

ESG ARCHITECTURE DESIGNING TRIPLE NEXUS SYNERGIES: MULTIDIMENSIONAL CORPORATE PERFORMANCE UNDER SUSTAINABILITY RISK

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ABSTRACT

This study examines how green accounting (PROPER), ESG architecture (Environmental, Social, Governance), and management efficiency jointly determine multidimensional financial performance (ROA, ROE, NPM, and Sales Growth). It further evaluates the moderating role of sustainability risk (DER). Data was gathered from sustainability report of 27 basic material's sector companies in IDX achieving PROPER's rank during 2019-2024, through quantitative approach with using panel data on moderating regression analysis method by EViews 13. The findings reveal that Green Accounting improves corporate performance selectively by increasing profit margins but does not significantly influence broader profitability indicators or growth. ESG Architecture demonstrates uneven impacts, where environmental disclosure strengthens shareholder returns, social disclosure reduces asset efficiency, and governance disclosure shows no significant financial effect. In contrast, management efficiency consistently drives profitability and growth, highlighting the central role of operational capability in sustaining corporate performance. Moderation analysis further shows that sustainability risk does not alter the impact of Green Accounting, weakens the effectiveness of ESG practices, but conditions the performance impact of managerial efficiency. These findings highlight that sustainability initiatives alone do not guarantee financial improvement unless supported by strong managerial efficiency and balanced financial risk. The study contributes by introducing an integrated Triple Nexus ESG Architecture framework linking sustainability accounting, managerial capability, and financial risk in explaining multidimensional corporate performance.

Keywords: Green Accounting, Environmental Social Governance Architecture, Management Efficiency, Multidimensional Financial Performance, Sustainability Risk.

ABSTRAK

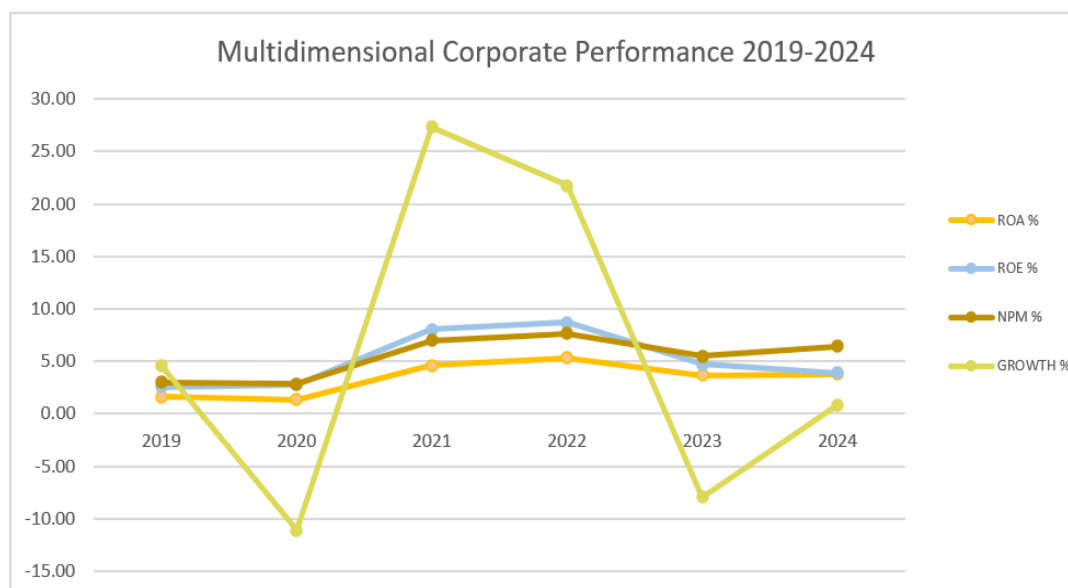
Studi ini mengkaji bagaimana akuntansi hijau (PROPER), arsitektur ESG (Lingkungan, Sosial, Tata Kelola), dan efisiensi manajemen bersama-sama menentukan kinerja keuangan multidimensi (ROA, ROE, NPM, dan Sales Growth). Ini lebih lanjut mengevaluasi peran moderasi risiko keberlanjutan (DER). Data dikumpulkan dari laporan keberlanjutan dari 27 perusahaan sektor material dasar di BEI yang meraih peringkat PROPER selama 2019-2024, melalui pendekatan kuantitatif dengan menggunakan data panel metode analisis regresi moderasi oleh Eviews 13. Temuan ini mengungkapkan bahwa Akuntansi Hijau meningkatkan kinerja perusahaan secara selektif dengan meningkatkan margin keuntungan tetapi tidak secara signifikan mempengaruhi indikator profitabilitas atau pertumbuhan yang lebih luas. Arsitektur ESG menunjukkan dampak yang tidak merata, di mana pengungkapan lingkungan

memperkuat pengembalian pemegang saham, pengungkapan sosial mengurangi efisiensi aset, dan pengungkapan tata kelola tidak menunjukkan efek keuangan yang signifikan. Sebaliknya, efisiensi manajemen secara konsisten mendorong profitabilitas dan pertumbuhan, menyoroti peran sentral kemampuan operasional dalam mempertahankan kinerja perusahaan. Analisis moderasi lebih lanjut menunjukkan bahwa risiko keberlanjutan tidak mengubah dampak Green Accounting, melemahkan efektivitas praktik ESG, tetapi mengkondisikan dampak kinerja dari efisiensi manajerial. Temuan ini menyoroti bahwa inisiatif keberlanjutan saja tidak menjamin peningkatan keuangan kecuali didukung oleh efisiensi manajerial yang kuat dan risiko keuangan yang seimbang. Studi ini berkontribusi dengan memperkenalkan kerangka kerja Arsitektur ESG Triple Nexus terintegrasi yang menghubungkan akuntansi keberlanjutan, kemampuan manajerial, dan risiko keuangan dalam menjelaskan kinerja perusahaan multidimensi.

Kata Kunci: *Corporate Social Responsibility, Islamic Corporate Social Responsibility, Environment Quality, Financial Vulnerability, Corporate Performance.*

INTRODUCTION

The accelerating pace of climate change, intensifying environmental degradation, and global decarbonisation commitments have fundamentally altered the way corporate performance is evaluated. Firms are no longer assessed solely on their ability to generate short-term profits but increasingly on how effectively they sustain financial, environmental, and social performance amid escalating sustainability risks. These pressures directly affect cost structures, access to capital, stakeholder expectations, and long-term growth prospects, particularly in environmentally sensitive industries (Amosh & Khatib, 2023; Martiny et al., 2024). Recent research shows that global environmental dynamics have a direct impact on the stability of profitability and growth ability of companies (Cahyani et al., 2024; Liu et al., 2024). This is reflected in Indonesian companies during 2019 - 2024, where ROA, ROE, NPM, and Growth showed a pattern of fluctuations that soared in 2021 and a significant decline in 2022-2023, shown in Figure 1.



