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ESG PARADOX IN ASEAN-5: INTELLECTUAL CAPITAL EFFICIENCY UNDER EARNINGS PERSISTENCE AND SUSTAINABILITY PRESSURE

Flaviana Bahagia¹⁾, Erni Ekawati²⁾

^{1,2} Universitas Kristen Duta Wacana, Yogyakarta, Indonesia

Email: erniekawati@staff.ukdw.ac.id



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ABSTRACT

This study is motivated by inconsistent findings about ESG implementation on Intellectual Capital (IC) in developing countries. Several studies show the benefits of ESG on increasing intangible asset value, but other studies reveal that ESG creates costs without increasing internal efficiency. This study aims to examine the effect of ESG on IC-efficiency by considering two moderating variables: Earnings Persistence (EP) proxing an earnings predictability of companies' financial reporting, and Sustainable Development Score (SDS) as an external pressure of sustainable implementation within the countries. This study using secondary panel data in ASEAN-5 countries on non-financial companies from 2015 to 2023. The results show that ESG has a negative impact on two dimensions of IC, namely Structural Capital Efficiency (SCE) and Cost of good sold-based Relational Capital Efficiency (RCECOGS), but not significant on Human Capital Efficiency (HCE). The EP and SDS as moderating variables show significant negative effects, indicating that companies with high earnings predictability and high sustainability pressures countries tend to experience the negative impacts of ESG on IC-efficiency. These findings have important implications for corporate managers and policymakers in designing adaptive ESG strategies and policies in developing countries.

Keywords: ESG; intellectual capital; earnings persistence; sustainable development score.

INTRODUCTION

The major challenges facing the world today are related to the environment, such as climate change, environmental damage, air pollution, and the increasingly serious energy crisis. One response to these challenges is the implementation of Environmental, Social, and Governance (ESG). ESG has become an indicator that encourages companies to care the environment, be socially responsible, and implement good governance, thereby reducing risk and increasing company value. The implementation of ESG is believed to reduce external risks, increase stakeholder trust, improve internal efficiency, increase employee loyalty and reputation, and enhance long-term competitiveness (Glavas, 2016; Lins et al., 2017; Liu et al., 2021; Renita et al., 2025; Soelaiman & Sariutami, 2024; Khrisna et al., 2024).

Although ESG offers various benefits, its implementation still faces several obstacles. One of the main obstacles is the increasing operational costs associated with reporting, ESG auditing, and the procurement of technology to support sustainability (Krüger, 2015). In some cases, ESG is even implemented merely as a formality or greenwashing without becoming part of the core business strategy (Dorfleitner & Utz, 2024). This is supported by several

studies showing that the implementation of ESG also has the potential to have negative consequences on company efficiency, particularly in the management of intellectual capital.

ESG has been widely associated with improvements in non-financial performance, including strengthening Intellectual Capital (IC) such as knowledge, organizational systems, and external relations. Cross-country research by Pham et al. (2024) shows that ESG has a positive impact on IC, especially in countries with high levels of innovation and financial conditions. Similar findings were reported by (Liu et al., 2021) and (Shahzad et al., 2022a) which indicate that ESG can drive innovation efficiency and enhance reputation. In addition, research by Beretta et al. (2019) supports the positive relationship between ESG performance and IC disclosure, where improved ESG performance encourages companies to be more active in displaying IC through integrated reporting, particularly in terms of human capital, organizational structure, and external relationships.

However, several studies have revealed the opposite results. Research in Spain by García-Sánchez et al. (2019) found that the burden of sustainability costs reduces the efficiency of companies' external relationships. Research by Lanzalonga et al. (2025) shows that in the food and beverage industry in Europe, ESG pressure diverts companies' focus from human capital development and innovation, thereby reducing intellectual capital efficiency. ESG also becomes an additional burden, especially in developing countries, due to the costs of reporting, monitoring, and investing in environmentally friendly technology (Krüger, 2015). In such cases, ESG can create counterproductive structural pressures for IC strengthening. Research by Awad Bakry (2022) in Egypt also found that ESG is only related to human capital but has not yet shown a strong impact on the overall performance of a company's IC.

Prior research has produced mixed evidence regarding the ESG-intellectual capital relationship. While Pham et al. (2024) documented a generally positive association across multiple countries, other studies have reported weaker or negative effects when ESG implementation imposes substantial organizational and compliance costs (García-Sánchez et al., 2019; Lanzalonga et al., 2025). These inconsistent findings suggest that the impact of ESG may be contingent upon institutional and economic contexts rather than universally positive. ASEAN-5 countries provide a particularly relevant setting to examine this issue because they differ substantially from many developed economies in terms of regulatory maturity, sustainability readiness, governance quality, and capital market development. Although ESG regulations and sustainability reporting requirements have expanded rapidly throughout ASEAN, many firms continue to face resource constraints, institutional heterogeneity, and uneven implementation capacity. Under such conditions, ESG investments may generate adjustment costs that influence firms' ability to efficiently develop and utilize intellectual capital. Therefore, ASEAN-5 offers an important context for examining whether ESG functions primarily as a value-creating mechanism or as a resource-consuming pressure on intellectual capital efficiency.

This study extends the existing literature in three ways. First, it re-examines the ESG–intellectual capital relationship in the ASEAN-5 context, where sustainability implementation costs and institutional heterogeneity are particularly salient. Second, it introduces a multi-level perspective by incorporating Earnings Persistence (EP) as a firm-level factor and Sustainable Development Score (SDS) as a country-level factor that may shape the effectiveness of ESG initiatives. Third, instead of treating intellectual capital as a single construct, the study separately examines Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Relational Capital Efficiency–COGS (RCECOGS), thereby providing

a more nuanced understanding of how ESG affects different organizational resources under varying internal and external conditions.

This study uses three efficiency indicators as a measure of intellectual capital that differs from previous studies, namely: Human Capital Efficiency (HCE), which represents the productive contribution of labor in creating added value (Pham et al., 2024), Structural Capital Efficiency (SCE), which reflects the effectiveness of organizational structures and internal systems in supporting innovation (Chen et al., 2005), and Relational Capital Efficiency – Cost of Good Sold (RCECOGS), which measures the efficiency of external relationships in the supply chain and production cost management (Pham et al., 2024). These three dimensions represent different dimensions of IC and are believed to respond to ESG implementation, particularly due to their sensitivity to costs, external pressures, and the sustainability strategies adopted by companies.

Based on research evidence from Awad Bakry (2022) and Lanzalonga et al. (2025), this study takes the position that ESG tends to reduce the efficiency of IC management, especially in the context of developing countries such as ASEAN. In addition to focusing on the direct influence of ESG, this study adds two moderating variables, namely Earnings Persistence (EP) as the internal factor of the company and Sustainable Development Score (SDS) as the external factor derived from state policy. EP describes the stability and quality of profits over time, where current profits can be used to predict future profits and reflect the transparency of the company's financial information. High profit quality is reflected in its persistence, which is an important signal for investors and analysts in assessing the long-term performance of a company (Canina & Potter, 2019; Fatma & Hidayat, 2019). Thus, EP not only indicates profit stability but also strengthens the validity of financial information available to external parties. Earnings Persistence (EP) reflects the sustainability and predictability of firms' earnings over time. Firms with higher earnings persistence generally possess stronger financial stability and resource availability, enabling them to absorb ESG-related costs more effectively. Consequently, EP may influence the extent to which ESG investments can be transformed into improvements in intellectual capital efficiency. Therefore, EP is expected to moderate the ESG–IC relationship by affecting firms' capacity to convert sustainability expenditures into productive organizational resources. Conversely, since EP also reflects the informativeness and the reliability of financial reports, the negative consequence of the ESG investment related costs would be more pronounced under higher EP.

