the association between ESG and IC and how industry type influences this relationship. We divided our sample into three sub-samples, namely firms that are indexed (1) environmental (ENV), (2) social (SOC), and governance (GOV), when investigating the individual effects of ESG. In terms of attribution, this study further separates two other sub-samples, namely financial industry (FIN) and non-financial industry (NonFIN) when investigating the impact of industry type. ESG, as an independent variable, was obtained from the Refinitiv/S-Network ESG Best Practices Ratings and Indices\(^8\). IC was measured by two methods. First, the Modified Value Added Intellectual Coefficient (MVAIC) model was developed by (Ulum et al. 2014) and (Nimtrakoon 2015). Second, the Value-Added Intellectual Coefficient (VAIC) model, established by (Pulic 1998), is a monetary-based intellectual capital measurement approach that may be used to examine intellectual capital efficiency across industries. We used two approaches to IC estimation because of their advantages and widely used both research and corporate practice to assess the efficiency of intellectual capital (Massaro et al. 2018), so that the results of this study can be compared with their findings. The VAIC model is used to assess the relationship between intellectual capital (Human Capital-HC, Structural Capital-SC, Capital Employed-CE efficiencies, while MVAIC includes Relational Capital (RC) as additional component of VAIC. These measurements show the efficiency of a firm’s value creation. The higher the MVAIC and VAIC, the better the firm utilized its IC resources.

Variables of industry type are dummy, and as in the CSR or ESG literature, we account for control variables at the firm level (firm size-SIZE), industry level (Market to Book Value-MBV), and country level (Growth of GDP-GGDP), to avoid confounding effects. Year-fixed effects were also used to control for time trends, and country-fixed effects were used to adjust for unobserved country

---

\(^8\) Refinitiv/S-Network ESG Best Practices Ratings & Indices is a series of indexes designed to provide corporate benchmarks demonstrating the best practices of corporate social responsibility that are constituents of Environmental, Social and Governance performance. The index represents a comprehensive benchmarking system for CSR investors assessed in 156 main indicators of ESG.
Table 1
Research variables, measurements, predictions, and data sources

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measure</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intellectual Capital (IC)</td>
<td>Modified Value Added Intellectual Coefficient (MVAIC)</td>
<td>[ MVAIC = HCE + SCE + CEE + RCE ]</td>
</tr>
<tr>
<td></td>
<td>Value Added Intellectual Coefficient (VAIC)</td>
<td>[ VAIC = HCE + SCE + CEE ]</td>
</tr>
<tr>
<td></td>
<td>HCE = Human Capital Efficiency = VA / HC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SCE = Structural Capital Efficiency = VA / SC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CEE = Capital Employed Efficiency = VA / CE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RCE = Relational Capital Efficiency = VA / RC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VA = value added = total revenue-cost of goods sold-operating expense (excluding staff expenses)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HC = human capital = labor cost</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SC = structural capital = VA - HC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CE = capital employed = book value of total asset</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RC = relational capital = marketing expenses</td>
<td></td>
</tr>
<tr>
<td><strong>Independent variable</strong></td>
<td>Environmental, Social, Governance (ESG)</td>
<td>ESG = Weight x Index</td>
</tr>
<tr>
<td></td>
<td>Environmental (ENV)</td>
<td>Environment = Weight x Index</td>
</tr>
<tr>
<td></td>
<td>Social (SOC)</td>
<td>Social = Weight x Index</td>
</tr>
<tr>
<td></td>
<td>Governance (GOV)</td>
<td>Governance = Weight x Index</td>
</tr>
<tr>
<td></td>
<td>Finance firms (FIN)</td>
<td>Dummy: 1 for financial firms, 0 for non-financial firms</td>
</tr>
<tr>
<td><strong>Control variable</strong></td>
<td>Bank size (SIZE)</td>
<td>Natural log of corporate total assets</td>
</tr>
<tr>
<td></td>
<td>Market to Book Value (MBV)</td>
<td>Natural log of market price divided by book value</td>
</tr>
<tr>
<td></td>
<td>Country Growth of GDP (GDP)</td>
<td>Natural log of GDP per capita growth (annual %)</td>
</tr>
<tr>
<td></td>
<td>Country dummies (CountryD)</td>
<td>Dummy variable for the countries, Indonesia as a benchmark</td>
</tr>
<tr>
<td></td>
<td>Year dummies (YearD)</td>
<td>Dummy variable for the years of 2015-2019, 2020 as a benchmark</td>
</tr>
</tbody>
</table>

The differences. IC data and other control variables were obtained from the annual financial statements (2015-2020) and the World Bank (www.data.worldbank.org). A detailed description of all the variables is given in Table 1.