Source: www.idx.co.id

Figure 1. Multidimensional Corporate Performance

Multidimensional Corporate Performance is highly sensitive to sustainability risks and market uncertainty (Elika et al., 2025; Kasman & Utami, 2023; Ningrum et al., 2025). This fact confirms that environmental risks are now a core determinant of a company's financial performance and growth. From a theoretical point of view, the urgency of strengthening MCP is explained through various grand theories. Stakeholder Theory places sustainability of performance because of meeting stakeholder expectations for social, environmental, and corporate governance actions (Ningrum et al., 2025; Seok et al., 2024; Tanjung & Lestari, 2025). Legitimacy theory states that companies respond to normative pressures by increasing sustainability disclosure through PROPER, GRI Standards 2021, and green accounting practices to gain social legitimacy and reduce reputational risks (Driastuti et al., 2024; Nengzih, 2022; Wahyuningsih & Risman, 2025). From the market side, signalling theory argues that ESG disclosure, governance quality, and managerial efficiency function as a signal of credibility and risk transparency to investors, thereby increasing the perception of performance and growth prospects (Sabrina et al., 2025; Seok et al., 2024; Sutrisno et al., 2024). Resource-Based View (RBV Theory) emphasizes that green accounting capability, operational efficiency, and governance are internal capabilities that increase profitability while maintaining long term growth (Arvitariyani & Wahidahwati, 2018; Martins & Eseosa, 2022; Sutrisno et al., 2024). The five theories are united by the SDGs theory, which emphasizes that the sustainability of the MCP can only be achieved through a People-Planet–Prosperity balance (Cahyani et al., 2024; Chen et al., 2022).



Figure 2. Tripple Nexus Accounting-Triple Bottom Line

Although the urgency of sustainability is strengthening, empirical findings on the impact of Green Accounting, ESG, and Management Efficiency for MCP still show inconsistent results. Some research supports that sustainability and environmental management practices increase the value and profitability of companies, including growth (Chen et al., 2022; Kasman & Utami, 2023; Tanjung & Lestari, 2025). However, other studies show that ESG disclosure is often symbolic and does not result in performance improvements because it does not reflect substantial sustainability actions (Driastuti et al., 2024; Fang, 2023; Nengzih, 2022). Similarly, the influence of Management Efficiency on profitability and growth is unstable and sensitive to capital structure and external risks (Aulia et al., 2025; Fadhillah et al., 2024; Martins & Eseosa, 2022). The literature also still discusses GA, ESG, and ME separately, although the Triple Nexus Accounting framework emphasizes the need for financial–management–sustainability accounting integration to read performance more accurately (Chen et al., 2022; Liu et al., 2024; Martiny et al., 2024). In addition, Sustainability Risk, has been shown to affect the sensitivity of the sustainability performance relationship,

but has not been widely applied as a moderation variable in integrative models (Cahyani et al., 2024; Aulia et al., 2025; Metwally, 2025). This condition shows that there is an empirical gap, conceptual gap, and methodological gap that has not been answered.

To bridge these gaps, this study developed the model "ESG Architecture Designing Triple Nexus Synergies to Explain Multidimensional Corporate Performance Under Sustainability Risk." This model integrates Green Accounting, ESG Architecture, and Management Efficiency in explaining MCP (ROA, ROE, NPM, Growth), as well as including sustainability risk (DER) as a moderator that influences the strength of the relationship between variables. The novelty of this research includes the formulation of a triple nexus-based ESG architecture as an interdependent system, simultaneous green accounting, ESG, management efficiency testing of multidimensional corporate performance, and Sustainability Risk modelling as a structural moderator that determines when sustainability generates value.

Theoretically, this study expands the sustainability accounting literature by showing that MCP is more accurately described through an integrated ESG architecture rooted in five grand theories. In practical terms, this research provides guidance for companies in designing more measurable green accounting, governance, and efficiency strategies, as well as provides input for regulators to strengthen PROPER, GRI, and ISSB policies to be more responsive to increasing sustainability risks.

LITERATURE REVIEW

Multidimensional Corporate Performance (MCP) is a central issue in the accounting and sustainability literature because companies are required to maintain financial and non-financial performance simultaneously amid the pressures of the energy transition, climate change, and regulatory dynamics. Empirical data on Indonesian companies for the period 2019–2024 shows the volatility of MCPs profitability (ROA, ROE, NPM) increased strongly in 2021 and decreased dramatically in 2022–2023 indicating sensitivity to sustainability risks and market uncertainty (Kasman & Utami, 2023; Liu et al., 2024; Pratiwi & Armaniah, 2026). This condition shows that MCP cannot be explained by conventional financial indicators alone, but requires an integrative model involving sustainability accounting, management accounting, ESG governance, and financial risk.

This study develops the ESG Architecture Designing Triple Nexus Synergies model that integrates sustainability accounting (Green Accounting and ESG Architecture), management accounting (Management Efficiency), and financial accounting (MCP) under sustainability risk conditions. The model is grounded in several theoretical perspectives. Stakeholder theory explains that meeting stakeholder expectations for sustainability supports corporate performance stability (Ningrum et al., 2025; Seok et al., 2024). Legitimacy theory highlights the role of environmental reporting and ESG disclosure in maintaining regulatory and social legitimacy (Driastuti et al., 2024). Signalling theory emphasizes that sustainability practices provide information signals to investors (Nugroho & Nurhayati, 2025; Sabrina et al., 2025). Meanwhile, the Resource-Based View (RBV) and SDGs theory emphasize that sustainability capability and governance integration create long-term competitive advantage and support the balance of People–Planet–Prosperity (Martins & Eseosa, 2022; Chen et al., 2022; Martiny et al., 2024). The construct of this research is shown at Figure 3.