Meanwhile, SDS reflects institutional pressure from countries to support sustainability agendas (J. Sachs et al., 2022). Countries with high SDS scores generally implement strict regulations, such as ESG reporting requirements and international standards such as IFRS S1 and S2 (Plastun et al., 2020; Wahyuni, 2025). This pressure encourages companies to adapt, but for companies that are not yet ready, it becomes a burden that reduces the efficiency of intellectual capital management (Reboredo & Sowaity, 2021). Sustainable Development Score (SDS) reflects a country's sustainability readiness and institutional commitment toward sustainable development objectives. Countries with higher SDS typically provide stronger regulatory support, sustainability infrastructures, stakeholder awareness, and implementation guidance. Such institutional conditions may facilitate firms' ability to implement ESG initiatives effectively and convert them into intellectual capital benefits. Therefore, SDS is expected to moderate the ESG–IC relationship by shaping the external environment in which sustainability initiatives are implemented.

With a more contextual approach focused on developing countries, this study aims to explain how ESG, rather than strengthening, can weaken IC management, especially when faced with significant internal and external structural burdens. This research aims to examine the effect of ESG on IC by considering the role of EP and SDS as moderating variables that are expected to strengthen the negative effect of ESG on Intellectual Capital. These findings are expected to contribute significantly to the formulation of more realistic policies and business strategies regarding the dynamics of ESG implementation in the ASEAN-5 region.

This study is primarily grounded in the shareholder expense perspective, which originates from the shareholder value argument that corporate resources should be allocated to activities that maximize shareholders' wealth (Friedman, 1970). From this perspective, ESG-related expenditures may be viewed as costs rather than investments when their benefits are uncertain, delayed, or insufficient to compensate for the resources consumed. ESG reporting, sustainability audits, environmental investments, and compliance activities require substantial financial and managerial resources. When these expenditures are not effectively integrated into productive business activities, they may reduce the efficiency with which firms develop and utilize intellectual capital.

The shareholder expense perspective is rooted in the shareholder primacy argument developed by Friedman (1970), which maintains that managers should allocate corporate resources toward activities that maximize shareholder value. Consistent with this view, ESG expenditures may be perceived as non-essential costs when they do not generate measurable economic returns or improve operational efficiency. This perspective differs from legitimacy theory, which emphasizes firms' efforts to gain social acceptance and maintain stakeholder support. While legitimacy theory explains why firms may engage in ESG activities, the shareholder expense perspective explains how ESG expenditures may affect organizational resource efficiency. Legitimacy theory is discussed in the ESG literature as an alternative explanation for firms' sustainability initiatives. However, because legitimacy and greenwashing are not directly measured in this study, they are not treated as the primary mechanisms underlying the proposed hypotheses. This study focuses on the economic implications of ESG implementation through the shareholder expense perspective. The hypotheses examine the economic implications of ESG implementation for intellectual capital efficiency. Hence, the shareholder expense perspective serves as the primary theoretical foundation of this study.

ESG is a sustainability concept aimed at encouraging companies to consider environmental, social, and governance aspects in their business operations (Friede et al., 2015; Kotsantonis & Serafeim, 2019). However, in practice, implementing ESG can create additional cost pressures that are not always relevant to a company's operational priorities, especially in developing countries facing resource constraints (Krüger, 2015; Pham et al., 2024). Costs for reporting, ESG audits, training, and investment in green technologies often disrupt operational efficiency and reduce allocation for strategic asset development (Flammer, 2021; Lins et al., 2017).

This aligns with the shareholder expense theory, which states that any company expenditure that does not directly enhance shareholder welfare is a cost, not an investment. In this context, ESG can become a "social cost" that disrupts internal efficiency and negatively affects the management of the company's intangible assets, such as IC (Lanzalonga et al., 2025). IC refers to intangible assets embedded in knowledge, internal processes, and corporate networks that contribute to competitive advantage (Hejase et al., 2016). IC is generally classified into three main dimensions: Human Capital, Structural Capital, and Relational

Capital. The measurement of Intellectual Capital (IC) uses ratios such as Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Relational Capital Efficiency COGS (RCECOGS). HCE measures the contribution of the workforce in generating added value. The higher the HCE, the more optimal the utilization of employees in business processes. However, formal ESG programs often force companies to conduct training and rehiring without careful planning, which can reduce workforce efficiency (Cheng & Li, 2024). Structural Capital Efficiency (SCE) indicates how effective a company's internal systems, business processes, and technological infrastructure are in supporting innovation and operational efficiency. In practice, adapting to ESG can cause sudden structural changes that are not always accompanied by technological readiness or internal competence, thus disturbing the stability of existing systems (García-Sánchez et al., 2019). Furthermore, Relational Capital Efficiency – COGS (RCECOGS) measures how efficiently a company builds relationships with suppliers and external partners in managing production costs (Pham et al., 2024). The implementation of sustainability standards in an unprepared supply chain often results in increased costs, production delays, and decreased logistics efficiency (Li & Liu, 2023).

ESG implementation may affect the three dimensions of intellectual capital through different mechanisms. Human Capital Efficiency (HCE) is influenced through investments in employee training, workforce development, diversity initiatives, and sustainability-related competencies. Structural Capital Efficiency (SCE) is affected through modifications to governance systems, reporting infrastructures, internal controls, and organizational processes required for ESG compliance. Meanwhile, Relational Capital Efficiency–COGS (RCECOGS) is influenced through sustainability requirements imposed on suppliers and external stakeholders that may alter supply-chain efficiency, procurement costs, and relationship management activities. Because these mechanisms differ, the impact of ESG on each intellectual capital dimension may not be uniform.

The management of the effectiveness of Intellectual Capital (IC) based on these three dimensions highly depends on the strategic and stable allocation of resources (Shahzad et al., 2022b). When ESG is implemented without internal readiness or merely as a formality (greenwashing), the company's focus will shift away from human resource development, management systems, market relationships, and supply chain efficiency. This reinforces the findings of García-Sánchez et al. (2019), which indicate that ESG negatively affects IC management efficiency, especially in the context of high costs and unintegrated sustainability strategies. Therefore, this study takes the position that ESG tends to have a negative impact on Intellectual Capital Efficiency, particularly in environments that are not yet fully ready in terms of regulations and internal structures.

H1a : ESG has a negative effect on Human Capital Efficiency (HCE)

H1b : ESG has a negative effect on Structural Capital Efficiency (SCE)

H1c : ESG has a negative effect on Relational Capital Efficiency - COGS (RCECOGS)

Earnings Persistence (EP) represents the quality of earnings, that is, how well current earnings can predict future earnings. The higher the level of earnings persistence, the greater investors' confidence in the company's financial information, as it is considered more stable and transparent (Canina & Potter, 2019). However, high EP can also highlight inefficiencies in the company's sustainability strategies. In this context, EP acts not as a shield, but as a revealer of the company's financial reality. In the ESG context, the predictability of earnings enables external stakeholders to more sharply evaluate the effectiveness of the sustainability

strategies the company implements, including whether ESG truly drives efficiency or increases burdens the company's resources. When ESG does not directly contribute to value creation, high EP enhances the visibility of ESG's negative impact on the efficiency of Intellectual Capital (IC) management (Fatma & Hidayat, 2019).

