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ESG Disclosure, Intellectual Capital, and Firm Financial Performance: The Role of Board Gender Diversity as a Moderator

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Abstract

This study examines whether ESG disclosure and intellectual capital affect Indonesian banks' financial performance and whether board gender diversity (BGD) moderates these effects. Panel data from 14 IDX-listed banks during 2019–2023 (n = 70 firm-year observations) were analyzed using a Random Effect Model and Moderated Regression Analysis in EViews 12. ROA represents financial performance; ESG is a GRI-based disclosure index; intellectual capital is measured by VAIC; and BGD is the proportion of female directors. Results show ESG disclosure improves ROA (β = 0.010735; t = 2.199; p = 0.031), whereas intellectual capital is negative and not significant (β = −0.000196; t = −0.112; p = 0.911) and BGD has no significant direct effect (β = −0.015360; t = −1.292; p = 0.201). The baseline model explains modest variation in ROA (R^2 = 0.093; adjusted R^2 = 0.052). Interaction tests indicate that BGD strengthens the ESG–ROA link at the 10% level (βESG×BGD = 0.080093; p = 0.055) and significantly strengthens the intellectual capital–ROA link (βIC×BGD = 0.022174; t = 2.762; p = 0.007), suggesting gender-diverse boards help convert sustainability transparency and knowledge-based resources into profitability. The study contributes to Resource-Based Theory and Stakeholder Theory by showing that governance diversity is a boundary condition for realizing performance payoffs from ESG disclosure and intellectual resources in an emerging-market banking context. Practically, banks should enhance ESG reporting quality, improve intellectual-capital efficiency, and increase female representation in boards and key committees to strengthen oversight and strategic use of intangible assets. Overall, the findings highlight inclusive governance as a strategic lever to amplify the financial benefits of ESG disclosure and intellectual capital in Indonesian banking.

Keywords *– ESG disclosure; intellectual capital; board gender diversity; financial performance.*

Abstrak

Penelitian ini menganalisis pengaruh pengungkapan ESG dan intellectual capital (IC) terhadap kinerja keuangan bank di Indonesia serta menguji moderasi board gender diversity (BGD). Data panel 14 bank BEI periode 2019–2023 (n = 70 observasi firm-year) dianalisis dengan Random Effect Model dan Moderated Regression Analysis menggunakan EViews 12. Kinerja keuangan diproksikan ROA; ESG diukur dengan indeks pengungkapan berbasis GRI; IC diukur dengan VAIC; dan BGD adalah proporsi direktur perempuan. Hasil menunjukkan ESG berpengaruh positif signifikan terhadap ROA (β = 0.010735; t = 2.199; p = 0.031), sedangkan IC berpengaruh negatif namun tidak signifikan (β = −0.000196; t = −0.112; p = 0.911) dan BGD tidak signifikan secara langsung (β = −0.015360; t = −1.292; p = 0.201). Daya jelas model terhadap ROA relatif rendah (R^2 = 0.093; adjusted R^2 = 0.052). Uji interaksi memperlihatkan BGD memperkuat hubungan ESG–ROA secara marginal pada tingkat 10% (βESG×BGD = 0.080093; p = 0.055) serta memperkuat hubungan IC–ROA secara signifikan (βIC×BGD = 0.022174; t = 2.762; p = 0.007), yang menunjukkan bahwa dewan yang lebih beragam gender lebih efektif mengonversi transparansi keberlanjutan dan aset pengetahuan menjadi

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profitabilitas. Secara teoretis, temuan ini memperluas Resource-Based Theory dan Stakeholder Theory dengan menegaskan bahwa keberagaman tata kelola merupakan kondisi batas (boundary condition) agar manfaat kinerja dari ESG dan IC dapat terealisasi dalam konteks perbankan pasar berkembang. Secara praktis, manajemen bank perlu meningkatkan kualitas pelaporan ESG, mengoptimalkan efisiensi IC, dan mendorong keterwakilan perempuan pada dewan/komite strategis untuk memperkuat pengawasan dan pengambilan keputusan. Secara keseluruhan, studi ini menegaskan governance yang inklusif sebagai pengungkit penting untuk memperbesar dampak ESG dan intellectual capital terhadap kinerja keuangan bank di Indonesia.

Kata Kunci – Pengungkapan ESG, modal intelektual, keberagaman gender dewan, kinerja keuangan.

1. INTRODUCTION

In recent years, business sustainability has become a central issue in the corporate world. Companies are no longer evaluated solely on their ability to generate profits, but also on their responsibility toward environmental, social, and governance (ESG) practices (Clementino & Perkins, 2021; Shaikh, 2021). ESG disclosure serves as a communication channel with stakeholders and a signal of corporate accountability in creating long-term value (Agbakwuru et al., 2024; Hamrianto J., 2025). By reporting ESG activities, firms can strengthen their legitimacy, improve stakeholder trust, and enhance competitiveness in increasingly dynamic markets (Agbakwuru et al., 2024; Rabaya & Saleh, 2022).