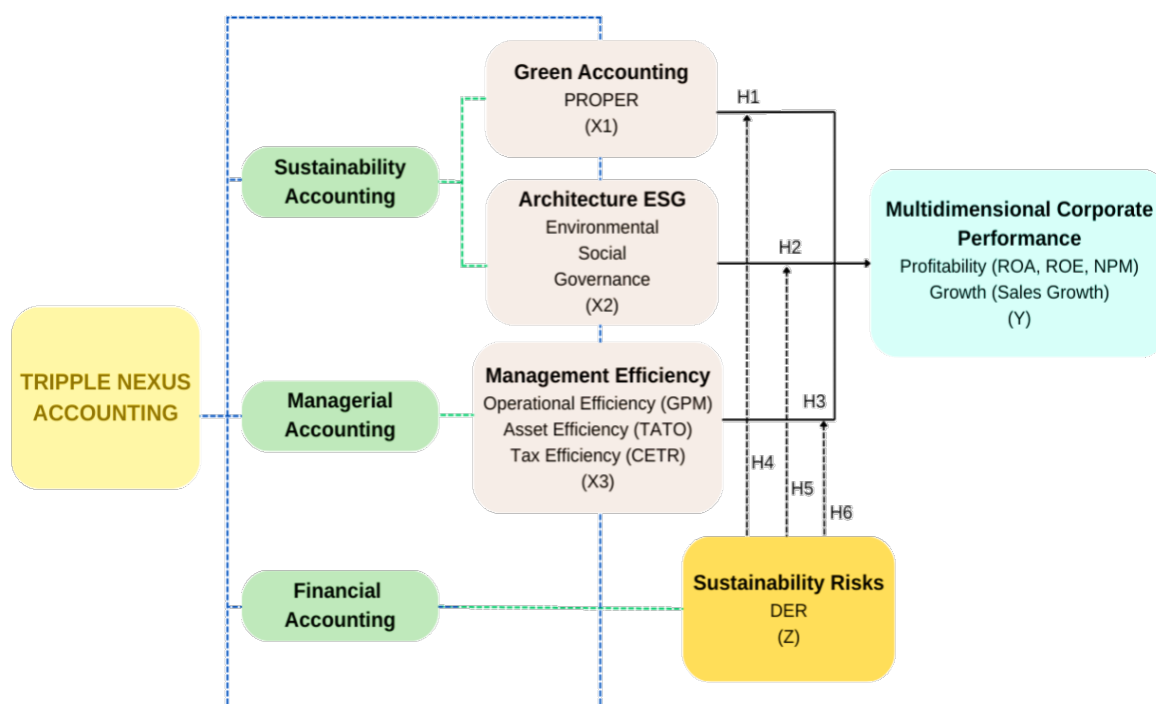


Figure 3. Construct of Research

Green Accounting through PROPER reflects responsible environmental management, reducing environmental risks, operational costs, and improving corporate reputation, sales, and profitability (Driastuti et al., 2024; Magoma et al., 2022; Nengzih, 2022; Refalina et al., 2024; Riyadh et al., 2020). From the perspective of stakeholder theory, companies with stronger environmental performance gain greater trust from investors and customers, supporting performance stability (Chen et al., 2022; Tanjung & Lestari, 2025). In addition, the Resource-Based View (RBV) suggests that environmental capability functions as a strategic resource that enhances long-term efficiency and reduces environmental risk costs (Ningrum et al., 2025; Rosharlianti & Laia, 2025).

In line with empirical research by Kristandy & Sipayung (2025), Tanjung & Lestari (2025), Chen et al (2022), Ningrum & Handajani (2025) which finds that environmental practices improve profitability and strengthen corporate performance. However, other studies report insignificant or negative effects because environmental investments and compliance costs may increase operational expenses without generating immediate financial returns (Driastuti et al., 2024; Liu et al., 2024; Nengzih, 2022). These the hypothesis:

H1: Green Accounting influences Multidimensional Corporate Performance.

ESG architecture integrates environmental, social, and governance aspects into corporate management systems. Effective ESG implementation improves resource efficiency, manages ecological risks, strengthens stakeholder relationships, and ensures transparent and accountable governance. These practices increase public and investor trust, which positively affects sales and profitability (Bastiar & Soenaria, 2024; Driastuti et al., 2024; Sabrina et al., 2025; Seok et al., 2024). From signalling theory and RBV perspectives, ESG also signals

lower risk and becomes a strategic resource that strengthens corporate performance and long-term competitive advantage (Luo, 2024; Sutrisno et al., 2024; Zhou, 2023).

Various studies indicate that ESG improves profitability, market value, consumer loyalty, and investor confidence, thereby reducing risk and enhancing efficiency and overall performance (Lee & Rhee, 2023; Millenia & Abdi, 2022; Nagari et al., 2019; Semenova & Hassel, 2015; Yoon & Lee, 2018). However, other studies find ESG disclosure may be symbolic and driven by regulatory pressure. Governance disclosure may also indicate internal control issues rather than governance strength, resulting in weak or even negative relationships between ESG practices and profitability (Bastiar & Soenaria, 2024; Driastuti et al., 2024; Taring, 2023; Velte, 2017; Wahyuningsih & Risman, 2025). These the hypothesis:

H2: ESG Architecture influences Multidimensional Corporate Performance.

Management efficiency reflects a firm's ability to control operations, assets, and tax burdens to generate profits. Efficient management improves cost control, asset productivity, and tax optimization, increasing profitability. According to RBV, efficiency is a strategic capability that strengthens long-term competitiveness (Martins & Eseosa, 2022). Signaling theory suggests efficiency signals strong managerial quality, improving market perception, while stakeholder theory views efficient resource management as responsible governance that enhances reputation and stakeholder trust (Aulia et al., 2025; Fadhillah et al., 2024).

Empirical studies show that management efficiency positively affects profitability, growth, and resilience to market risks (Aisy et al., 2025; Kusmayadi & Firmansyah, 2023; Nariswari & Nugraha, 2020; Pello & Shanti, 2024). However, excessive efficiency may create diminishing returns, weaken innovation, and increase regulatory or reputational risks from aggressive tax planning (Alomair & Metwally, 2025). These the hypothesis:

H3: Management Efficiency influences Multidimensional Corporate Performance.