In the ASEAN region, the implementation of EP varies between countries. In Indonesia, EP tends to be fluctuating due to the impact of fiscal policy volatility and exposure to resource-intensive sectors (Paramaratri et al., 2023). Malaysia shows a high level of EP although it is often influenced by managerial conservatism that reduces long-term orientation (Tee & Rasiah, 2020). In Thailand, earnings manipulation is still a common practice, making EP more accounting-based rather than reflecting business reality. In Vietnam, earnings persistence tends to be low and is more influenced by accounting practices such as accruals and conservatism, rather than reflecting real economic performance. This condition reflects earnings fluctuations and limitations in financial information quality (Do et al., 2020). Meanwhile, in Singapore, earnings persistence tends to be stable due to strong corporate governance practices and a transparent and standardized financial reporting system. This context reinforces the argument that in countries with high EP, the effect of ESG on Intellectual Capital (IC) will be more pronounced because financial statements provide a more accurate picture of the company's resource efficiency.

Based on the shareholder expense theory approach, any expenditure that does not provide direct benefits to shareholders is considered a cost. When a company has high EP, more informative financial statements will more clearly reveal that ESG investments, if not properly designed, tend not to create efficiency, particularly in managing intangible assets such as Intellectual Capital (IC). In other words, EP does not cause companies to be reluctant to invest in ESG, but it makes external parties more aware that ESG does not support long-term value creation. In this condition, EP acts as a mirror that clarifies the weaknesses of ESG implementation that is not strategically integrated. Therefore, EP is expected to worsen the effect of ESG on IC, because it makes ESG inefficiencies more evident and readable through high-quality earnings information (Fatma & Hidayat, 2019; Wijaya & Wedari, 2023). The hypotheses are states as follows:

H2a : Earnings Persistence worsens the influence of ESG on Human Capital Efficiency (HCE).

H2b : Earnings Persistence worsens the influence of ESG on Structural Capital Efficiency (SCE)

H2c : Earnings Persistence worsens the influence of ESG on Relational Capital Efficiency-COGS (RCE-COGS)

The Sustainable Development Score (SDS) reflects the extent to which a country succeeds in achieving the Sustainable Development Goals (SDGs) set by the United Nations (J. Sachs et al., 2022). Countries with high SDS tend to have strict regulatory frameworks, strong institutional pressure, and high social expectations for sustainable business practices (Galeazzo et al., 2024; Subramaniam et al., 2023). This encourages companies to be more compliant with ESG principles (Reboredo & Sowaity, 2021). In such an environment, companies are not only required to be formally compliant but also to demonstrate genuine commitment in implementing ESG principles. This pressure can increase compliance costs and reinforce market expectations, especially for companies that lack readiness in sustainability infrastructure (D'Ecclesia et al., 2025).

High pressure from the institutional environment can also pose a distinct challenge, especially for companies that lack internal readiness or sufficient financial flexibility. Implementing ESG in countries with high SDS also tends to be more complex and costly due to higher reporting and transparency demands (Khan et al., 2015). Therefore, SDS not only reflects support for sustainability but also serves as an external factor that determines whether a company responds to ESG efficiently or inefficiently.

In the ASEAN-5 countries, the implementation of SDS shows diverse dynamics. Singapore ranks highest in the regional sustainability index, with a highly structured and transparent regulatory system, encouraging ESG to become a mandatory part of corporate policy (J. D. Sachs et al., 2023). Malaysia and Thailand are in the middle position with progressive policies, but implementation still faces challenges in law enforcement and transparency (Tirumala & Tiwari, 2022; Tran & Beddewela, 2020). Indonesia and the Philippines, although having clear SDG agendas, still encounter major obstacles in institutional capacity and oversight, causing ESG to often be pursued only formally (Qisa'i, 2020; Tran & Beddewela, 2020). Meanwhile, in Vietnam, SDG disclosure remains low despite existing regulations, influenced by governance and the use of GRI, while smaller companies or those supported by local auditors tend to be less transparent (Nguyen & Duong, 2025). These differences in institutional readiness reinforce the view that SDS can act as an environmental pressure that increases the burden of implementing ESG, especially in developing countries. In this context, companies operating in countries with high SDS scores may face excessive external pressure, which becomes a structural burden when ESG is not strategically integrated (Saha et al., 2024).

Sustainable Development Score (SDS) reflects a country's overall progress toward the Sustainable Development Goals and, more importantly, signals the maturity of its sustainability ecosystem. Higher SDS values are generally associated with stronger sustainability institutions, more developed regulatory frameworks, greater stakeholder awareness, and broader support mechanisms for sustainable business practices. From an institutional perspective, firms operating in countries with higher SDS may face different opportunities and constraints when implementing ESG initiatives. Well-developed sustainability environments may facilitate ESG implementation by providing regulatory clarity, supporting infrastructures, and stronger stakeholder engagement. Conversely, they may also increase compliance expectations and reporting requirements.

The shareholder expense theory highlights that the cost of implementing ESG is at risk of being seen as an unnecessary expenditure by management and shareholders, especially if there is no direct impact on profitability (Krüger, 2015). worsen the effects of ESG on Intellectual Capital, particularly for companies that are not internally prepared. Hence, in this study, the hypotheses are stated as follows:

- H3a : Sustainable Development Score (SDS) worsens the influence of ESG on Human Capital Efficiency (HCE).**
- H3b : Sustainable Development Score (SDS) worsens the influence of ESG on Structural Capital Efficiency (SCE)**
- H3c : Sustainable Development Score (SDS) worsens the influence of ESG on Relational Capital Efficiency-COGS (RCE-COGS)**