Beyond ESG, Intellectual Capital (IC) has emerged as a vital intangible resource that plays a decisive role in modern business performance (Amitrano et al., 2025; Awad Bakry, 2022; Lanzalonga et al., 2025). Consisting of human, structural, and relational capital, IC enables firms to innovate, operate efficiently, and maintain robust stakeholder relationships (Cabrilo et al., 2020; Wang et al., 2021). In knowledge-based economies, the ability to manage IC effectively often distinguishes high-performing firms from their peers, with direct implications for financial outcomes such as profitability and market value (Eldaia, 2025; Parkman et al., 2012).

However, the extent to which ESG and IC translate into financial performance is strongly shaped by governance quality, particularly at the board (Abdelkader et al., 2024; Arayssi et al., 2020) Board Gender Diversity (BGD) has received growing attention as a key determinant of board effectiveness (Lefley & Janecek, 2025; Wasiu Abiodun et al., 2023; Wu et al., 2022). The inclusion of women in boards is expected to enrich perspectives, introduce diverse leadership styles, and foster more inclusive decision-making (Ok & Eniola, 2024). Gender-diverse boards are also argued to be more responsive to sustainability challenges, which may reinforce the positive impact of ESG and IC on firm performance (Issa & Zaid, 2025; Kampoowale et al., 2024).

Although prior studies have examined the relationship between ESG disclosure, intellectual capital, and firm performance, empirical evidence from Indonesia remains limited and inconclusive, particularly within the banking sector. Existing Indonesian studies often analyze ESG or intellectual capital in isolation, without integrating governance mechanisms such as board gender diversity. Moreover, most prior research emphasizes direct effects, while the moderating role of board gender diversity in transforming ESG disclosure and intellectual capital into financial performance has received little attention. This gap is critical, given the relatively low representation of women on corporate boards in Indonesia and the early stage of ESG implementation. Therefore, this study addresses this gap by developing an integrative model that simultaneously examines ESG disclosure, intellectual capital, and board gender diversity in explaining bank financial performance.

By filling this gap, the study contributes to theory by expanding the literature on ESG, IC, and governance diversity in emerging markets. It also provides practical insights for managers, investors,

and regulators by emphasizing the strategic importance of transparency, intangible assets, and inclusive governance in driving sustainable financial performance.

2. LITERATURE REVIEW

2.1. ESG Disclosure and Financial Performance

ESG disclosure has increasingly been recognized as a mechanism for enhancing corporate accountability and stakeholder confidence (Agbakwuru et al., 2024). Prior studies in developed economies show that higher ESG transparency is associated with improved access to financing, reduced risk, and stronger reputational capital, all of which contribute to superior financial outcomes ((Ng et al., 2020; Zhao et al., 2024). In emerging markets, findings are more varied. For instance, found that ESG disclosure positively influences firm value in Malaysia (Raja Ahmad et al., 2021; Sadiq et al., 2020), while reported that in Indonesia, ESG practices are still uneven and their impact on financial performance is not fully consistent across sectors (Nurahman et al., 2024). These mixed results highlight the importance of further investigation, especially in contexts where sustainability standards are still evolving.

Hypothesis 1 (H1): ESG disclosure has a positive effect on firm financial performance (ROA).

2.2. Intellectual Capital and Financial Performance

Intellectual Capital (IC) represents a set of intangible assets, human, structural, and relational capital that underpin knowledge creation and competitive advantage (Nareswari et al., 2023; Nurahman et al., 2024). Research shows that IC efficiency is strongly related to firm profitability and long-term performance (Ting et al., 2023). Introduced the Value-Added Intellectual Coefficient (VAIC) model, which has been widely applied to measure IC efficiency (Marzo, 2022). Using VAIC, demonstrated that IC positively affects both profitability and market valuation in Taiwanese firms (Ni et al., 2020). Similar findings were reported by Appuhami (2007) in the Thai banking sector and by Nirino et al. (2022) in European contexts. In Indonesia, Purnamawati et al. (2022) found that IC components significantly enhance financial performance, particularly in industries with high reliance on human capital. These findings reinforce the expectation that IC contributes positively to firm performance.

Hypothesis 2 (H2): Intellectual Capital has a positive effect on firm financial performance (ROA).

2.3. Board Gender Diversity as a Moderator

Corporate governance structures, particularly board composition, play a critical role in determining how effectively ESG and IC translate into financial outcomes (Bhat et al., 2024; Moussa et al., 2024). Board Gender Diversity (BGD) has emerged as a governance attribute of growing importance (Lefley & Janecek, 2025; Mazumder, 2025; Wasiu Abiodun et al., 2023). Studies show that female directors enhance monitoring effectiveness and bring diverse perspectives that improve board decision-making (Adams & Ferreira, 2009). More recent research suggests that gender-diverse boards are more attuned to sustainability issues and stakeholder concerns. For example, Bear et al. (2010) found that board gender diversity enhances corporate social performance in U.S. firms, while Nadeem et al. (2017) documented that gender diversity strengthens the positive association between IC and financial performance in Australian companies. In emerging economies, Ouni et al. (2022) argued that female representation on boards increases the credibility of ESG reporting and strengthens its impact on financial outcomes. These findings indicate that BGD may reinforce the effectiveness of ESG disclosure and IC in improving firm performance.

Hypothesis 3a (H3a): Board Gender Diversity strengthens the positive relationship between ESG disclosure and firm financial performance (ROA).