Sustainability risk, proxied by the Debt to Equity Ratio (DER), reflects a firm's dependence on debt. High DER reduces financial flexibility for environmental investments because firms prioritize debt obligations. Consequently, green accounting may become symbolic compliance. Legitimacy, signaling, and stakeholder theories suggest that high leverage weakens environmental credibility and increases creditor scrutiny (Nengzih, 2022; Tanjung & Lestari, 2025)

Research shows that Sustainability risk (DER) influences the relationship between sustainability and performance (Alomair & Metwally, 2025; Liu et al., 2024; Pello & Shanti, 2024). Instead, Aulia et al (2025) found that Sustainability risk (DER) reinforces the effect of operational efficiency on performance, suggesting that efficient companies can use debt as a performance multiplier, but Green Accounting cannot fully improve MCP (Aulia et al., 2025; Cahyani et al., 2024). Alomair & Metwally (2025) further documented that leveraging the ESG-firm value relationship results in both positive and negative moderating effects depending on ESG quality. Thus, DER alters the strength of GA's influence on MCP. These the hypothesis:

H4: Sustainability Risk moderates the influence of Green Accounting on Multidimensional Corporate Performance.

ESG implementation requires substantial long-term resources. Firms with lower leverage (DER) have greater financial flexibility to sustain ESG initiatives, strengthening investor trust, stakeholder relations, and corporate legitimacy, which may improve profitability and growth. In contrast, highly leveraged firms face financial constraints that limit sustainability

investments and weaken ESG's impact on performance (Abdi et al., 2022; Lee & Rhee, 2023; Luo, 2024; Rakhmayani et al., 2025; Seok et al., 2024).

Some study found that high financial risk may weaken ESG effectiveness because firms prioritize debt obligations over sustainability investments (Lee & Rhee, 2023; Luo, 2024; Rakhmayani et al., 2025). However, other studies suggest firms intensify ESG initiatives to maintain legitimacy and stakeholder trust under financial pressure (Abdi et al., 2022; Seok et al., 2024). These the hypothesis:

H5: Sustainability Risk moderates the influence of ESG Architecture on Multidimensional Corporate Performance.

Management efficiency reflects a firm's ability to manage operations, assets, and tax obligations effectively, making it closely related to financial outcomes (Aulia et al., 2025; Fadhillah et al., 2024). Under the Resource-Based View (RBV), operational efficiency represents a strategic capability that enhances competitiveness and long-term profitability by enabling firms to utilize resources more productively and respond to financial pressures more effectively (Martins & Eseosa, 2022).

Previous studies indicate that sustainability risk proxied by leverage (DER) may influence how efficiency translates into financial performance. Efficient firms are generally better able to convert debt financing into higher returns and growth, while inefficient firms face amplified financial risk due to debt obligations (Aulia et al., 2025; Martins & Eseosa, 2022). However, excessive financial risk may also suppress the benefits of efficiency by limiting operational flexibility and investment capacity (Liu et al., 2024; Pello & Shanti, 2024). This the hypothesis:

H6: Sustainability Risk moderates the influence of Management Efficiency on Multidimensional Corporate Performance.

RESEARCH METHOD

This study employs a quantitative explanatory research design aimed at testing the causal relationships among Green Accounting (PROPER), ESG Architecture, Management Efficiency (ME), Sustainability Risk (DER), and Multidimensional Corporate Performance (MCP). The model extends prior sustainability accounting frameworks by integrating the Triple Nexus (sustainability accounting, management accounting, and financial accounting) into a moderated relationship structure appropriate for emerging markets. The empirical approach utilizes panel data regression with moderation analysis. This research employs 27 company's secondary data collected from company annual reports and sustainability reports from 2019 to 2024 by BEI (www.idx.com), and SK PROPER from Ministry of Environment and Forestry website, which choosen with probability sampling (cluster sampling) in basic material sector that received a PROPER rating from 2019 to 2024. So that 162 observations data were obtained. Table 2. presents all the variables in this study and their measurements.

Table 2. Operational Definition

Variable	Indicator	Definition	Proxy
Dependent Variable:			
Multidimensional Financial Performance			
Profitability:		Company ability to results the profit used its own resources (Fadhillah et al., 2024)	
Return on Asset	Total Asset and Net Profit	Ability of company to reach the profit from asset (Fadhillah et al., 2024)	ROA= Net Profit/Total Assets

Return on Equity	Total Equity and Net Profit	Ability of company to reach profit from shareholder's equity	ROE = Net Profit/Total Equity
Net Profit Margin	Sales and Earnings Net Profit	Percentage of net profit from sales (Nariswari & Nugraha, 2020)	NPM = Net Profit/Sales x100%
Growth:			
Sales Growth	Total Sales present and Sales	Comparison sales on year to year (Shubita, 2024)	Growth = $(Sales_t - Sales_{t-1}) / Sales_{t-1} \times 100\%$
Independent Variable:			
Green Accounting	PROPER Rank	Objective evaluation of company's environmental management performance (Ningrum et al., 2025)	Gold=5, Green=4, Blue=3, Red=2, Black=1
Environment Social Governance Architecture:			
Environment Disclosure	31 Environment Indicator GRI Standard 2021	Disclosure of the company's environmental activities and impacts. (Global Reporting Initiative, 2021; Sabrina et al., 2025; Saini et al., 2023)	ED = Total Disclosure/17 ED Index GRI Standard 2021 x 100%
Social Disclosure	36 Social Indicator GRI Standard 2021	Disclosure of social practices and corporate welfare. (Global Reporting Initiative, 2021; Sabrina et al., 2025; Tanjung & Lestari, 2025)	SD = Total Disclosure/36 SD Index GRI Standard 2021 x 100%
Governance Disclosure	30 Governance Indicator GRI Standard 2021	Disclosure of corporate structure and governance. (Global Reporting Initiative, 2021; Tanjung & Lestari, 2025)	GD = Total Disclosure/30 GD Index GRI Standard 2021 x 100%
Management Efficiency:			
Gross Profit Margin	Cost of Goods Sold and Sales	Ability to generate margins after production costs (Fadhillah et al., 2024; Mahruzal & Khaddafi, 2020; Nurjayanti & Amin, 2022)	GPM = $(Sales - COGS) / Sales \times 100\%$
Asset Turnover	Assets and Sales	Asset efficiency generates income (Adinda & Musdholifah, 2020; Wardani & Reina Candradewi, 2024).	Asset Turnover = Sales/Total Assets
Tax Planning	Tax Expense and Pre-Tax Income	The effectiveness of tax payments on profits (Aronmwan & Okaiwele, 2020; Martiny et al., 2024)	CETR = Cash Taxes Paid/Pre-Tax Income
Moderator Variable:			
Sustainability Risk			
Debt to Equity Ratio	Total Equity and Total Liability	Financial risks due to high debt financing (Fernando et al., 2023)	DER = Liability/Equity x 100%

Source: Data proceed by authors, 2026.