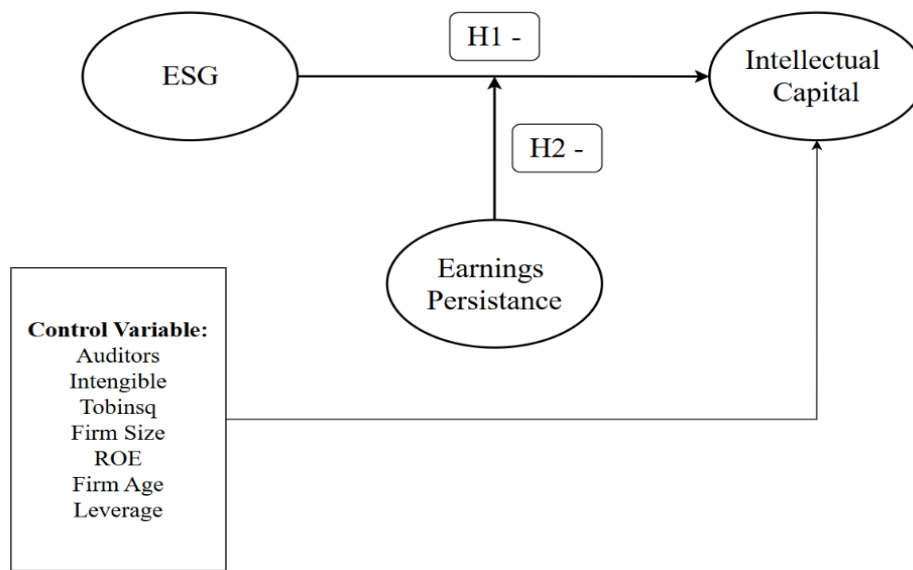


Figure 1. Conceptual Framework Model 1 & Model 2

Source: Author, 2025

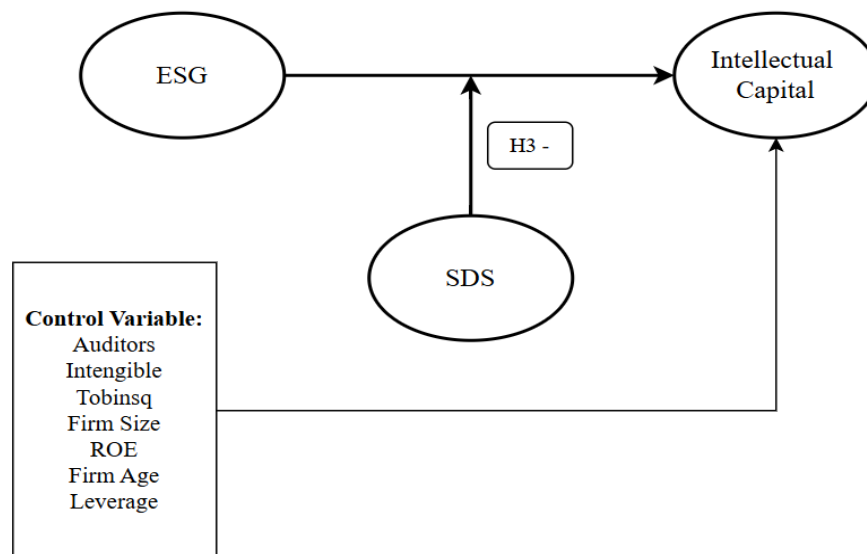


Figure 2. Conceptual Framework Model 3

Source: Author, 2025

METHODS

The data used in this study is secondary data, namely annual financial reports of non-financial companies that have been published by companies listed on the Stock Exchanges of five ASEAN countries from 2015 to 2023. The data in this study was obtained from the Osiris database, Refinitiv and sdgindex.org for Sustainable Development Scores (SDS) data.

Purposive sampling is the sampling technique used in this study with the aim of obtaining samples that meet the criteria.

In this study, the dependent variable is Intellectual Capital, which consists of Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Relational Capital Efficiency COGS (RCECOGS). ESG is the independent variable, while earning persistence (EP) and Sustainable Development Score (SDS) are moderating variables. The following table shows the definitions of the variables used in this study.

Table 1. Variable Definitions

Variable	Acronym	Description	Source
Intellectual Capital			
HCE	Human Capital Efficiency	Human capital performance proxies measured by: $HCE = \frac{\text{Operating Income}}{\text{Total Salaries, Wages, Training, and Development Expense}}$	Refinitiv
SCE	Structural Capital Efficiency	A company's ability to fulfill the infrastructure that can support the smooth running of company operations is measured by: $SCE = \frac{\text{Operating Income}}{\text{Administrative Expenses}}$	Refinitiv
RCE	Relational Capital Efficiency	The company's ability to establish cooperation with third parties: - Company relationships with suppliers RCE Cost of Goods Sold (RCECOGS) $RCECOGS = \frac{\text{Operating Income}}{\text{Total Cost of Goods Sold}}$	Refinitiv
Independent Variable			
ESG	Environmental, Social, and Governance Score	Performance is measured through ESG scores provided by Thomson Reuters, which evaluate performance, commitment, and effectiveness in environmental, social, and corporate governance aspects. Each dimension consists of three main subdivisions, namely environment, social, and governance. The scores range from 0 to 100.	Refinitiv
Environmental pillar	Skor Pilar Environmental	The Environmental Pillar score consists of resource utilization, emissions, and environmental innovation. The Environmental Pillar score ranges from 0 to 100.	Refinitiv
Social pillar	Skor Pilar Social	The Environmental Pillar Score consists of the Human Rights Score, Community Service Score, and Product Responsibility Score. The Social Score ranges from 0 to 100.	Refinitiv
Governance pillar	Skor Pilar Governance	The governance pillar score covers management, shareholders, and CSR strategy. The governance score ranges from 0 to 100.	Refinitiv
Firm Level Variable			
TOBIN'S Q	Tobin's Q	Tobin's Q = $\frac{\text{Market Capitalisation} + \text{Debt}}{\text{Total Assets}}$	Osiris

Variable	Acronym	Description	Source
Auditors	Auditors	Auditor using dummy variable. This variable takes the value 1 if the company uses a Big 4 audit firm, and 0 if it does not.	Refinitiv
Intangible	Intangibility Investment	Intangible assets, measured as intangible assets scaled based on total assets in year t $\text{Intangibility investment} = \frac{\text{Intangible Assets}}{\text{Total Assets}}$	Osiris
EP (Slope)	Earnings Persistence	Earnings persistence is measured using Annual Net Income as the basis for regressing current earnings on lagged 1-year earnings. The slope of the regression is the EP-score.	Refinitiv
Firm size	Firm Size	Company size is calculated as the natural logarithm of total assets. $\text{Firm size} = \ln(\text{Total Asset})$	Osiris
ROE	Return on Equity	$\text{ROE} = \frac{\text{Net income}}{\text{Book value of equity}}$	Osiris
Firm Age	Firm Age	The age of a company can be calculated using the natural logarithm (Ln) of the company's age measured in years since its date of establishment. $\text{Firm Age} = \ln(\text{Firm Age})$	Refinitiv
LEV	Leverage Ratio	$\text{Leverage ratio} = \frac{\text{Total liabilities of a firm}}{\text{Total assets}}$	Osiris
Country Level Variable			
SDS	Sustainable Development Scores	Sustainable Development Scores (SDS) are indicators that assess the extent to which a country has succeeded in achieving the Sustainable Development Goals (SDGs) set by the United Nations. Countries with higher SDS typically exhibit stronger sustainability institutions, regulatory support, and stakeholder expectations for ESG implementation (Galeazzo et al., 2024; Reboredo & Sowaity, 2021; Subramaniam et al., 2023). SDS are measured based on a country's progress toward the 17 SDGs, with scores typically ranging from 0 to 100. https://dashboards.sdgindex.org/rankings	Sustainable Development Reporting

Source: Author, 2025

The empirical analysis employs pooled Ordinary Least Squares (OLS) regression using an unbalanced panel dataset. To mitigate potential omitted-variable bias arising from observable heterogeneity, the model includes year fixed effects, country fixed effects, and industry fixed effects through dummy variables. Year effects control for macroeconomic and regulatory changes over time, country effects capture institutional and regulatory differences across ASEAN countries, and industry effects account for sector-specific characteristics that may influence intellectual capital efficiency. This approach allows the model to exploit both cross-sectional and time-series variation while maintaining comparability across firms operating in different institutional environments.

The empirical analysis employs multiple linear regression. Prior to hypothesis testing, classical assumption tests are conducted. Heteroscedasticity is examined using the Glejser test. When heteroscedasticity is detected, the Weighted Least Squares (WLS) estimator is applied, where the weights are derived from the absolute residuals obtained from the initial regression model. Because moderation models incorporating interaction terms are frequently associated with multicollinearity between the interaction term and its constituent variables, an additional two-stage estimation procedure is applied. In the first stage, the interaction term is isolated from its main effects. In the second stage, the resulting residual component is incorporated into the regression model to estimate the moderating effect while reducing the collinearity between the interaction term and the main-effect variables. This procedure allows the direct and moderating effects of ESG, Earnings Persistence (EP), and Sustainable Development Score (SDS) to be estimated more reliably.