Hypothesis 3b (H3b): Board Gender Diversity strengthens the positive relationship between Intellectual Capital and firm financial performance (ROA).

2.4. Conceptual Framework

Based on the theoretical background and previous empirical studies, this study proposes a framework that links Environmental, Social, and Governance (ESG) Disclosure and Intellectual Capital (IC) to firm financial performance, with Board Gender Diversity (BGD) serving as a moderating factor. First, ESG disclosure is expected to enhance financial performance by improving transparency, building stakeholder trust, and reducing information asymmetry. In the Indonesian context, where sustainability practices are still evolving, ESG disclosure signals firms' commitment to responsible and long-term value creation, which may positively affect profitability. Second, IC, comprising human, structural, and relational capital, is considered a strategic intangible resource that drives innovation and operational efficiency. Firms that effectively leverage IC are better positioned to sustain competitive advantage and improve profitability, as reflected in Return on Assets (ROA). Third, the effectiveness of ESG disclosure and IC may not be uniform across firms, as governance mechanisms, particularly board composition, shape their outcomes. Board Gender Diversity is argued to enrich decision-making, improve monitoring, and strengthen responsiveness to sustainability concerns. Therefore, BGD is expected to amplify the positive effects of ESG disclosure and IC on financial performance. This framework integrates sustainability, intangible resources, and governance diversity into one model, highlighting their interaction in shaping firm performance in emerging markets.

Proposed Conceptual Framework

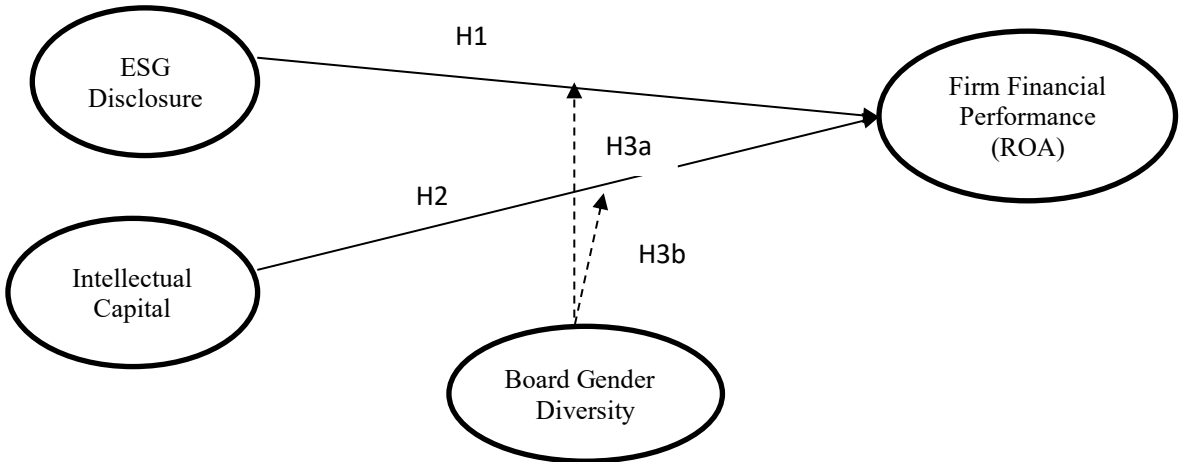

Figure 1. Conceptual Framework

3. RESEARCH METHOD

3.1. Population and Sample

The population of this study includes all banking companies listed on the Indonesia Stock Exchange (IDX) during the period 2019-2023, totalling 46 banks. The banking sector was selected because of its strategic role in maintaining Indonesia's financial stability and its growing involvement in implementing Environmental, Social, and Governance (ESG) principles, as well as managing Intellectual Capital (IC) as part of sustainable financial performance. A purposive sampling technique was employed to determine the study sample, with the following selection criteria:

- The bank must be continuously listed on the IDX during the observation period (2019-2023).

- The bank must have published complete annual reports and sustainability (ESG) reports for each year within the observation period.
- The bank must have disclosed sufficient data to calculate the research variables: ESG Disclosure Index, Intellectual Capital (measured by VAIC), Return on Assets (ROA), and Board Gender Diversity (BGD).
- The bank must have non-negative equity values to ensure financial soundness and comparability across the sample.

A purposive sampling technique was employed to ensure data completeness and consistency across the observation period. The banking sector was selected due to its standardized reporting structure and mandatory sustainability disclosure requirements, which are essential for ESG and intellectual capital measurement. Although the final sample consists of 14 banks, this size is considered adequate for panel data analysis and moderated regression, as the dataset forms a balanced panel with 70 firm-year observations. Prior empirical studies suggest that moderation analysis remains statistically valid when supported by balanced panel structures and robust estimation techniques, such as the Random Effect Model used in this study.

3.2. Variables and Measurement

3.2.1. Dependent Variable

Financial Performance (ROA): measured using Return on Assets (ROA), calculated as net income divided by total assets. ROA reflects the efficiency of management in utilizing assets to generate profits.

3.2.2. Independent Variables

Environmental, Social, and Governance (ESG) Disclosure: measured using a disclosure index based on the Global Reporting Initiative (GRI) Standards. Each disclosed item is scored (1 if disclosed, 0 if not), and the total is divided by the maximum possible score to obtain a disclosure index.