**Research Model**
Models (1)-(4) were used to evaluate the relationship between ESG and firm IC (MVAIC and VAIC).

\[
IC_t = \alpha_0 + \alpha_1 ESG_{it} + \alpha_2 FIN_{it} + \alpha_3 MBV_{it} + \alpha_4 GDP_{it} + \alpha_5 CountryD_{it} + \alpha_6 YearD_{it} + e_{it}
\]

(1)

\[
IC_t = \beta_0 + \beta_1 ENV_{it} + \beta_2 FIN_{it} + \beta_3 MBV_{it} + \beta_4 GDP_{it} + \beta_5 CountryD_{it} + \beta_6 YearD_{it} + e_{it}
\]
Table 2
Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observation</th>
<th>Mean</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Std. Dev.</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVAIC</td>
<td>267</td>
<td>4.375</td>
<td>13.129</td>
<td>0.474</td>
<td>2.444</td>
<td>1.231</td>
</tr>
<tr>
<td>VAIC</td>
<td>268</td>
<td>4.259</td>
<td>13.123</td>
<td>0.231</td>
<td>2.444</td>
<td>1.284</td>
</tr>
<tr>
<td>ESG</td>
<td>270</td>
<td>3.220</td>
<td>10.18</td>
<td>0.908</td>
<td>1.609</td>
<td>1.174</td>
</tr>
<tr>
<td>ESG-fin</td>
<td></td>
<td>4.03</td>
<td>8.15</td>
<td>2.04</td>
<td>1.26</td>
<td>0.760</td>
</tr>
<tr>
<td>ESG-nonfin</td>
<td></td>
<td>2.97</td>
<td>10.18</td>
<td>0.91</td>
<td>1.63</td>
<td>1.524</td>
</tr>
<tr>
<td>ENV</td>
<td>270</td>
<td>3.039</td>
<td>9.689</td>
<td>0.875</td>
<td>1.536</td>
<td>1.174</td>
</tr>
<tr>
<td>ENV-fin</td>
<td></td>
<td>3.75</td>
<td>7.58</td>
<td>1.60</td>
<td>1.26</td>
<td>0.752</td>
</tr>
<tr>
<td>ENV-nonfin</td>
<td></td>
<td>2.83</td>
<td>9.69</td>
<td>0.88</td>
<td>1.55</td>
<td>1.486</td>
</tr>
<tr>
<td>SOC</td>
<td>270</td>
<td>2.955</td>
<td>8.799</td>
<td>0.794</td>
<td>1.467</td>
<td>1.072</td>
</tr>
<tr>
<td>SOC-fin</td>
<td></td>
<td>3.69</td>
<td>6.59</td>
<td>1.73</td>
<td>1.16</td>
<td>0.492</td>
</tr>
<tr>
<td>SOC-nonfin</td>
<td></td>
<td>2.72</td>
<td>8.79</td>
<td>0.79</td>
<td>1.47</td>
<td>1.43</td>
</tr>
<tr>
<td>GOV</td>
<td>270</td>
<td>3.324</td>
<td>9.164</td>
<td>0.772</td>
<td>1.661</td>
<td>0.898</td>
</tr>
<tr>
<td>GOV-fin</td>
<td></td>
<td>4.41</td>
<td>9.16</td>
<td>2.23</td>
<td>1.48</td>
<td>0.817</td>
</tr>
<tr>
<td>GOV-nonfin</td>
<td></td>
<td>2.98</td>
<td>8.15</td>
<td>0.77</td>
<td>1.57</td>
<td>1.164</td>
</tr>
<tr>
<td>FIN</td>
<td>270</td>
<td>0.252</td>
<td>1</td>
<td>0</td>
<td>0.431</td>
<td>1.189</td>
</tr>
<tr>
<td>SIZE (million dollar)</td>
<td>270</td>
<td>30,665</td>
<td>203,845</td>
<td>6018</td>
<td>44,150</td>
<td>1.952</td>
</tr>
<tr>
<td>MBR (times)</td>
<td>270</td>
<td>2.458</td>
<td>11.261</td>
<td>0.312</td>
<td>2.119</td>
<td>2.008</td>
</tr>
<tr>
<td>GGDP (%)</td>
<td>270</td>
<td>2.866</td>
<td>7.149</td>
<td>-8.083</td>
<td>0.040</td>
<td>-1.715</td>
</tr>
</tbody>
</table>