The hypothesis in this study was tested using the following statistical model:

Statistical Model 1

$$HCE = \alpha_1 + \beta_1 ESG + \gamma_1 TobinsQ + \gamma_2 Auditors + \gamma_3 Intangible + \gamma_4 Firm Age + \gamma_5 ROE + \gamma_6 Firm Size + \gamma_7 Leverage + \sum_{i=1}^4 \delta_i C_i + \sum_{i=1}^6 \delta_i Ind_i + \sum_{i=1}^8 \delta_i yr_i + \varepsilon \quad 1a$$

$$SCE = \alpha_1 + \beta_1 ESG + \gamma_1 TobinsQ + \gamma_2 Auditors + \gamma_3 Intangible + \gamma_4 Firm Age + \gamma_5 ROE + \gamma_6 Firm Size + \gamma_7 Leverage + \sum_{i=1}^4 \delta_i C_i + \sum_{i=1}^6 \delta_i Ind_i + \sum_{i=1}^8 \delta_i yr_i + \varepsilon \quad 1b$$

$$RCECOGS = \alpha_1 + \beta_1 ESG + \gamma_1 TobinsQ + \gamma_2 Auditors + \gamma_3 Intangible + \gamma_4 Firm Age + \gamma_5 ROE + \gamma_6 Firm Size + \gamma_7 Leverage + \sum_{i=1}^4 \delta_i C_i + \sum_{i=1}^6 \delta_i Ind_i + \sum_{i=1}^8 \delta_i yr_i + \varepsilon \quad 1c$$

Hypotheses 1a, 1b, and 1c are supported if $\beta_1 < 0$ and statistically significant.

Statistical Model 2

$$HCE = \alpha_1 + \beta_1 ESG + \beta_2 EP + \beta_3 ESG * EP + \gamma_1 TobinsQ + \gamma_2 Auditors + \gamma_3 Intangible + \gamma_4 Firm Age + \gamma_5 ROE + \gamma_6 Firm Size + \gamma_7 Leverage + \sum_{i=1}^4 \delta_i C_i + \sum_{i=1}^6 \delta_i Ind_i + \varepsilon \quad 2a$$

$$SCE = \alpha_1 + \beta_1 ESG + \beta_2 EP + \beta_3 ESG * EP + \gamma_1 TobinsQ + \gamma_2 Auditors + \gamma_3 Intangible + \gamma_4 Firm Age + \gamma_5 ROE + \gamma_6 Firm Size + \gamma_7 Leverage + \sum_{i=1}^4 \delta_i C_i + \sum_{i=1}^6 \delta_i Ind_i + \varepsilon \quad 2b$$

$$\begin{aligned}
RCECOGS = & \alpha_1 + \beta_1 ESG + \beta_2 EP + \beta_3 ESG * EP + \gamma_1 TobinsQ + \gamma_2 Auditors \\
& + \gamma_3 Intangible + \gamma_4 Firm Age + \gamma_5 ROE + \gamma_6 Firm Size \\
& + \gamma_7 Leverage + \sum_{i=1}^4 \delta_i C_i + \sum_{i=1}^6 \delta_i Ind_i + \varepsilon
\end{aligned} \tag{2c}$$

Hypotheses 2a, 2b, and 2c are supported if $\beta_3 < 0$ and statistically significant. Given, $\delta HCE/\delta ESG = \beta_1 + \beta_3 EP$, $\beta_3 < 0$ and statistically significant indicating that the marginal effect of ESG on HCE becomes increasingly adverse as EP increases. In other words, higher EP worsens the impact of ESG on HCE. The same interpretation applies to other dependent variables, SCE and RCECOGS.

Statistical Model 3

$$\begin{aligned}
HCE = & \alpha_1 + \beta_1 ESG + \beta_2 SDS + \beta_3 ESG * SDS + \gamma_1 TobinsQ + \gamma_2 Auditors \\
& + \gamma_3 Intangible + \gamma_4 Firm Age + \gamma_5 ROE + \gamma_6 Firm Size \\
& + \gamma_7 Leverage + \sum_{i=1}^4 \delta_i C_i + \sum_{i=1}^6 \delta_i Ind_i + \sum_{i=1}^8 \delta_i yr_i + \varepsilon
\end{aligned} \tag{3a}$$

$$\begin{aligned}
SCE = & \alpha_1 + \beta_1 ESG + \beta_2 SDS + \beta_3 ESG * SDS + \gamma_1 TobinsQ + \gamma_2 Auditors \\
& + \gamma_3 Intangible + \gamma_4 Firm Age + \gamma_5 ROE + \gamma_6 Firm Size \\
& + \gamma_7 Leverage + \sum_{i=1}^4 \delta_i C_i + \sum_{i=1}^6 \delta_i Ind_i + \sum_{i=1}^8 \delta_i yr_i + \varepsilon
\end{aligned} \tag{3b}$$

$$\begin{aligned}
RCECOGS = & \alpha_1 + \beta_1 ESG + \beta_2 SDS + \beta_3 ESG * SDS + \gamma_1 TobinsQ + \gamma_2 Auditors \\
& + \gamma_3 Intangible + \gamma_4 Firm Age + \gamma_5 ROE + \gamma_6 Firm Size \\
& + \gamma_7 Leverage + \sum_{i=1}^4 \delta_i C_i + \sum_{i=1}^6 \delta_i Ind_i + \sum_{i=1}^8 \delta_i yr_i + \varepsilon
\end{aligned} \tag{3c}$$

Hypotheses 2a, 2b, and 2c are supported if $\beta_3 < 0$ and statistically significant. Given, $\delta HCE/\delta ESG = \beta_1 + \beta_3 SDS$, $\beta_3 < 0$ and statistically significant indicating that the marginal effect of ESG on HCE becomes increasingly adverse as SDS increases. In other words, higher SDS worsens the impact of ESG on HCE. The same interpretation applies to other dependent variables, SCE and RCECOGS.

RESULT AND DISCUSSION

The samples in this study are obtained using purposive sampling with predetermined criteria. The data are driven from non-financial companies in five ASEAN countries (Indonesia, Malaysia, Singapore, Thailand, and the Philippines) for the period 2015-2023. The sample of the study is unbalanced because some firms do not implement ESG from the beginning of the observation period. Nevertheless, firms are included in the sample only if financial and firm-level data were available continuously from the year within the sample to the end of the study period. This sampling approach is adopted to prevent survival bias.

The number of observations depends on the availability of ESG data and the completeness of information related to each dimension of Intellectual Capital measurement, as well as the availability of data for moderating variables and control variables. Below is a table showing the sample selection.

Table 2. Sample Selection

Description	Number of Observations			
	HCE	SCE	RCECOGS	Total
Companies listed on the stock exchanges of 5-ASEAN countries				3,654
Companies without ESG scores				2,989
Companies with ESG scores in 2023				665
Availability of data for model 1a, 1b, 1c 2023	203	588	348	
Research period (2015-2023)				9
Number of observations for Model 1 (Unbalanced Data):	790	2,465	1,936	
Availability of data for model 2a, 2b, 2c 2023	117	265	220	
Year of model research 2 (2023)				1
Number of observations for Model 2 (Unbalanced Data):	117	265	220	
Availability of data for model 3a, 3b, 3c 2023	203	588	348	
Research period (2015-2023)				9
Number of observations for Model 3 (Unbalanced Data)	790	2,465	1,936	

Source: Author 2025

Table 3. Number of Companies with ESG Scores from 2015 to 2023

Country	2015	2016	2017	2018	2019	2020	2021	2022	2023
Indonesia	30	33	34	35	37	40	45	59	62
Malaysia	40	41	45	47	49	55	137	304	334
Philippines	19	20	20	20	21	22	25	30	31
Thailand	24	26	28	31	41	84	118	145	153
Singapore	33	34	34	34	49	76	83	83	85
Sub Total	146	154	161	167	197	277	408	591	665
Total									
Observations	2,766 Companies - Years								

Source: Author, 2025

Based on Table 3, it can be analyzed that the implementation of ESG in these five countries has increased every year. Of these five countries, Malaysia is the country that has implemented ESG the most and has experienced a significant increase, namely 304 companies in 2022 and rising to 334 companies in 2023. Apart from Malaysia, which has the highest number of companies implementing ESG, there are also countries with the fewest companies implementing ESG, namely the Philippines, which experience a relatively small increase each year.