Intellectual Capital (IC): measured using the Value-Added Intellectual Coefficient (VAIC) model developed by Pulic. VAIC is composed of three components:

Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and the VAIC score is the sum of these components.

3.2.3. Moderating Variable

Board Gender Diversity (BGD): measured using the proportion of female members on the board of directors to the total number of directors.

Table 1. Operationalization of Variables

Variable	Definition	Indicator / Measurement
Financial Performance (ROA) (Dependent)	A measure of firm efficiency in utilizing its assets to generate net income.	ROA = Net Income / Total Assets
ESG Disclosure (Independent)	The extent to which firms disclose Environmental, Social, and Governance activities based on GRI standards.	ESG Index = (Total items disclosed / Maximum disclosure items) × 100%
Intellectual Capital (IC) (Independent)	Intangible assets are reflected through the efficiency of human, structural, and capital resources (VAIC model).	VAIC = HCE + SCE + CEE, where: HCE = VA / HC SCE = SC / VA CEE = VA / CE
Board Gender Diversity (BGD) (Moderator)	The proportion of female directors relative to the total members of the board.	BGD = (Number of female directors / Total board members) × 100%

3.3. Model Specification

This study employs panel data regression models to capture both cross-sectional (between banks) and time-series (across years) variations. The analysis begins with model selection using the Chow test,

Lagrange Multiplier test, and Hausman test to determine whether the Pooled OLS, Fixed Effect Model (FEM), or Random Effect Model (REM) is most appropriate.

The empirical model is formulated as follows:

$$ROAit = \alpha + \beta 1ESGit + \beta 2ICit + \beta 3BGDit + \beta 4(ESG \times BGD)it + \beta 5(IC \times BGD)it + \epsilon it$$

Where:

- ROAit = Financial performance of firm i in year t
- ESGit = ESG Disclosure score
- ICit = Intellectual Capital (VAIC)
- BGDit = Board Gender Diversity
- ESG×BGD = interaction term for the moderation of ESG
- IC×BGD = interaction term for the moderation of IC
- ϵit = error term

4. RESULT AND DISCUSSION

4.1. Descriptive Statistics Analysis

Descriptive statistics provide an overview or description of the data by examining the minimum, maximum, mean, and standard deviation values. Once all data and information have been successfully collected, the data processing stage can be carried out. The data processing was conducted using the EViews 12 software. Based on the results of the data processing, a summary of the descriptive statistics for each research variable used in this study was obtained, as presented in Table 2 below.

Table 2. Descriptive Statistics.

	Y	X1	X2	Z
Mean	0.018519	0.363750	3.714392	0.290458
Median	0.014373	0.362500	3.569043	0.277778
Maximum	0.089636	0.937500	5.911334	0.500000
Minimum	0.001516	0.037500	1.135744	0.000000
Std. Dev.	0.016217	0.207176	1.386223	0.151774
Skewness	2.461321	0.466219	-0.021937	-0.487372
Kurtosis	10.24513	2.689441	1.539939	2.420926
Jarque-Bera	223.7792	2.817168	6.223296	3.749239
Probability	0.000000	0.244489	0.044528	0.153413
Sum	1.296344	25.46250	260.075	20.33205
Sum Sq. Dev.	0.018145	2.961609	132.5914	1.589433
Observations	70	70	70	70

Source: Own Data Primary, 2025

Table 2 presents the descriptive statistics for the main variables of this study, including Firm Financial Performance (Y), ESG Disclosure (X1), Intellectual Capital (X2), and Board Gender Diversity (Z), based on a total of 70 firm-year observations covering the research period. The mean value of Return on Assets (ROA) as the proxy for financial performance is 0.0185, indicating that, on average, firms generated a return of approximately 1.85% on their assets. The maximum value of 0.0899 suggests that some firms achieved relatively high profitability, while the minimum value of 0.0015 reflects low efficiency in asset utilization among others. The standard deviation of 0.0162 implies moderate variation in profitability across firms. However, the skewness (2.46) and kurtosis (10.25) reveal that the ROA data are highly non-normal, with a positively skewed and leptokurtic distribution.

This is further confirmed by the Jarque–Bera statistic (223.77, p = 0.0000), indicating the presence of outliers and deviations from normality in firm performance data.

The ESG Disclosure (X1) variable has an average score of 0.3637, meaning that firms, on average, disclosed about 36% of the ESG indicators considered in this study. The minimum (0.0375) and maximum (0.9375) values demonstrate substantial variation in disclosure practices among companies. The mean value of Intellectual Capital (X2) is 3.714, reflecting that, on average, firms demonstrate a good level of efficiency in managing their intellectual resources to create value. The wide range from 1.135 to 5.911 shows substantial variation in intellectual capital performance across firms. For the moderating variable, Board Gender Diversity (Z), the average value of 0.2904 indicates that approximately 29% of board members are female. The minimum value of 0.0000 signifies the existence of firms with no female directors, whereas the maximum value of 0.5000 reveals that some boards are composed of an equal number of male and female members. The standard deviation (0.1517) demonstrates moderate variability among firms. The Jarque-Bera probability (p = 0.153) confirms that the BGD variable is approximately normally distributed.