RESULT & DISCUSSION

Table 3. Descriptive Statistic

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observ.
PROPER	3,3951	3,0000	5,0000	1,0000	0,7670	162
ED	80,2071	80,6452	100,0000	48,3871	13,8759	162
SD	78,2922	77,7778	100,0000	55,5556	11,6511	162
GD	99,2593	100,0000	100,0000	83,3333	2,5470	162
GPM	19,9597	18,6824	113,8722	-11,7283	14,8074	162

TATO	73,3856	63,5039	246,5244	22,1594	41,7276	162
CETR	21,6266	23,4990	287,7234	-589,3368	61,5430	162
DER	1,0674	0,6708	8,23216	0,0696	1,3242	162
ROA	3,3862	3,1064	26,5598	-18,7963	5,9703	162
ROE	5,1160	6,0147	42,0262	-34,1057	9,9845	162
NPM	5,3990	5,7435	40,5166	-25,3260	9,0805	162
GROWTH	5,9082	2,1028	165,7552	-99,9935	31,5784	162

Source(s): Data proceed by E-Views 13, 2025,

Table 3 reports descriptive statistics for 162 firm year observations, The PROPER mean of 3,39 indicates that most firms fall in the blue category, meaning they generally comply with environmental regulations, In the PROPER system (1=black, 2=red, 3=blue, 4=green, 5=gold), blue represents regulatory compliance while higher ratings indicate proactive environmental management (Kementerian Lingkungan Hidup dan Kehutanan, 2025), Thus, the sample firms demonstrate moderate environmental performance with compliance-oriented sustainability practices, In terms of sustainability disclosure, the average value of Environmental Disclosure (ED) is 80,21, Social Disclosure (SD) is 78,29, and Governance Disclosure (GD) reaches 99,26, These values indicate relatively high levels of ESG disclosure among the sampled firms, Disclosure levels above 70% are generally interpreted as high transparency in sustainability reporting, particularly when measured using the GRI Standards disclosure index (Global Reporting Initiative, 2021), The governance disclosure variable also shows the smallest standard deviation, indicating relatively consistent governance reporting practices across firms, From the perspective of operational efficiency, Gross Profit Margin (GPM) shows an average value of 19,96%, which falls within the typical profitability range of 10–30% observed in manufacturing and basic materials industries (Kasmir, 2020), Meanwhile, Total Asset Turnover (TATO) has an average value of 73,39, which is equivalent to 0,73 times after adjusting the scale, This indicates that firms generate approximately 0,73 units of sales for every unit of assets, reflecting moderate asset utilization efficiency, In financial ratio analysis, a TATO value between 0,5 and 1,0 is generally categorized as moderate asset efficiency, while values above 1 indicate higher operational efficiency (Brigham & Houston, 2022), The Cash Effective Tax Rate (CETR) averages 21,63%, which is close to the Indonesian corporate income tax rate of approximately 22%, suggesting that the sampled firms generally experience a normal effective tax burden, In terms of financial structure, the Debt-to-Equity Ratio (DER) shows an average value of 1,07, indicating that firms finance their assets with relatively balanced proportions of debt and equity, DER value between 1 and 2 is generally considered a moderate and acceptable leverage level in corporate financial analysis (Kieso et al., 2020), Regarding financial performance, Return on Assets (ROA) averages 3,39%, which falls within the moderate profitability range of 2–5%, while Return on Equity (ROE) averages 5,12%, indicating relatively modest returns to shareholders because strong ROE performance is typically above 10% (Brigham & Houston, 2022), Meanwhile, the Net Profit Margin (NPM) averages 5,40%, which indicates moderate profitability since profit margins between 5% and 10% are generally considered stable across many industries (Higgins, 2016; Kieso et al., 2020), Finally, sales growth shows considerable variability, ranging from –99,99% to 165,76%, indicating substantial differences in company expansion and market performance during the observation period,

Before regression analysis, panel data model selection is conducted using Chow, Hausman, and Lagrange Multiplier tests to determine the appropriate estimation model,

Tabel 4, Selection Model Test

Test	Statistic	p-value	Decision	Chosen Model
Chow Test	Sig, (<0,01)	0,0000	Reject Pooled OLS	FEM
Hausman Test	Sig, (<0,001)	0,0000	Reject REM	FEM
LM Test	Sig, (<0,01)	0,0000	Reject Pooled	CEM

Source(s): Data proceed by E-Views 13, 2026.

Table 4 shows the results of the panel data model selection tests, The Chow test and Hausman test both produce significant p-values (0,0000), indicating that the Fixed Effect Model (FEM) is more appropriate than the pooled and random effect models, Therefore, FEM is selected as the most suitable model for the regression analysis, Then Tabel 5 shows the classic assumption test for the regression,

Table 5. Classic Assumption Test

Multicollinearity (VIF)	ROA	ROE	NPM	GROWTH
PROPER	1,516	1,370	1,638	1,553
ED	1,896	1,778	2,321	1,773
SD	1,657	1,634	2,128	1,515
GD	1,185	1,175	1,197	1,186
GPM	1,947	1,727	2,093	1,903
TATO	1,998	1,281	1,530	1,284
CETR	1,150	1,138	1,152	1,154
Heteroscedasticity (Breusch-pagan)	0,634	0,099	0,501	0,540
Autocorrelation (DW)	1,224	1,248	1,097	1,945

Source(s): Data proceed by E-Views 13, 2026.