Table 4 shows the number of companies in each industry, with sensitive industries ranking highest compared to other industries. Sensitive industries refer to sectors such as energy, materials, industrial, and utilities, which have relatively high environmental risks. The large number of observations from this sector may be due to high regulatory pressure and public expectations regarding the sustainability performance of companies in this sector (Bhatia & Tuli, 2018). Other sectors such as consumer staples and real estate also show active involvement in ESG reporting

Table 4. Industrial Distribution in the Sample

N o	Industry Name	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	Sensitive	61	66	65	71	74	92	145	244	257
2	Communication Servis	19	19	19	19	20	27	31	34	34
3	Consumer Discretionary	9	8	9	9	11	20	35	55	62
4	Consumer Staples	18	19	21	22	27	34	48	84	87
	Health Care	7	7	8	8	8	14	21	27	29
5	Information Technology	3	3	4	4	4	6	16	35	39
6	Real Estate	11	15	16	17	24	39	55	74	77
	Total	128	137	142	150	168	232	351	477	585

Source: Author, 2025

The number of models in the industry classification varies according to the availability of data, whether it is independent, dependent, or control data.

Table 5. Descriptive Statistics

Variabel		Indonesia	Malaysia	Philippines	Thailand	Singapore
ESG	<i>Mean</i>	46.018	42.615	44.944	52.093	45.877
	<i>Minimum</i>	8.160	4.940	7.840	2.280	4.490
	<i>Maximum</i>	87.780	91.640	89.230	91.830	86.990
	<i>Std.dev</i>	19.537	17.849	18.904	18.519	17.542
	<i>N</i>	375	1,052	208	650	511
HCE	<i>Mean</i>	50.987	347.808	0.268	0.887	0.521
	<i>Minimum</i>	0.000	-0.900	0.000	0.000	-0.510
	<i>Maximum</i>	3,016.97		7.770	28.960	5.740
	<i>Std.dev</i>		57,909.68			
	<i>N</i>	345.539	4,481.107	1.045	3.007	1.107
SCE	<i>Mean</i>	160	167	107	311	94
	<i>Minimum</i>	4.661	0.818	0.161	0.295	1.112
	<i>Maximum</i>	-1.150	-653.93	0.000	-1.190	-0.760
	<i>Std.dev</i>	1,571.24	472.78	4.480	9.660	249.260
	<i>N</i>	81.357	28.589	0.592	0.861	12.241
RCECOGS	<i>Mean</i>	373	992	202	638	424
	<i>Minimum</i>	1.681	0.086	0.048	0.055	0.766
	<i>Maximum</i>	-11.770	0.000	0.000	0.000	-0.170
	<i>Std.dev</i>	522.540	2.380	1.930	3.150	158.340
	<i>N</i>	29.038	0.205	0.196	0.182	8.738
EP (Slope)	<i>Mean</i>	29	618	179	555	383
	<i>Minimum</i>	0.459	0.385	0.373	0.327	0.435
	<i>Maximum</i>	-0.550	-0.930	-0.610	-1.050	-0.830
	<i>Std.dev</i>	1.480	5.140	1.600	1.060	1.270
	<i>N</i>	0.440	0.695	0.547	0.368	0.435
SDS	<i>Mean</i>	37	106	23	74	50
	<i>Minimum</i>	67.705	68.514	65.639	73.789	69.630
	<i>Maximum</i>	64.070	66.830	63.070	72.140	68.380
	<i>Std.dev</i>	69.430	69.320	67.470	74.670	71.410
	<i>N</i>	1.813	0.748	1.554	0.816	0.957
		375	1,052	208	650	511

Source: Author, 2025

From the table above, Thailand has the highest average ESG score of 52.093, while Malaysia has the lowest ESG score of 42.615. However, Malaysia is the country with the most companies implementing ESG, namely 1,052 companies. This phenomenon shows that high participation of companies in ESG reporting is not always accompanied by high quality ESG implementation.

When examined further from the perspective of the dependent variable, namely intellectual capital consisting of HCE, SCE, and RCECOGS, there are variations between countries and the number of companies for each intellectual capital measurement tool. Malaysia has the highest reported mean for HCE, but Indonesia has the highest mean for SCE and RCECOGS. Furthermore, for the moderating variable, Earnings Persistence reflects a company's profits over time and shows differences between countries. In the EP_Slope indicator, Indonesia has the highest score, followed by Singapore at 0.435. This indicates that corporate profits in both countries tend to be more predictable and persistent. However, this stability does not necessarily correlate with intellectual capital efficiency or the quality of ESG implementation.

Table 6. Results of ESG's Effect on IC (Model 1)

Variable	HCE	SCE	RCECOGS
Constant	-3917.616*** (-5.623)	47.781 (0.267)	83.644 (1.228)
ESG	-2.687 (-1.272)	-1.296** (-2.248)	-0.669*** (-3.172)
Tobin's Q	54.758*** (2.600)	0.668 (0.100)	0.481 (0.217)
Auditors	122.377* (1.670)	-0.176 (-0.007)	11.330 (1.264)
Intangible	-1132.536*** (-5.063)	-32.996 (-0.443)	-25.469 (-0.961)
Firm_Age	-3.771** (-2.272)	1.535*** (3.198)	0.642*** (3.477)
ROE	1.954 (1.195)	-0.568 (-1.540)	-0.253* (-1.802)
Firm_Size	207.161*** (7.472)	-12.335* (-1.765)	-8.177*** (-3.100)
Leverage	-786.002*** (-4.564)	207.845*** (3.934)	107.654*** (5.153)
Country	Yes	Yes	Yes
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
R-Square (R ²)	0.545	0.532	0.551
Adjusted R-Square	0.534	0.528	0.547
N	790	2,465	1,936

* : Significant at the 10% α level, ** : Significant at the 5% α level,

*** : Significant at the 1% α level, the numbers in parentheses are T-test values.

Source: Author 2025

The Sustainable Development Score (SDS) as a measure of sustainability pressure in the country level shows that the highest average score is in Thailand (73.789), while the lowest score is in the Philippines (65.639). This difference reflects that commitment and achievements in sustainable development still vary across the five ASEAN countries. Countries with high SDS scores, such as Thailand and Singapore, generally face institutional pressure and greater expectations regarding ESG implementation. However, this pressure is

not always directly proportional to an increase in intellectual capital efficiency, as companies may shift their focus to meeting external demands rather than strengthening internal aspects in a sustainable manner. On the other hand, countries with lower SDS scores may have more flexibility in adopting ESG but face the challenge of a lack of systematic encouragement to maximize the impact of ESG on companies' intangible assets.