Overall, the descriptive statistics indicate considerable heterogeneity among firms in terms of ESG disclosure, intellectual capital efficiency, and gender diversity on corporate boards. This variation provides a robust empirical foundation for testing how differences in sustainability disclosure and intellectual capital utilization influence firm financial performance, as well as how board gender diversity moderates these relationships.

4.2. Selection of Panel Data Regression Model Estimation

4.2.1. Chow Test

The Chow test is used to determine which panel data analysis model should be applied. This test helps in choosing between the Fixed Effect Model (FEM) and the Common Effect Model (CEM), based on the following hypotheses:

H_0: Common Effect Model

H_a: Fixed Effect Model

If the test results show that the probability value of the Cross-section F is greater than 0.05, then the appropriate model is the Common Effect Model. Conversely, if the probability value of the Cross-section F is less than 0.05, the model that should be used is the Fixed Effect Model.

Table 3. Chow Test Results

Redundant Fixed Effects Tests Equation: Untitled Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	23.380724	(13,53)	0.0000
Cross-section Chi-square	133.51150	13	0.0000

Source: Processed data (2025)

Based on Table 3 above, it can be seen that the probability value of the Cross-section F test is 0.0000 < 0.05, indicating that the Fixed Effect Model (FEM) is more appropriate than the Common Effect Model (CEM). To further confirm the most suitable estimation method, an additional test the Hausman test, was conducted. The Hausman test aims to determine whether the Fixed Effect Model or the Random Effect Model should be used in this study.

4.2.2. Hausman test

The Hausman test is used to determine which model is more appropriate to use the Fixed Effect Model (FEM) or the Random Effect Model (REM). The hypotheses for the Hausman test are as follows:

H_0: Random Effect Model
H_a: Fixed Effect Model

If the test results show that the probability value of the Chi-Square (Cross-section test) is greater than 0.05, then the appropriate model is the Random Effect Model. Conversely, if the probability value of the Chi-Square is less than 0.05, the model that should be used is the Fixed Effect Model. The results of the model specification test are presented as follows:

Table 4. Hausman Test Results

Correlated Random Effects – Hausman Test Equation: Untitled Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.614210	3	0.8932

Source: Processed data (2025)

In Table 4, it can be seen that the probability value of Cross-section Random is 0.8932, which is greater than 0.05. Therefore, it can be concluded that the Random Effect Model is more appropriate than the Fixed Effect Model. After conducting the Chow test and the Hausman test, a third test, the Lagrange Multiplier (LM) test, was carried out for further verification.

4.2.3. Lagrange Multiplier (LM) Test

The Lagrange Multiplier (LM) test is used to determine whether the Common Effect Model or the Random Effect Model is more appropriate. If the Breusch–Pagan probability value is greater than 0.05, then the Common Effect Model is selected. Conversely, if the Breusch–Pagan probability value is less than 0.05, the Random Effect Model should be used. The estimation results of the Lagrange Multiplier test are presented as follows:

Table 5. Lagrange Multiplier (LM) Test Results

Lagrange Multiplier Tests for Random Effects Null hypothesis: No effects Alternative hypotheses: Two-sided (Breusch–Pagan) and one-sided (all others) alternatives			
Test	Cross-section	Time	Both
Breusch–Pagan	90.41051 (0.0000)	1.479066 (0.2239)	91.88958 (0.0000)
Honda	9.508444 (0.0000)	-1.216169 (0.8880)	5.863524 (0.0000)
King–Wu	9.508444 (0.0000)	-1.216169 (0.8880)	3.548764 (0.0002)

Source: Processed data (2025)

In Table 5, it can be seen that the Breusch-Pagan probability value is 0.0000, which is less than 0.05. Therefore, it can be concluded that the Random Effect Model is more appropriate than the Common Effect Model. After conducting the Chow test, Hausman test, and Lagrange Multiplier test, it is concluded that the most suitable estimation model for this study is the Random Effect Model (REM).

4.3. Panel Data Analysis Using the Random Effect Model

Table 6. Results of Panel Data Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.019805	0.009017	2.196286	0.0316
X1	0.010735	0.004881	2.199342	0.0314
X2	-0.000196	0.001758	-0.111639	0.9114
Z	-0.015360	0.011892	-1.291652	0.2010

Source: Processed data (2025)

Based on the selected estimation model, the following panel data regression equation is obtained:

$$\mathrm{ROA} = 0.019805 + 0.010735(\mathrm{X1}) - 0.000196(\mathrm{X2}) - 0.015360(\mathrm{Z}) + \mathrm{e}$$

The coefficient for ESG Disclosure (X1) is 0.010735 with a probability value of 0.0314, which is less than 0.05. This indicates that ESG disclosure has a positive and statistically significant effect on firm financial performance. Thus, companies with higher levels of ESG disclosure tend to achieve better financial performance (ROA), reflecting the benefits of enhanced transparency and sustainability practices in improving stakeholder trust and operational efficiency. The coefficient for Intellectual Capital (X2) is -0.000196 with a probability value of 0.9114, indicating that this variable has a negative and insignificant effect on financial performance. This suggests that intellectual capital, as measured in this study, does not directly contribute to improving profitability during the observed period, possibly due to inefficiencies in knowledge utilization or the long-term nature of intangible asset benefits.