Notes:
This table shows descriptive statistics for all variables used in the research. MVAIC and VAIC are the value-added intellectual coefficient. ESG is firms’ ESG. ENV is environmental performance. SOC is social performance. GOV is governance performance. SIZE is a firm size. MBV is market-to-book value. GGDP is GDP growth.

\[ IC_{it} = \gamma_0 + \gamma_1 SOC_{it} + \gamma_2 FIN_{it} + \gamma_3 MBR_{it} + \gamma_4 GDP_{it} + \gamma_5 Country_{it} + \gamma_6 Year_{it} + \epsilon_{it} \]

(3)

\[ IC_{it} = \theta_0 + \theta_1 GOV_{it} + \theta_2 IND_{it} + \theta_3 MBR_{it} + \theta_4 GDP_{it} + \theta_5 Country_{it} + \theta_6 Year_{it} + \epsilon_{it} \]

(4)

where \(i\) and \(t\) represent the firm and year, respectively; \(\epsilon\) denotes the disturbance.

**EMPIRICAL RESULTS AND DISCUSSION**

**Descriptive Statistics**
Table 2 shows the descriptive statistics where the mean values of MVAIC and VAIC are 4.375 and 4.259, respectively. The higher the MVAIC dan VAIC values indicate that the company has more value creation efficiency from its tangible and intangible assets. The highest MVAIC value of 13.129 and VAIC value of 13.123 correspond to an energy company in Thailand, indicating the most efficient use of their IC.

The independent variables, total ESG, ENV, SOC, and GOV, have mean values of 3.220, 3.039, 2.955, and 3.324, respectively. The statistical value explains that the greater the value of these variables, the better the environmental, social, and governance performance. Furthermore, we divided performance by financial and non-financial sectors, which shows that the mean performance of total ESG and individual ESG (ENV, SOC, GOV) for the financial sector was higher than the non-financial sector. Marcyta et al. (2020)
Table 3
Correlation Matrix

<table>
<thead>
<tr>
<th>Probability</th>
<th>ESG</th>
<th>ENV</th>
<th>SOC</th>
<th>GOV</th>
<th>LnMBV</th>
<th>LnSIZE</th>
<th>GGDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESG</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENV</td>
<td>0.964***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC</td>
<td>0.979***</td>
<td>0.981***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOV</td>
<td>0.979***</td>
<td>0.958***</td>
<td>0.974***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LnMBV</td>
<td>0.043</td>
<td>-0.019</td>
<td>0.001</td>
<td>-0.012</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LnSIZE</td>
<td>0.487***</td>
<td>0.473***</td>
<td>0.497***</td>
<td>0.544***</td>
<td>-0.505***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>GGDP</td>
<td>-0.100</td>
<td>-0.104</td>
<td>-0.089</td>
<td>-0.047</td>
<td>-0.031</td>
<td>0.144**</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes:
Standard errors *, **, *** indicate significance at 10%, 5%, and 1%, respectively.
ESG represents firms’ ESG. ENV is environmental performance. SOC is social performance. GOV is governance performance. LnSIZE is the natural log of firm size. LnMBV is the natural log of the market-to-book value. GGDP is the natural log of GDP growth.

stated that banks rely heavily on public trust, reputation, and corporate image, so banks are expected to have higher ESG (undertaking more ESG) to maintain their sustainability. Furthermore, the non-financial sector represents 75% of our samples, while the financial sector represents the remainder (25%).

Concerning the control variables, SIZE (total assets) has a mean value of USD 30.665 million, with the largest asset value owned by a Malaysian bank. In addition, the mean value of the market-to-book ratio in ASEAN-4 was 2.5 times, with the most expensive shares were 11 times and the cheapest ones were 0.3 times. The average GDP growth rate (GGDP) in ASEAN was 2.85%, with the lowest growth experienced in 2020. The Philippines had the highest GDP growth rate (7%) in 2016 but also faced the biggest GDP slowdown (-8%) in 2020.

Correlation Analysis
Table 3 shows the results of the correlation analysis. As the correlation between the independent variables, ESG, ENV, SOC, and GOV, was very high (>0.9), we did not test these variables in one equation to avoid multicollinearity problems. This table shows the results of the correlation analysis.

Regression Results and Discussion
The results of the static regressions (panel least square) of four different models with the MVAIC and VAIC measurements are reported in Table 4. We also used the weighted least square (WLS) estimator to address the probability of heteroscedasticity problems. WLS, also known as generalized least square (GLS), is a widely used econometric technique to deal with data heterogeneity in ordinary least squares (OLS) (see, for example (Greene 2018; Verbeek 2017)).