This study also includes control variables (Tobin's Q, Auditors, Intangible, Firm Age, ROE, Firm Size, and Leverage) and dummy variables (Country, Industrial, Year) to control for variations between countries in the regression model. The following are regression tests on statistical models 1, 2, and 3 in five ASEAN countries. Regression tests of statistical models 1, 2, and 3 in ASEAN countries used the weighted least squares (WLS) method due to signs of heteroscedasticity in classical assumption testing. The tests were conducted from 2015 to 2023.

Table 7. Results of ESG's Effect on IC with Earnings Persistence as a Moderator (Model 2)

EP Proxy	EP (Slope)		
	HCE	SCE	RCECOGS
Constant	54.891** (2.446)	555.717 (1.457)	-0.722*** (-3.354)
ESG	-0.071 (-1.326)	0.578 (0.699)	0.001** (2.557)
EP_Slope	-0.683 (-0.368)	3.165 (0.196)	-0.004 (-0.210)
ESG*EP_Slope	-0.034 (-0.841)	-1.093*** (-2.915)	-0.001* (-1.741)
Tobin's Q	-1.686 (-1.628)	11.620 (0.781)	-0.009 (-0.913)
Auditors	5.289** (2.283)	-158.674*** (-4.160)	-0.035 (-1.522)
Intangible	-5.330 (-0.519)	71.313 (-0.580)	-0.088 (-1.229)
Firm_Age	0.009 (0.128)	-1.698** (-2.215)	-0.002*** (-2.877)
ROE	0.068 (0.720)	-0.504 (-0.525)	0.001 (1.050)
Firm_Size	-2.076** (-2.230)	-13.813 (-0.886)	0.034*** (3.743)
Leverage	-9.777 (-1.452)	44.701 (0.433)	-0.069 (-0.873)
Country	Yes	Yes	Yes
Industry	Yes	Yes	Yes
R-Square (R ²)	0.582	0.518	0.464
Adjusted R-Square	0.506	0.482	0.417
N	117	265	220

* : Significant at the 10% α level, ** : Significant at the 5% α level

*** : Significant at the 1% α level, the numbers in parentheses are T-test values.

Source: Author, 2025

Based on the regression results presented in Table 7, the ESG*EP interaction coefficient exhibits varying effects across the three intellectual capital dimensions (HCE, SCE, and RCECOGS). Specifically, the interaction between ESG and Earnings Persistence (ESG*EP_Slope) is negative and statistically significant for SCE and RCECOGS, with coefficients of -1.093 ($t = -2.915$) and -0.001 ($t = -1.741$), respectively, at the 1% and 10% significance levels. Given that the marginal effect of ESG on intellectual capital efficiency is

expressed as $(\delta IC/\delta ESG = \beta_1 + \beta_3 EP)$ the negative interaction coefficients indicate that the effect of ESG becomes increasingly adverse as Earnings Persistence increases. In other words, higher Earnings Persistence strengthens the negative impact of ESG on Structural Capital Efficiency (SCE) and Relational Capital Efficiency based on COGS (RCECOGS). These findings suggest that firms with more persistent earnings experience a stronger deterioration in structural and relational capital efficiency associated with ESG implementation.

Meanwhile, in the HCE dimension, the ESG*EP_Slope interaction shows a coefficient of -0.034 ($t = -0.841$), which is not statistically significant. These results indicate that earnings persistence neither strengthens nor weakens the relationship between ESG and HCE. One possible reason for this is that companies with high earnings stability tend to have less urgency to transform or invest in human resource development through an ESG approach.

Table 8. Results of ESG's Effect on IC with SDS as a Moderator (Model 3)

Variable	HCE	SCE	RCECOGS
Constant	-7655.770*** (-12.462)	-0.073 (0.000)	173.438** (2.444)
ESG	5.840*** (3.472)	6.216*** (13.297)	1.906*** (10.089)
SDS	-398.033*** (-8.566)	168.900*** (8.800)	58.123*** (9.002)
ESG*SDS	-0.209*** (-5.770)	-0.083*** (-7.835)	-0.031*** (-8.231)
Tobin's Q	80.552*** (3.687)	6.084 (0.659)	-1.183 (-0.382)
Auditors	119.357 (1.437)	-282.791*** (-8.857)	-62.919*** (-5.270)
Intangible	-1255.166*** (-4.314)	-849.158*** (-8.857)	-389.318*** (-11.989)
Firm_Age	-13.031*** (-7.273)	6.018*** (9.719)	1.961*** (8.524)
ROE	4.383** (2.211)	-3.223*** (-6.130)	-1.361*** (-6.987)
Firm_Size	396.975*** (15.406)	0.163 (0.020)	-6.590** (-2.224)
Leverage	-813.522*** (-4.103)	805.781*** (11.823)	336.726*** (13.143)
Country	Yes	Yes	Yes
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
R-Square (R^2)	0.313	0.236	0.282
Adjusted R-Square	0.306	0.234	0.279
N	790	2,465	1,936

* : Significant at the 10% α level, ** : Significant at the 5% α level

*** : Significant at the 1% α level, the numbers in parentheses are T-test values.

Source: Author 2025

Based on the test results in Table 8, it shows that overall, the ESG*SDS interaction coefficient has a significant negative effect on HCE, SCE, and RCECOGS, each at the $\alpha = 1\%$ level. Given that the marginal effect of ESG on intellectual capital efficiency is expressed as $(\delta IC/\delta ESG = \beta_1 + \beta_3 SDS)$ the negative interaction coefficients indicate that the effect of ESG becomes increasingly adverse as SDS increases. This finding indicates that the application of ESG in situations with high pressure on sustainable development can actually reduce the effectiveness of the utilization of corporate intellectual capital. This may be due to

a shift in the company's focus towards prioritizing compliance with regulations and sustainability demands rather than optimal intellectual asset management. For example, large allocations of funds for sustainable projects can reduce attention to human resource development (HCE), internal organizational structure (SCE), and efficiency in supplier relationships (RCECOGS).

The results of the study indicate that ESG generally has a negative impact on the efficiency of Intellectual Capital (IC) management, particularly in the dimensions of SCE and RCECOGS. These findings reinforce the argument that the implementation of ESG that is not strategically integrated can create additional burdens that do not always provide direct benefits to a company's internal efficiency (Krüger, 2015). In the context of developing countries such as the ASEAN region, ESG implementation often faces obstacles such as reporting costs, green technology investments, and a lack of human resource readiness, which ultimately hinders the development of corporate intellectual capital (Pham et al., 2024).

This finding supports research by Kudlak (2025) which states that many companies implement ESG only for compliance or image purposes (greenwashing), not because of strategic commitment. This contrasts with the results of studies by (Pham et al., 2024; Shahzad et al., 2022), which found that ESG can improve IC efficiency in countries with mature innovation and governance systems. Thus, the influence of ESG on IC is highly contextual, depending on internal readiness and external support. In the view of Shareholder Expense Theory, spending on ESG that does not generate short-term returns is considered a waste of resources that should be allocated to other productive activities.

The different results across intellectual capital dimensions suggest that ESG does not affect all organizational resources equally. The insignificant relationship between ESG and Human Capital Efficiency (HCE) may reflect the fact that many ESG initiatives, such as employee training, workplace safety, and employee welfare programs, directly support human capital development. In contrast, the negative associations with Structural Capital Efficiency (SCE) and Relational Capital Efficiency (RCECOGS) indicate that ESG implementation may impose additional costs related to governance systems, compliance processes, sustainability reporting, and supply-chain monitoring, thereby reducing the efficiency of structural and relational capital.