Meanwhile, the Board Gender Diversity (Z) variable shows a negative coefficient of -0.015360 with a probability value of 0.2010, meaning that gender diversity in the board of directors does not have a statistically significant effect on firm performance at the 5% level. However, the negative direction of the coefficient could indicate that, in some firms, the presence of gender diversity may not yet translate into measurable financial advantages, possibly due to the limited representation or influence of female directors in strategic decision-making processes. Overall, the regression results demonstrate that ESG Disclosure plays a critical role in improving firm financial performance, while Intellectual Capital and Board Gender Diversity show no significant direct effect. However, further analysis incorporating moderating effects may provide deeper insights into how these factors interact to influence firm outcomes.

4.4. Hypothesis Testing

4.4.1. t-Test

The t-test is used to test the hypotheses partially, in order to determine the individual effect of each independent variable on the dependent variable. This test is conducted by examining the probability value (p-value) based on the following criteria:

- If the probability value is less than 0.05, then H_0 is rejected, and H_a is accepted.
- If the probability value is greater than 0.05, then H_0 is accepted, and H_a is rejected.

Table 7. t-Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.019805	0.009017	2.196286	0.0316
X1	0.010735	0.004881	2.199342	0.0314
X2	-0.000196	0.001758	-0.111639	0.9114
Z	-0.015360	0.011892	-1.291652	0.2010

Source: Processed data (2025)

The results of the t-test presented in Table 7 reveal the partial effects of each independent variable, ESG Disclosure (X1), Intellectual Capital (X2), and Board Gender Diversity (Z), on Firm Financial Performance (ROA).

The ESG Disclosure (X1) variable shows a coefficient value of 0.010735 with a probability value of 0.0314 (< 0.05). This indicates that ESG disclosure has a positive and statistically significant effect on firm financial performance. Firms that disclose ESG information more extensively tend to achieve better profitability, as their commitment to environmental responsibility, social accountability, and sound governance enhances stakeholder confidence and operational efficiency.

Thus, Hypothesis 1 (H1), which states that ESG Disclosure has a positive and significant effect on firm financial performance, is accepted.

Meanwhile, Intellectual Capital (X2) has a coefficient of −0.000196 and a probability value of 0.9114 (> 0.05), indicating a negative and insignificant effect on financial performance. This suggests that intellectual capital does not directly improve profitability in the short term. The result may be attributed to the fact that the benefits of intellectual capital, such as human resource competence, innovation capability, and organizational knowledge, often manifest over a longer horizon and may not immediately influence short-term financial outcomes.

Therefore, Hypothesis 2 (H2), which posits that Intellectual Capital positively affects firm financial performance, is rejected.

In summary, the t-test results demonstrate that ESG Disclosure significantly enhances firm financial performance, whereas Intellectual Capital and Board Gender Diversity do not show significant direct effects. These findings underscore the growing importance of sustainability disclosure in shaping firm outcomes while highlighting the need for stronger integration of intellectual and gender diversity dimensions into corporate governance practices.

4.4.2. Coefficient of Determination (R^2)

Table 8. Coefficient of Determination Results

Weighted Statistics			
	Value		Value
R-squared	0.093501	Mean dependent var	0.003380
Adjusted R-squared	0.052296	S.D. dependent var	0.06841

Source: Processed data (2025)

Based on Table 8, the results indicate that the adjusted R-squared for the model is 0.0523, indicating that the combination of Environmental, Social, and Governance (ESG) Disclosure and Intellectual Capital, with Board Gender Diversity as a moderating variable, explains 5.23% of the variation in firm financial performance. The relatively low Adjusted R-squared value (5.23%) indicates that a wide range of factors beyond ESG disclosure, intellectual capital, and board gender diversity influences bank financial performance. Variables such as credit risk, capital adequacy, macroeconomic conditions, digital transformation, and regulatory compliance are likely to play a significant role in determining ROA in the banking sector. Nevertheless, the significance of the moderating effects highlights that governance quality, rather than standalone ESG or IC metrics, is crucial in converting non-financial resources into financial outcomes.

4.5. Moderated Regression Analysis (MRA) Test

The panel data regression analysis in this study aims to examine the effect of Environmental, Social, and Governance (ESG) Disclosure and Intellectual Capital on Firm Financial Performance, with Board Gender Diversity serving as the moderating variable. The estimation results were obtained using

the EViews 12 software. Based on the model selection tests conducted, the most appropriate estimation approach for this study is the Random Effect Model (REM).

4.5.1. Board Gender Diversity strengthens the positive relationship between ESG disclosure and firm financial performance

Table 9. Results of the Moderated Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.019805	0.009017	2.196286	0.0316
X1	0.010735	0.004881	2.199342	0.0314
X2	-0.000196	0.001758	-0.111639	0.9114
Z	-0.015360	0.011892	-1.291652	0.2010

Source: Processed data (2025)

Table 9 presents the results of the Moderated Regression Analysis (MRA) conducted to test whether Board Gender Diversity (BGD) moderates the relationship between ESG Disclosure (X1) and Firm Financial Performance (ROA).