The results of the multicollinearity test showed that all independent variables had low VIF values, which were between 1,138 and 2,321 in all models (ROA, ROE, NPM, and GROWTH). The value is well below the threshold of 5 or 10, thus indicating the absence of a strong correlation between independent variables (Ghozali & Ratmono, 2020). The heteroscedasticity test using Breusch–Pagan yielded probability values of 0,634 (ROA), 0,099 (ROE), 0,501 (NPM), and 0,540 (GROWTH), all of which were greater than 0,05, so that the model was homoskedastic. Durbin–Watson value ranged from 1,097 to 1,945 close with 2, which indicates the absence of significant autocorrelation in the regression model, Based on this classic assumption test, here is the hypotesis tests as shown on **Table 6**:

Table 6. Hypothesis Test (Model 1)

Variable	ROA		ROE		NPM		GROWTH	
	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.
C	-17,635	0,087	11,429	0,558	-26,446	0,049	39,651	0,577
PROPER	0,646	0,105	0,337	0,639	1,400	0,009***	1,255	0,651
ED	0,028	0,251	0,116	0,013**	0,001	0,974	0,067	0,681
SD	-0,055	0,045**	-0,082	0,122	-0,052	0,192	-0,259	0,153
GD	0,114	0,280	-0,005	0,982	0,208	0,133	-0,454	0,534
GPM	0,254	0,000***	0,447	0,000***	0,390	0,000***	0,534	0,001***
TATO	0,071	0,000***	0,068	0,000***	0,031	0,001***	0,146	0,002***
CETR	-0,014	0,161	-0,029	0,115	-0,009	0,443	-0,060	0,367
R-Square	0,765		0,681		0,831		0,577	
F-Statistic	0,000		0,000		0,000		0,000	

Notes(s): significant level at * p<0,10, ** p<0,05, *** p<0,01

Source(s): Data proceed by E-Views 13, 2026.

Based on the Tabel 6, here is the model 1 results:

$$\text{MCP(ROA)} = -17,635 + 0,646\text{PROPER} + 0,028\text{ED} + 0,114\text{GD} + 0,254\text{GPM} + 0,071\text{TATO} - 0,014\text{CETR} + \varepsilon$$

$$\text{MCP(ROE)} = 11,429 + 0,337\text{PROPER} + 0,116\text{ED} - 0,082\text{SD} - 0,005\text{GD} + 0,447\text{GPM} + 0,068\text{TATO} - 0,029\text{CETR} + \varepsilon$$

$$\text{MCP(NPM)} = -26,446 + 1,400\text{PROPER} + 0,001\text{ED} - 0,052\text{SD} + 0,208\text{GD} + 0,390\text{GPM} + 0,146\text{TATO} - 0,060\text{CETR} + \varepsilon$$

$$\text{MCP(GROWTH)} = 39,651 + 1,255\text{PROPER} + 0,067\text{ED} - 0,259\text{SD} - 0,454\text{GD} - 0,543\text{GPM} + 0,146\text{TATO} - 0,060\text{CETR} + \varepsilon$$

The results in Model 1 in Tabel 6 indicate that Green Accounting, proxied by the PROPER rating, shows a positive and statistically significant effect only on Net Profit Margin ($\beta = 1,400$; $p\ 0,009 < 0,01$), while its influence on ROA ($\beta = 0,646$ and $p\ 0,105 > 0,05$), ROE ($\beta = 0,337$; $p\ 0,639 > 0,05$), and sales growth ($\beta = 1,255$; $p\ 0,651 > 0,05$) are not statistically significant. These findings suggest that environmental performance contributes selectively to profitability margins rather than broadly affecting all dimensions of corporate performance (Chen et al, 2022; Ningrum et al, 2025; Tanjung & Lestari, 2025). Companies that manage environmental impacts effectively tend to reduce environmental risks and operational disruptions, which can strengthen profit margins through better cost management and improved corporate reputation (Magoma et al, 2022; Refalina et al, 2024; Riyadh et al, 2020). From a stakeholder theory perspective, firms that demonstrate environmental responsibility are more likely to gain stakeholder trust, which can improve market acceptance and profitability (Chen et al, 2022; Martiny et al, 2024; Ningrum et al, 2025). However, the insignificant relationship between PROPER and broader profitability indicators suggests that environmental initiatives often require substantial investment costs, which may reduce short-term returns despite potential long-term benefits (Driastuti et al, 2024; Liu et al, 2024; Nengzih, 2022). Environmental disclosure may also serve primarily as a legitimacy mechanism aimed at maintaining regulatory compliance rather than immediately increasing financial performance (Driastuti et al, 2024; Liu et al, 2024; Wahyuningsih & Risman, 2025). So, the hypothesis stating that Green Accounting influences Multidimensional Corporate Performance is supported, therefore H1 is accepted. These results are consistent with previous studies showing that environmental accounting practices can improve profitability but do not always influence broader financial indicators, as reported by Chen et al (2022), Kristandy & Sipayung (2025), Ningrum et al (2025), Tanjung & Lestari (2025), Wulandari & Akbar (2025).

ESG architecture components show heterogeneous effects on multidimensional corporate performance. Environmental disclosure (ED) has a positive and statistically significant effect on ROE ($\beta = 0,116$; $p\ 0,013 < 0,05$), while its influence on ROA ($\beta = 0,028$; $p\ 0,251 > 0,05$), NPM ($\beta = 0,001$; $p\ 0,974 > 0,05$), and sales growth ($\beta = 0,067$; $p\ 0,681 > 0,05$) is not statistically significant. Environmental disclosure appears to enhance shareholder returns, suggesting that transparency regarding environmental practices can strengthen investor confidence and market perception of corporate credibility (Sabrina et al, 2025; Seok et al, 2024; Sutrisno et al, 2024). Social disclosure (SD) shows a negative and significant relationship with ROA ($\beta = -0,055$; $p\ 0,045 < 0,05$), but does not significantly influence ROE, NPM, and growth. Social disclosure (SD) negatively affects ROA, indicating that social initiatives may increase operational costs in the short term and reduce asset efficiency returns (Bastiar & Soenaria, 2024; Driastuti et al., 2024; Velte, 2017). Contrastly, governance disclosure (GD) does not significantly influence financial performance, suggesting relatively

homogeneous governance reporting across firms (Martiny et al., 2024; Saini et al., 2023; Wahyuningsih & Risman, 2025). Therefore, the hypothesis stating that ESG Architecture influences Multidimensional Corporate Performance is partially supported, so H2 is accepted, indicating that ESG components influence financial performance differently across indicators. Consistent with Lee & Rhee (2023), Millenia & Abdi (2022), Semenova & Hassel (2015), Seok et al, (2024), Wulandari & Akbar (2025), which shows ESG practices can influence corporate performance but often produce heterogeneous effects across profitability indicators.