The influence of ENV, SOC, and GOV performances on IC, as proxied by MVAIC and VAIC, was significantly positive (at a level of 1 percent) with coefficient values were 0.296, 0.219, 0.190, and 0.263, 0.211, 0.142, respectively. In line with previous studies (Alfraih 2018; Beretta et al. 2019; Chang and Chen 2012; Gallardo-Vázquez et al. 2019; Gangi et al. 2019) and theories (stakeholder, RBV and KBV), one way to obtain support from stakeholders for survival is through company activities that improve its reputation and create added value. Based on the MVAIC model, total ESG had a significantly positive effect on IC but had no statistically significant impact on IC with the VAIC model. It shows that relational capital is a factor or component that needs to be considered and integrated into measuring intellectual capital so that high ESG levels can increase IC (MVAIC model).

Environmental performance (ENV) had a positive and significant effect on IC.
### Table 4

**Results of Regression Estimation**

This table reports the OLS regression test results from four different models with MVAIC and VAIC.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Prediction</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MVAIC</td>
<td>VAIC</td>
<td>MVAIC</td>
<td>VAIC</td>
<td>MVAIC</td>
<td>VAIC</td>
<td>MVAIC</td>
<td>VAIC</td>
</tr>
<tr>
<td>ESG</td>
<td>+</td>
<td>0.134***</td>
<td>0.079</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.050)</td>
<td>(0.049)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENV</td>
<td>+</td>
<td>0.296***</td>
<td>0.263***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.047)</td>
<td>(0.043)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC</td>
<td>+</td>
<td>0.219***</td>
<td>0.211***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.050)</td>
<td>(0.046)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOV</td>
<td>+</td>
<td>0.190***</td>
<td>0.142***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.047)</td>
<td>(0.052)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN</td>
<td>+</td>
<td>-1.977***</td>
<td>-2.184***</td>
<td>-1.739***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.259)</td>
<td>(0.270)</td>
<td>(0.282)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN*ESG</td>
<td>+</td>
<td>0.302***</td>
<td>0.350***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.075)</td>
<td>(0.076)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN*ENV</td>
<td>+</td>
<td>0.189***</td>
<td>0.235***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.061)</td>
<td>(0.064)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN*SOC</td>
<td>+</td>
<td>0.187**</td>
<td>0.217***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.084)</td>
<td>(0.085)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN*GOV</td>
<td>+</td>
<td>0.186***</td>
<td>0.239***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.067)</td>
<td>(0.072)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LnSIZE</td>
<td>+/-</td>
<td>0.048</td>
<td>0.107</td>
<td>0.013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.129)</td>
<td>(0.126)</td>
<td>(0.105)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LnMBV</td>
<td>+/-</td>
<td>0.419***</td>
<td>0.374***</td>
<td>0.309***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.125)</td>
<td>(0.124)</td>
<td>(0.117)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GGDP</td>
<td>+/-</td>
<td>2.186</td>
<td>3.173</td>
<td>1.903**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.210)</td>
<td>(5.650)</td>
<td>(5.215)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country dummies</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>Yes</td>
<td>yes</td>
<td>Yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Variable</td>
<td>Prediction</td>
<td>MVAIC</td>
<td>VAIC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------</td>
<td>-------</td>
<td>------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td>Model 4</td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td>Model 4</td>
</tr>
<tr>
<td></td>
<td>ESG (se)</td>
<td>ENV (se)</td>
<td>SOC (se)</td>
<td>GOV (se)</td>
<td></td>
<td>ESG (se)</td>
<td>ENV (se)</td>
<td>SOC (se)</td>
<td>GOV (se)</td>
</tr>
<tr>
<td>Year dummies</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td>yes</td>
<td>yes</td>
<td>Yes</td>
<td>yes</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.496</td>
<td>0.482</td>
<td>0.531</td>
<td>0.488</td>
<td></td>
<td>0.492</td>
<td>0.471</td>
<td>0.508</td>
<td>0.468</td>
</tr>
<tr>
<td>F-statistic</td>
<td>19.746 ***</td>
<td>18.697***</td>
<td>22.519 ***</td>
<td>19.105 ***</td>
<td></td>
<td>19.479***</td>
<td>17.635 ***</td>
<td>20.316 ***</td>
<td>17.455 ***</td>
</tr>
<tr>
<td>No of obser.</td>
<td>267</td>
<td>267</td>
<td>267</td>
<td>267</td>
<td></td>
<td>268</td>
<td>268</td>
<td>268</td>
<td>268</td>
</tr>
</tbody>
</table>