The interaction term (X1Z) between ESG Disclosure and Board Gender Diversity has a coefficient value of 0.080093 with a probability value of 0.0555, which is slightly above the 5% significance level but within the 10% threshold. This indicates a marginally significant moderating effect, suggesting that Board Gender Diversity strengthens the positive relationship between ESG Disclosure and firm financial performance. This result implies that companies with greater female representation on their boards tend to derive stronger financial benefits from ESG disclosure practices.

Female directors are often associated with higher ethical awareness, stronger stakeholder orientation, and a greater emphasis on long-term sustainability, all of which enhance the effectiveness of ESG initiatives in improving firm performance. Meanwhile, the direct coefficient for ESG Disclosure (X1) is −0.013467 with a p-value of 0.3137, indicating no significant direct effect on financial performance without the moderating role of gender diversity. However, the inclusion of the interaction term (X1Z) shifts the dynamic, showing that Board Gender Diversity acts as a positive catalyst that enables ESG activities to translate more effectively into improved financial outcomes.

Therefore, Hypothesis 3a, which states that Board Gender Diversity strengthens the positive relationship between ESG Disclosure and firm financial performance, is supported at the 10% significance level, confirming the relevance of gender-inclusive governance in enhancing the financial value of sustainable business practices.

4.5.2. Board Gender Diversity strengthens the positive relationship between Intellectual Capital and firm financial performance

Table 10. Results of the Moderated Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047884	0.012476	3.838160	0.0003
X2	-0.006891	0.003043	-2.264163	0.0269
Z	-0.092430	0.030080	-3.072743	0.0031
X2Z	0.022174	0.008028	2.762034	0.0074

Source: Processed data (2025)

Table 10 presents the results of the Moderated Regression Analysis (MRA) examining whether Board Gender Diversity (Z) moderates the relationship between Intellectual Capital (X2) and Firm Financial Performance (ROA).

The interaction term (X2Z) between Intellectual Capital and Board Gender Diversity shows a coefficient of 0.022174 with a t-statistic of 2.762 and a probability value of 0.0074 (< 0.05). This result indicates that the moderating effect of Board Gender Diversity is positive and statistically significant. In other words, the presence of female representation on the board strengthens the positive relationship between Intellectual Capital and firm financial performance. The direct effect of Intellectual Capital (X2) alone shows a negative coefficient of -0.006891 with a p-value of 0.0269 (< 0.05), implying that, without the moderating role of gender diversity, Intellectual Capital has a significant but negative influence on financial performance. This suggests that firms may not fully utilize their intangible resources effectively when board diversity is low. However, when Board Gender Diversity (Z) interacts with Intellectual Capital (X2Z), the relationship becomes positive and significant, indicating that gender-diverse boards can transform intellectual capital into stronger financial outcomes.

This finding supports the view that gender-diverse boards tend to be more inclusive, open to innovation, and effective in utilizing knowledge-based assets, thereby maximizing the value created from intellectual capital. Female directors often bring unique perspectives, stronger monitoring roles, and higher ethical sensitivity, which collectively enhance decision-making processes related to knowledge management and resource optimization.

Therefore, Hypothesis 3b (H3b), which states that Board Gender Diversity strengthens the positive relationship between Intellectual Capital and firm financial performance, is accepted.

In summary, the results confirm that Board Gender Diversity acts as a crucial governance mechanism that enhances the effectiveness of intellectual capital in driving superior financial performance, underscoring the strategic value of diversity in corporate boards within the Indonesian context.

The results of this study provide valuable insights into how Environmental, Social, and Governance (ESG) Disclosure, Intellectual Capital (IC), and Board Gender Diversity (BGD) interact to influence firm financial performance within the Indonesian context. The findings contribute to the growing body of research on corporate sustainability and governance in emerging markets, where the integration of non-financial factors into performance measurement remains relatively new but increasingly relevant.

The findings show that ESG Disclosure has a positive and significant effect on firm financial performance, as measured by Return on Assets (ROA). This supports the argument that transparency in environmental and social responsibility enhances corporate reputation, builds stakeholder trust, and leads to operational efficiency, all of which contribute to improved profitability. This result aligns with prior studies by Itan et al. (2025) and Singhania & Saini (2023) which suggest that comprehensive ESG reporting helps firms attract investors and achieve sustainable growth. In the Indonesian context, where regulatory attention to sustainability reporting has increased following OJK Regulation No. 51/POJK.03/2017, the positive impact of ESG disclosure confirms that stakeholders increasingly value ethical and sustainable business practices.

Although intellectual capital is theoretically expected to enhance firm performance, the empirical results reveal a negative and insignificant direct effect. This finding may reflect the long-term nature of intellectual capital, whose benefits are not immediately observable in short-term financial indicators such as ROA. In the Indonesian banking context, intellectual capital investments such as employee training, digital systems, and organizational learning often require substantial time and governance support to translate into profitability. Without effective board oversight and strategic alignment, intellectual resources may increase costs without generating immediate returns, explaining the observed negative association. Similar findings were reported by Amitrano et al. (2025), who noted that the impact of intellectual capital on profitability often requires time to materialize, as it depends on knowledge management systems, innovation culture, and leadership effectiveness.