Management efficiency variables show a consistent influence on multidimensional corporate performance. Gross profit margin (GPM) demonstrates a positive and statistically significant effect on ROA ($\beta = 0,254$; $p\ 0,000 < 0,01$), ROE ($\beta = 0,447$; $p\ 0,000 < 0,01$), NPM ($\beta = 0,390$; $p\ 0,000 < 0,01$), and sales growth ($\beta = 0,534$; $p\ 0,001 < 0,01$). Similarly, total asset turnover (TATO) shows a positive and significant relationship with ROA ($\beta = 0,071$; $p\ 0,000 < 0,01$), ROE ($\beta = 0,068$; $p\ 0,000 < 0,01$), NPM ($\beta = 0,031$; $p\ 0,001 < 0,01$), and growth ($\beta = 0,146$; $p\ 0,002 < 0,01$). These results indicate that firms with higher operational margins and more efficient asset utilization are better able to convert operational activities into financial returns and business expansion (Fadhillah et al, 2024; Martins & Eseosa, 2022; Nariswari & Nugraha, 2020). From the Resource-Based View perspective, operational efficiency represents an internal capability that supports competitive advantage and financial performance (Aisy et al, 2025; Kusmayadi & Firmansyah, 2023; Martins & Eseosa, 2022).. Therefore, the hypothesis stating that Management Efficiency influences Multidimensional Corporate Performance is supported, so H3 is accepted. These findings are consistent with (Aisy et al., 2025; Kusmayadi & Firmansyah, 2023; Martins & Eseosa, 2022; Nariswari & Nugraha, 2020).

Table 5 shows F-Statistic value 0,000 indicating that the independent variables jointly have a significant effect on multidimensional corporate performance. Then R^2 values of ROA 0,814 (81,4%), ROE 0,756 (75,6%), NPM 0,863 (86,3%) and GROWTH 0,612 (61,2%) means that variation multidimensional corporate performance can be explained by the independent variables, the moderating variable (DER), and the interaction terms between sustainability factors and financial risk. Here is the results of moderation regression analysis test (model 2):

Table 5. Hypothesis Test (Model 2)

Variable	ROA		ROE		NPM		GROWTH	
	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.
C	-0,459	0,987	25,500	0,679	-55,054	0,146	-3,400	0,987
PROPER	0,336	0,633	-0,792	0,534	1,467	0,128	5,184	0,321
ED	0,086	0,049**	0,055	0,525	0,046	0,444	0,375	0,197
SD	-0,030	0,528	0,239	0,019**	-0,039	0,547	-0,374	0,261
GD	-0,104	0,718	-0,502	0,424	0,524	0,173	-0,202	0,924
GPM	0,282	0,000***	0,492	0,000***	0,368	0,000***	0,460	0,045**
TATO	0,077	0,000***	0,047	0,031**	-0,010	0,463	-0,019	0,806
CETR	-0,037	0,008***	-0,102	0,000***	-0,071	0,000***	-0,055	0,587
DER	9,624	0,176	14,353	0,418	30,581	0,001***	31,505	0,547
PROPER*DER	0,134	0,847	2,180	0,108	-0,549	0,550	-3,989	0,478
ED*DER	-0,040	0,407	0,170	0,126	-0,030	0,651	-0,762	0,031**
SD*DER	-0,054	0,310	-0,539	0,000***	-0,056	0,440	0,218	0,577
GD*DER	-0,020	0,783	0,024	0,895	-0,262	0,007***	0,121	0,823
GPM*DER	-0,080	0,008***	-0,042	0,545	-0,056	0,176	0,115	0,623
TATO*DER	-0,014	0,218	0,029	0,231	0,029	0,063*	0,234	0,006***
CETR*DER	0,007	0,167	0,039	0,004***	0,029	0,001***	-0,002	0,969

R-Square	0,814	0,756	0,863	0,612
F-Statistic	0,000	0,000	0,000	0,000

Notes(s): significant level at * $p < 0,10$, ** $p < 0,05$, *** $p < 0,01$

Source(s): Data proceed by E-Views 13, 2026.

Here is the models for tabel 5 results

$$\text{MCP(ROA)} = -0,459 + 0,336\text{PROPER} + 0,086\text{ED} - 0,030\text{SD} - 0,104\text{GD} + 0,282\text{GPM} + 0,077\text{TATO} - 0,037\text{CETR} + 9,624\text{DER} + 0,134\text{PROPER*DER} - 0,040\text{ED*DER} - 0,020\text{SD*DER} - 0,020\text{GD*DER} - 0,080\text{GPM*DER} - 0,014\text{TATO*DER} + 0,007\text{CETR*DER} + \varepsilon$$

$$\text{MCP(ROE)} = 25,500 - 0,792\text{PROPER} + 0,055\text{ED} + 0,239\text{SD} - 0,502\text{GD} + 0,492\text{GPM} + 0,047\text{TATO} - 0,102\text{CETR} + 14,353\text{DER} + 2,180\text{PROPER*DER} + 0,170\text{ED*DER} - 0,539\text{SD*DER} + 0,024\text{GD*DER} - 0,042\text{GPM*DE} + 0,029\text{TATO*DER} + 0,039\text{CETR*DER} + \varepsilon$$

$$\text{MCP(NPM)} = -55,054 + 1,467\text{PROPER} + 0,046\text{ED} - 0,039\text{SD} + 0,524\text{GD} + 0,368\text{GPM} - 0,010\text{TATO} - 0,071\text{CETR} + 30,581\text{DER} - 0,549\text{PROPER*DER} - 0,030\text{ED*DER} - 0,056\text{SD*DER} - 0,262\text{GD*DER} - 0,056\text{GPM*DER} + 0,029\text{TATO*DER} + 0,029\text{CETR*DER} + \varepsilon$$

$$\text{MCP(GROWTH)} = -3,400 + 5,184\text{PROPER} + 0,375\text{ED} - 0,374\text{SD} - 0,202\text{GD} + 0,460\text{GPM} - 0,019\text{TATO} - 0,055\text{CETR} + 31,505\text{DER} - 3,989\text{PROPER*DER} - 0,762\text{ED*DER} + 0,218\text{SD*DER} + 0,121\text{GD*DER} + 0,115\text{GPM*DER} + 0,234\text{TATO*DER} - 0,002\text{CETR*DER} + \varepsilon$$