Interestingly, when moderated by EP, the negative impact of ESG on IC becomes even stronger. High EP reflects predictable earnings, and more informative financial reports make it easier for investors and stakeholders to identify inefficiencies arising from ESG. In this context, ESG that does not support company value will increasingly be seen as a burden, as investors will see that these sustainability initiatives are not correlated with an increase in intangible assets. Therefore, EP acts as a mirror that clarifies the negative impact of ESG on IC, rather than as a protector. For companies, this means that high-quality financial reports can reveal the weaknesses of a company's sustainability strategy more clearly in the eyes of the market. In this context, EP does not merely improve stakeholders' ability to observe inefficiencies; rather, it reflects the extent to which firms repeatedly allocate resources to ESG activities that may reduce operational intellectual capital efficiency when not strategically aligned with business objectives. For companies, this finding suggests that sustainability initiatives should be integrated with core operational processes to ensure that ESG investments contribute to, rather than detract from, intellectual capital development.

Meanwhile, the moderating effect of the Sustainable Development Score (SDS) also strengthens the negative relationship between ESG and IC. A high SDS reflects institutional pressure from the state to implement sustainability through strict regulations and ESG

reporting requirements (Sachs et al., 2022). However, this pressure becomes a burden for companies that are not yet structurally and financially ready. Small and medium-sized enterprises, particularly in developing countries, face significant challenges in meeting sustainability standards without adequate policy support. In these circumstances, ESG is more often fulfilled administratively to avoid sanctions than as a value-added strategy. Therefore, governments need to take an active role, for example through tax incentives, green technology subsidies, or sustainability training programs, so that ESG is not only an obligation but also a strategic opportunity for companies to develop their IC.

Overall, this study shows that ESG implementation without internal readiness and adaptive regulatory support can be counterproductive to strengthening intellectual capital. Companies need to review their sustainability strategies to ensure they truly add value, rather than merely serving as a form of compliance. Meanwhile, governments and policy-making institutions must ensure that sustainability pressures do not become burdens, but are facilitated by incentives that encourage the strategic integration of ESG into business.

Table 9. Heteroscedasticity Test Results for Statistical Models 1, 2, and 3

	Model 1			Model 2			Model 3		
	HCE	SCE	RCECOGS	HCE	SCE	RCECOGS	HCE	SCE	RCECOGS
ESG	0.67	0.66	0.39	0.82	0.28	0.57	0.52	0.93	0.58
EP_Slope				0.80	0.07	0.56			
ESG*EP_Slope				0.64	0.02	0.66			
SDS							0.00	0.08	0.13
ESG*SDS							0.51	0.92	0.61
TobinsQ	0.14	0.64	0.99	0.78	0.33	0.45	0.03	0.64	0.99
Auditors	0.76	0.29	0.91	0.18	0.12	0.58	0.91	0.28	0.95
Intangible	0.35	0.66	0.95	0.60	0.37	0.35	0.49	0.63	0.91
Firm_Age	0.56	0.45	0.69	0.99	0.81	0.27	0.66	0.45	0.66
ROE	0.07	0.81	0.89	0.80	0.70	0.90	0.26	0.90	0.83
Firm_Size	0.29	0.72	0.94	0.27	0.64	0.44	0.06	0.87	0.82
Leverage	0.79	0.41	0.39	0.34	0.88	0.89	0.78	0.40	0.36

Source : Data processed , 2026

Table 10. Multicollinearity Test Results for Statistical Models 1, 2, and 3

	Model 1		Model 2		Model 3	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
ESG	0.66	1.49	0.83	1.19	0.87	1.13
EP_Slope			0.83	1.19		
ESG*EP_Slope			0.69	1.43		
SDS					0.20	4.55
ESG*SDS					0.71	1.40
TobinsQ	0.43	2.29	0.47	2.11	0.59	1.67
Auditors	0.55	1.80	0.49	2.00	0.67	1.48
Intangible	0.71	1.39	0.65	1.53	0.80	1.23
Firm_Age	0.64	1.54	0.71	1.40	0.93	1.07
ROE	0.55	1.81	0.54	1.84	0.60	1.64
Firm_Size	0.43	2.29	0.38	2.59	0.83	1.20
Leverage	0.65	1.53	0.44	2.24	0.80	1.24

Source : Data processed , 2026

The Glejser test results in Table 9 show that, following the application of Weighted Least Squares (WLS), all models are generally free from heteroscedasticity, as indicated by the insignificant coefficients of the explanatory variables ($p > 0.05$). Furthermore, the VIF and tolerance statistics reported in Table 10 confirm the absence of serious multicollinearity. To mitigate the collinearity typically associated with interaction terms, a two-stage procedure was applied in Models 2 and 3. For brevity, only the HCE model is reported, as the SCE and RCECOGS models produce similar results.

CONCLUSIONS

This study aims to analyze the effect of Environmental, Social, and Governance (ESG) on the efficiency of Intellectual Capital (IC) management in ASEAN-5 countries, with Earnings Persistence (EP) and Sustainable Development Score (SDS) as moderating variables. The empirical results indicate that ESG has a significant negative effect on two of the three intellectual capital dimensions, namely Structural Capital Efficiency (SCE) and COGS-based Relational Capital Efficiency (RCECOGS), while no significant effect is found on Human Capital Efficiency (HCE). These findings suggest that ESG implementation may create organizational and relational efficiency burdens when sustainability initiatives are not fully integrated into firms' core business strategies. Furthermore, the moderating analyses reveal that Earnings Persistence (EP) and Sustainable Development Score (SDS) intensify the adverse impact of ESG on SCE and RCECOGS. However, neither EP nor SDS significantly moderates the relationship between ESG and HCE. Overall, the findings indicate that the negative consequences of ESG implementation are concentrated in the structural and relational dimensions of intellectual capital rather than in human capital efficiency, particularly under conditions of greater earnings persistence and stronger sustainability-related institutional environments.

These findings have important implications for corporate managers and policymakers in developing countries. Companies need to consider their internal readiness and strategic clarity in implementing ESG so that it does not become a structural burden on intellectual capital development. In addition, regulators in the ASEAN region must design ESG policies that are adaptive to national institutional capacity and business readiness levels, so that ESG implementation does not become merely an administrative obligation. For investors and analysts, EP can be used as a tool to assess the clarity of ESG's impact on a company's non-financial performance.

This study has several limitations that provide opportunities for future research. First, this study does not directly test the shareholder expense theory through explicit measures of ESG-related costs. The costs associated with ESG implementation, such as sustainability reporting, compliance, and environmental investments, are assumed rather than directly observed. Therefore, the underlying cost mechanism through which ESG may reduce intellectual capital efficiency cannot be fully identified. Future research could incorporate direct measures of ESG expenditures and cost productivity to provide stronger evidence regarding the economic consequences of ESG investments.

Second, the analysis combines firms from five ASEAN countries into a single sample. Although country and industry dummy variables are included to control for contextual differences, the study does not explicitly examine cross-country heterogeneity. Variations in institutional environments, regulatory frameworks, and ESG maturity across countries may influence the relationship between ESG and intellectual capital efficiency. Future studies

could conduct country-specific analyses to provide more nuanced and context-sensitive findings.

Third, this study employs a composite ESG score without separately investigating the effects of the Environmental, Social, and Governance dimensions. As a result, the distinct impacts of each ESG pillar on human, structural, and relational capital efficiency remain unclear. Future research could examine these dimensions individually to identify which ESG dimensions contribute to intellectual capital development, and which may generate efficiency burdens for firms in developing economies.

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