In Indonesia, the underutilization of intellectual resources could stem from limited innovation investment, weak R&D infrastructure, or inadequate performance measurement frameworks for intangible assets.

The moderating role of Board Gender Diversity (BGD) reveals a nuanced understanding of corporate governance dynamics. The results demonstrate that BGD strengthens the positive relationship between both ESG Disclosure and Intellectual Capital with financial performance, although with varying degrees of significance. For the interaction between ESG Disclosure and BGD, the effect is positive and marginally significant, suggesting that the presence of female directors enhances the firm's ability to translate ESG efforts into better financial outcomes. This supports prior evidence from Yakubu & Oumarou (2023) and Al Amosh & Khatib (2022), who argue that women's participation in boards promotes ethical leadership, stakeholder orientation, and sustainability-driven decision-making.

Meanwhile, the interaction between Intellectual Capital and BGD shows a strong and significant positive effect, indicating that gender-diverse boards are more capable of leveraging intellectual resources to generate value. Female directors tend to bring collaborative leadership styles, diverse cognitive perspectives, and higher sensitivity toward human capital development key drivers for maximizing intellectual capital utilization.

The moderating role of board gender diversity suggests that gender-diverse boards enhance the effectiveness of ESG initiatives and intellectual capital utilization through several practical mechanisms. In Indonesian banks, female directors are often associated with stronger compliance orientation, enhanced stakeholder engagement, and greater emphasis on risk management. These characteristics improve strategic oversight and ensure that ESG policies and intellectual resources are implemented more effectively, thereby strengthening their contribution to financial performance.

Theoretically, these findings contribute to Resource-Based Theory (RBT) and Stakeholder Theory by illustrating how internal resources (such as intellectual capital) and governance mechanisms (such as gender diversity) interact with sustainability practices to shape firm performance. The study highlights that intangible and ethical dimensions of business, though non-financial, serve as strategic assets that drive long-term competitiveness.

From a managerial perspective, the results underscore the importance of promoting gender diversity within corporate boards and strengthening sustainability reporting. Managers are encouraged to invest in human and structural capital development while ensuring that ESG initiatives are not only symbolic but integrated into business strategy. Policymakers and regulators, such as the Financial Services Authority (OJK), can use these findings to design incentives that encourage more inclusive board compositions and mandatory ESG disclosures for listed companies.

In Indonesia, where corporate governance practices are evolving and female representation in leadership remains limited, this study provides timely evidence that inclusivity and transparency can improve both ethical and financial performance. Encouraging women's participation on boards is not merely a social agenda but a governance strategy that enhances firms' ability to translate sustainability and knowledge assets into tangible results.

5. CONCLUSION

5.1. Conclusion

This study aimed to analyze the effect of Environmental, Social, and Governance (ESG) Disclosure and Intellectual Capital (IC) on Firm Financial Performance (ROA), with Board Gender Diversity (BGD) serving as a moderating variable. Using panel data from Indonesian listed firms during the 2019-2023 period and employing the Random Effect Model (REM) estimation, several key findings were obtained.

First, the results demonstrate that ESG Disclosure positively and significantly affects financial performance, indicating that companies with greater transparency and commitment to sustainability tend to achieve superior profitability. This suggests that stakeholders reward firms that integrate responsible environmental and social practices with strong governance principles. Second, Intellectual Capital has a negative and insignificant direct effect on financial performance. This finding implies that, although intellectual capital represents an essential strategic resource, its benefits may require longer-term realization and are not immediately reflected in short-term profitability. Effective utilization of knowledge-based assets demands strong innovation systems and management commitment. Third, the moderating role of Board Gender Diversity provides deeper insight into corporate governance dynamics. BGD is found to strengthen the relationship between ESG Disclosure and firm performance (marginally significant) and to significantly enhance the relationship between Intellectual Capital and financial performance. These results confirm that gender-diverse boards can improve decision quality, promote inclusive leadership, and increase the effectiveness of sustainability and knowledge-driven strategies.

Overall, this study concludes that sustainability disclosure, intellectual resources, and inclusive governance are complementary drivers of firm value. However, their integration remains limited in many Indonesian companies, where ESG implementation and gender representation on boards are still evolving. Strengthening these areas can accelerate progress toward sustainable business performance.

5.2. Recommendations

5.2.1. *Theoretical Implications*

This study extends the literature on Resource-Based Theory and Stakeholder Theory by demonstrating that intangible assets and governance diversity are strategic enablers of firm performance in emerging markets. Future research should expand the model by including additional moderating variables such as board independence, ownership structure, or firm reputation, to better capture the complexity of sustainability-performance relationships.

5.2.2. *Managerial Implications*

Bank management should integrate ESG disclosure into core performance evaluation systems rather than treating it as a compliance exercise. Furthermore, banks are encouraged to promote female representation in board committees related to risk, sustainability, and human capital, as these areas are closely linked to ESG and intellectual capital effectiveness.

5.2.3. *Future Research Directions*

Future studies could explore broader sectors beyond manufacturing and banking, extend the observation period, or include mediating variables such as innovation capability or corporate reputation. Additionally, qualitative approaches could complement the quantitative findings to gain deeper insights into how board dynamics and sustainability practices interact within different organizational contexts.

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