Notes:
Standard errors *, **, *** indicate significance at 10%, 5%, and 1%, respectively.
MVAIC is the modified value-added intellectual coefficient developed by Ulum et al. (2014). VAIC is the evaluation value-added intellectual coefficient of Public (1998). ESG is firms’ ESG. ENV is environmental performance. SOC is social performance. GOV is governance performance. LnSIZE is the natural log of firm size. LnMBV is the natural log of market to book value. FIN is a dummy variable, given 1 for financial firms and 0 for non-financial firms. GGDP is the natural log of GDP growth.
because it can be considered a company asset that contributes to increasing the economic value of strategic assets, such as IC (Gangi et al. 2019). This is undoubtedly related to the level of public trust in the firm’s reputation when looking at its actions, particularly in maintaining its environmental performance. As a business entity that utilizes its business activities, firms must protect the environment around their business. Chang and Chen (2012) stated that corporate actions which support environmental sustainability will create a conducive corporate environment, creating a trusting relationship both internally and externally to the business, facilitating the creation and development of knowledge contained in IC, and helping optimize the creation of added value. In addition, environmental performance represents an internal dimension that involves individuals working for the company, motivating them and their belief to be part of a company, and prioritizing good values. Environmental performance is conceptually related to the multidimensional construction of IC that involves the knowledge of individuals to improve the company’s reputation (White 1996) and performance by optimizing the creation of added value (Gallardo-Vázquez et al. 2019; Zembrowski et al. 2019).

Companies that have environmental awareness will secure support from external institutions and stakeholders. According to stakeholder theory, it is beneficial for firms to engage in ESG activities that are essential to certain stakeholders because they may withdraw their support for companies that are not involved in such activities (Freeman 1984). Additionally, RBV suggests that environmental, social responsibility can be a resource or capability, such as an excellent corporate image or close relationships with stakeholders, which will lead to a sustainable competitive advantage (Barney 1991).

Human involvement and communication are required to successfully deploy and manage knowledge processes. As a result, its social capital and dimensions are crucial (Farahani et al. 2016) because they enable individuals (groups, teams, and organizations) to collaborate to achieve tasks successfully. Organizational social capital builds cohesiveness by instilling trust and confidence. Elements like trust, mutual understanding, dedication, and stability foster communication that enables companies to thrive in a changing marketplace (Cohen and Prusak 2001). Moreover, Gangi et al. (2019) and Alfraih (2018) stated that firms that pay attention to CG performance would strengthen their ability to create added value for their stakeholders. Allegrini and Greco (2013) also report that good CG enables more efficient IC management control and the disclosure of sufficient capital information.

Moreover, Table 4 shows that the coefficient value of industrial type (FIN) was negative and statistically significant (at the 1% level) for all models, which means that the financial industry (banking) had lower IC efficiency. This is in line with the finding of Ulum et al. (2016), stating that the IC of companies in the non-financial industry is higher than the IC of companies in the financial industry, although this sector with extensive IC, and its employees have a more homogeneous intellectual concept when compared to other economic sectors as stated by (Firer and Williams 2003).

FIN*ESG, FIN*ENV, FIN*SOC, and FIN*GOV variables are significant for either the MVAIC or VAIC models with coefficient values of 0.302, 0.350, 0.189, 0.235 (MVAIC model) and 0.187, 0.217, 0.186, 0.239 (VAIC model), respectively. This is consistent with Hypothesis 2 that there is a difference in the effect of the industry type (financial vs. non-financial) on the association between total ESG and individual ESG (environment, social, or governance) performances and IC. The firm’s total ESG and individual ESG in the financial sector had a greater influence on IC than in other sectors.