Tabel 5 shows that sustainability risk proxied by the DER does not has any influence on dependent variable, such as on ROA has probability 0,176, ROE 0,418 and sales growth 0,547 shows higher than 0,10, although it is significant only for NPM with probability 0,001 lower than 0,01). But, on role as moderate, shows interaction PROPER*DER statistically insignificant for ROA with probability 0,633 higher than 0,10, ROE 0,534 higher than 0,10, NPM 0,550 higher than 0,10 and growth 0,478 higher than 0,05. These findings indicate that sustainability risk does not alter the relationship between environmental performance and financial outcomes. The insignificant interaction suggests that DER acts as a homologizer moderator, meaning that sustainability risk does not modify the effect of green accounting on corporate performance; therefore, H4 is rejected. From the perspective of legitimacy theory, environmental performance measured through PROPER often functions as a compliance mechanism aimed at maintaining regulatory approval and social legitimacy rather than as a strategic investment influenced by capital structure (Driastuti et al, 2024; Nengzih, 2022; Wahyuningsih & Risman, 2025). Companies tend to maintain environmental compliance to avoid sanctions and sustain stakeholder acceptance regardless of their sustainability risk conditions, Similarly, signalling theory suggests that environmental ratings provide signals of corporate responsibility to stakeholders and investors, but their credibility is not necessarily influenced by firms' financial sustainability risk (Chen et al, 2022; Liu et al, 2024; Martiny et al, 2024). These findings are consistent with previous studies indicating that environmental accounting practices do not always interact with sustainability risk in explaining financial performance (Driastuti et al, 2024; Liu et al, 2024; Nengzih, 2022; Wahyuningsih & Risman, 2025).

Besides that, ESG Architecture moderate by DER shows the interaction show that interaction social disclosure and sustainability risk (SD*DER) has a negative and significant effect on ROE with coefficient $-0,539$ and probability 0,000 lower than 0,01. While interaction governance disclosure and sustainability risks (GD*DER) has negatively affected NPM with coefficient $-0,262$ and probability 0,007 lower than 0,01, and interaction of environmental disclosure with sustainability risk (ED*DER) has negatively influences sales growth with coefficient $-0,762$ and probability 0,031 lower than 0,05. These findings indicate that higher sustainability risk weakens the ability of ESG practices to translate into financial

performance. In other words, firms facing higher financial risk may have limited flexibility to allocate resources toward sustainability initiatives, reducing the financial benefits derived from ESG activities. Therefore, H5 is accepted, indicating that sustainability risk conditions the relationship between ESG Architecture and Multidimensional Corporate Performance and the moderator is categorized as a quasi moderator. From the perspective of stakeholder theory, companies experiencing higher financial pressure tend to prioritize debt obligations over long-term sustainability initiatives, which can weaken the positive impact of ESG practices on corporate performance (Abdi et al., 2022; Lee & Rhee, 2023; Seok et al., 2024). Similarly, signalling theory suggests that ESG disclosures function as signals of corporate responsibility and sustainability commitment; however, when firms have high sustainability risk, stakeholders may perceive sustainability initiatives as constrained by financial risk, thereby reducing the credibility and effectiveness of ESG signals (Luo, 2024; Seok et al., 2024; Zhou, 2023). These findings are consistent with previous studies indicating that capital structure influences the effectiveness of ESG initiatives in improving corporate performance, as reported by Abdi et al. (2022), Lee & Rhee (2023), Luo (2024), Seok et al. (2024).

Then the sustainability risks role as moderate on management efficiency to multidimensional corporate performance reflects on gross profit margin and sustainability risk interactions (GPM*DER) which shows a negative and significant effect on ROA coefficient $-0,080$ and probability $0,008$ lower than $0,01$ indicating that higher sustainability risks weaken the positive influence of gross profit margin on asset profitability. Meanwhile, when reflected with total asset turnover and sustainability interaction (TATO*DER), it shows a positive and significant effect on sales growth (GROWTH) with coefficient $0,234$ and probability $0,006$ lower than $0,01$, and a marginally significant relationship with net profit margin (NPM) with coefficient $0,029$ and probability $0,063$ lower than $0,10$, suggesting that firms with stronger asset efficiency can utilize debt financing to support operational expansion and revenue growth. In addition, interaction cash effective tax rate and sustainability risks (CETR*DER) shows a positive and significant effect on ROE with coefficient $0,039$ and probability $0,004$ lower than $0,01$ and NPM with coefficient $0,029$ also probability $0,001$ lower than $0,01$. These findings indicate that sustainability risks conditions how managerial efficiency translates into financial performance and moderator is categorized as a quasi moderator. Therefore, H6 is accepted. From the perspective of the Resource-Based View (RBV), operational efficiency represents an internal capability that enables firms to utilize financial resources more effectively and transform leverage into productive investments (Aisy et al., 2025; Kusmayadi & Firmansyah, 2023; Martins & Eseosa, 2022). Efficient firms are better able to manage operational costs, asset utilization, and tax planning even under higher financial risk conditions. Furthermore, signalling theory suggests that strong efficiency indicators signal managerial competence and operational stability, particularly in sustainability risk firms where investors closely monitor performance (Aulia et al., 2025; Fadhilah et al., 2024; Nariswari & Nugraha, 2020). These findings are consistent with previous studies indicating that the interaction between operational efficiency and financial sustainability risk plays an important role in determining corporate performance, as reported by Aisy et al. (2025), Aulia et al. (2025), Martins & Eseosa (2022), Nariswari & Nugraha (2020).

CONCLUSION

This study investigates the influence of Green Accounting, ESG Architecture, and Management Efficiency on Multidimensional Corporate Performance (MCP) under sustainability risk conditions. The results indicate that Green Accounting proxied by PROPER

significantly improves corporate performance only through Net Profit Margin, while its influence on ROA, ROE, and sales growth is not statistically significant, ESG Architecture demonstrates heterogeneous effects, where environmental disclosure positively affects ROE, social disclosure negatively affects ROA, and governance disclosure shows no significant influence on financial performance, In contrast, management efficiency represented by Gross Profit Margin and Total Asset Turnover consistently improves profitability and growth, confirming the importance of operational capability in sustaining corporate performance, Moderation analysis shows that sustainability risk proxied by DER does not moderate the relationship between Green Accounting and MCP, indicating a homologize moderator, However, sustainability risk weakens the relationship between ESG architecture and corporate performance and conditions the effect of management efficiency on financial outcomes,

Theoretically, this study contributes to sustainability accounting literature by proposing the ESG Architecture Designing Triple Nexus Synergies framework, which integrates sustainability accounting, management efficiency, and financial risk in explaining multidimensional corporate performance, Practically, the findings suggest that companies should not rely solely on sustainability disclosure but must strengthen managerial efficiency and maintain balanced capital structures to ensure sustainability initiatives translate into financial performance, Future research may expand the model by incorporating market-based performance indicators, broader ESG measurement frameworks, and cross-country comparisons to better understand sustainability-performance dynamics in different institutional contexts,

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