In recent years, ESG has become increasingly relevant for banks and
Table 5

Summary of Endogeneity Test

<table>
<thead>
<tr>
<th></th>
<th>MVAIC</th>
<th>VAIC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td></td>
<td>ESG</td>
<td>ENV</td>
</tr>
<tr>
<td>AR (2)</td>
<td>0.856</td>
<td>0.091</td>
</tr>
<tr>
<td>Prob (J-stat.)</td>
<td>0.869</td>
<td>0.871</td>
</tr>
<tr>
<td>LaggedMVAIC (GMM)</td>
<td>1.596</td>
<td>1.647</td>
</tr>
<tr>
<td>Conclusion</td>
<td>no bias</td>
<td>no bias</td>
</tr>
</tbody>
</table>

financial institutions. ESG activities are incorporated into their business models, risk processes, and credit policies, which can influence prudential requirements and become strategic for both banks and public authorities. In line with previous studies, bank scandals and financial crises played a crucial role in the development of ESG practices in the banking sector because credit institutions began to adopt these practices to rebuild their confidence with customers (Menicucci and Paolucci 2022), and to restore credibility and reputation (Miralles-Quirós et al. 2019). For example, a bank’s reputation can be enhanced through announcements of philanthropic projects for environmental purposes, green building certification, and achieving ISO 14001 certification (Chang and Devine 2019).

The regression results for the control variables show that firm size (LnSIZES) did not affect IC (both models). Companies with large sizes may not necessarily be able to manage employee skills and innovation efficiently. On the contrary, small companies do not mean it has lower IC efficiency because of limited resources and high costs. Kweh et al. (2013) stated that firm size was not a significant determinant of the intellectual capital efficiency of insurance companies in China. In addition, more staff do not mean the company’s level of innovation is higher, and staff are not the only ones who initiate and innovate (El-Bannany 2012).

Finally, the market-to-book value (LnMBV) and growth of state income (GGDP) have a positive and significant effect on IC. It means firms with high MBV can create good added value for investors (Chen et al. 2006). The higher the GDP growth of a country, the more successful it will be in utilizing its resources efficiently. In addition, high GGDP encourages regulators to be stronger and set higher standards so that the added value creation process is optimal, runs well, and is effective (Yu et al. 2017).

Robustness Check

Our research investigates the effect of ESG (total and individual) on IC with a dynamic approach to address endogeneity issues. The use of the generalized moment method (GMM) approach is required in analyzing this issue. Roodman (2009) stated that the GMM system is the best estimator because it uses internal instruments to handle endogeneity to obtain consistent and unbiased results. Table 5 reports that all models have the value of AR (2) and the difference in J-stats with probability is not significant. It can be concluded that there is no endogeneity bias in the OLS estimates.

---

9 Asymptotically, the GMM estimator is more efficient than the Spatial Two-Stage Least Square (2SLS) estimator (Liu and Saraiva 2019). The advantages of utilizing GMM, according to Verbeek (2017), are (i) the lack of a distribution constraint such as the assumption of normality, (ii) the ability to address heteroscedasticity issues, and (iii) the ease of selecting the right instrument variables to handle endogeneity.
CONCLUSION

IC is recognized to improve non-financial performance in creating value creation and maintaining a firm’s competitive advantage. Using 267 ASEAN-4 firm years listed over the period 2015-2020, we aimed to investigate how the total ESG and individual dimensions of ESG (ENV, SOC, and GOV) affect a firm’s IC proxied by MVAIC and VAIC. We also investigated the impact of a firm’s industry type on the association between ESG and IC. We conclude that IC had a significant positive association with the firms’ total ESG and individual ESG dimensions performance. Although, in general, there is no difference in the effect of intellectual capital when measured by the VAIC or MVAIC method on firm value. This implies that the results of this study are very important for companies to pay more attention to relational capital as part of knowledge management. In addition, we could prove the effect of industry type (finance and non-finance firms) on the ESG-IC relationship. This finding is robust; in which GMM approach is used to address endogeneity issues.

This research has some limitations. As for future research, our study could be extended by dividing MVAIC into HCE, SCE, CEE, and RCE categories, and VAIC into HCE, SCE, and CEE categories, by considering other measurements of IC and ESG. Furthermore, future research can compare different economies and settings through the use of a scoring method that tests the quality of ESG information disclosure and its relationship with intellectual capital.

ACKNOWLEDGEMENTS

This research was presented at: The 15th Bulletin of Monetary Economics and Banking (BMEB) International Conference and Call for Papers (The 15th BMEB). September 2 – 3 2021. We thank K. P. Prabheesh for reviewing our manuscript from the Asia Pacific Applied Economics Association (APAEA).

REFERENCE


Liu, X., and P. Saraiva. 2019. GMM Estimation of Spatial Autoregressive Models in A


Nimtrakoon, S. 2015. The Relationship Between Intellectual Capital, Firms’ Market Value and Financial Performance: Empirical...
Evidence from the ASEAN. Journal of Intellectual Capital, 16(3), 587-618.


Ulum, I., I. Ghozali, and A. Purwanto. 2014. Intellectual Capital


