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Corporate Resilience, ESG, Environmental Disclosure, Intellectual Capital, and Firm Value in Indonesia's Oil and Gas Industry

Monang Juanda Tua Sihombing
STMIK Mulia Darma, Rantauprapat, 21412, Indonesia

ABSTRACT

Purpose – This study examines whether ESG Performance, Environmental Disclosure, and Intellectual Capital are associated with Corporate Resilience and Firm Value, and whether Corporate Resilience represents a potential intervening mechanism in these relationships in Indonesia's oil and gas industry.
Design/methodology/approach – The study uses panel data from 16 oil and gas companies during 2020–2024, comprising 80 firm-year observations. Corporate Resilience is measured using a Composite Resilience Index, Environmental Disclosure using a modified GRI 300-based index with 30 harmonized disclosure items, Intellectual Capital using VAIC, and Firm Value using Tobin's Q. The analysis employs random-effects panel regression with year effects and firm-clustered robust standard errors. Model selection considers pooled, fixed-effects, random-effects, LM, and Hausman tests. Panel indirect associations are assessed using firm-level bootstrap inference, while fixed-effects estimation with wild cluster bootstrap is used as a robustness analysis.
Finding/Results – The results provide no statistically significant evidence that ESG Performance, Environmental Disclosure, or Intellectual Capital is associated with Corporate Resilience. Similarly, ESG Performance, Environmental Disclosure, Intellectual Capital, and Corporate Resilience show no statistically significant association with Firm Value at the 5% level. The panel indirect association analysis provides no statistically significant evidence that Corporate Resilience functions as a potential intervening mechanism. Wild cluster bootstrap results yield consistent conclusions, while the sensitivity analysis excluding Stock Price Recovery maintains the main inference concerning Corporate Resilience.

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*Corresponding Author at:
Department of Information Systems, STMIK Mulia Darma, Jl. H. Adam Malik No.18, Rantauprapat, 21412, Indonesia.
E-mail address: juandahs1984@gmail.com (Monang Juanda Tua Sihombing)

1. Introduction

The oil and gas industry remains an important part of Indonesia's economy, but its operations are exposed to environmental, market, regulatory, technological, and geopolitical pressures. Commodity-price fluctuations, operational disruptions, changing environmental regulations, and the transition toward a lower-carbon energy system require firms to maintain business continuity while adapting to changing conditions. Corporate resilience is therefore increasingly important because firms need to withstand disruptions, maintain essential operations, adapt their resources and strategies, and recover from adverse events. Previous research in the oil and gas industry has identified resilience as an important organizational capability, but the processes through which firms develop and sustain resilience remain insufficiently understood (Bento et al., 2021).

ESG Performance represents one potential organizational resource that may strengthen corporate resilience. Strong ESG practices may improve risk management, governance quality, stakeholder relationships, and organizational preparedness. Evidence from financial crises indicates that firms with stronger ESG performance may experience lower risk and better financial outcomes (Broadstock et al., 2021). More recent evidence also suggests that ESG Performance may be associated with enterprise resilience and lower systemic risk, particularly in environmentally sensitive industries and periods of greater uncertainty (Maghyereh & Awartani, 2026; Wang et al., 2026).

Environmental Disclosure represents another sustainability-related practice that may be relevant to resilience and firm outcomes. For environmentally sensitive industries such as oil and gas, information concerning environmental activities, emissions, resource use, waste management, and environmental policies can improve transparency and stakeholder communication. However, Environmental Disclosure should be distinguished from Green Accounting. Green Accounting concerns the integration of environmental considerations into accounting recognition, measurement, cost management, and managerial decision-making, whereas Environmental Disclosure concerns the communication of environmental information to external stakeholders. Accordingly, this study measures Environmental Disclosure intensity rather than the internal implementation of a complete Green Accounting system. The distinction is important because the extent of disclosure does not necessarily indicate the extent to which environmental considerations are integrated into internal accounting practices.

Intellectual Capital may also contribute to resilience because oil and gas firms rely on technological expertise, employee competencies, organizational knowledge, innovation, and managerial capabilities. Intellectual Capital can support efficiency, learning, innovation, and resource reconfiguration when firms face changing conditions. Previous studies indicate that Intellectual Capital is associated with organizational outcomes and may contribute to organizational resilience through knowledge development, innovation, and organizational agility (Ju et al., 2023; Ozkan et al., 2017).

These resources may also influence Firm Value. Investors may consider ESG practices, environmental information, and intellectual resources when assessing a firm's future prospects and risk exposure. However, previous findings remain mixed. Studies have reported positive, insignificant, or context-dependent relationships between ESG-related variables, Environmental Disclosure, Intellectual Capital, and Firm Value (Hamidi & Utama, 2026; Pramesti et al., 2024; Prasetiyo & Annisa, 2025; Wiguna et al., 2026). These inconsistent

findings indicate that sustainability-related resources do not necessarily translate directly into higher market valuation across industries and institutional settings.

A further issue concerns the mechanism underlying these relationships. Existing studies have largely examined the direct association between ESG-related practices, environmental information, Intellectual Capital, and Firm Value. Such an approach provides limited insight into whether these resources are first translated into organizational capabilities that enable firms to withstand, adapt to, and recover from disruption. Corporate Resilience may therefore represent a potential mechanism connecting sustainability-related resources with Firm Value. Although resilience has been associated with survival, recovery, risk mitigation, and value creation (Daadmehr, 2024; Li et al., 2025), evidence on whether Corporate Resilience functions as an intervening mechanism between ESG Performance, Environmental Disclosure, Intellectual Capital, and Firm Value remains limited, particularly in the Indonesian oil and gas industry.

The Indonesian oil and gas industry provides an important setting for examining this issue because firms simultaneously face commodity-price volatility, environmental exposure, regulatory pressure, operational uncertainty, and energy-transition challenges. These conditions make Corporate Resilience particularly relevant to understanding whether sustainability-related resources are translated into organizational outcomes and market valuation. This study therefore examines the relationships among ESG Performance, Environmental Disclosure, Intellectual Capital, Corporate Resilience, and Firm Value using firm-year panel data from Indonesian oil and gas companies during 2020–2024. Specifically, the study examines whether ESG Performance, Environmental Disclosure, and Intellectual Capital are associated with Corporate Resilience and Firm Value and whether Corporate Resilience represents a potential intervening mechanism in these relationships.

This study makes three contributions. First, it extends research on Firm Value by examining Corporate Resilience as a potential intervening mechanism between sustainability-related resources and market valuation. Second, it contributes evidence on Corporate Resilience in the Indonesian oil and gas industry, where environmental, market, regulatory, and energy-transition pressures occur simultaneously. Third, it integrates ESG Performance, Environmental Disclosure, and Intellectual Capital within a firm-year panel framework while explicitly distinguishing Environmental Disclosure from Green Accounting. By examining both direct and indirect relationships, the study provides evidence on whether sustainability-related resources are associated with Firm Value through Corporate Resilience or whether their effects remain primarily within the organizational domain.

2. Literature Review & Hypothesis Development

2.1 Resource-Based View (RBV)

RBV explains that firms can achieve sustainable competitive advantage through resources that are valuable, rare, difficult to imitate, and difficult to substitute (Barney, 1991). This perspective is relevant to the oil and gas industry, where financial, technological, organizational, and knowledge-based resources are important for dealing with environmental uncertainty, regulatory pressure, market volatility, and technological change. ESG Performance and Intellectual Capital can be viewed as organizational resources that strengthen firms' ability to respond to external pressures. Ozkan et al. (2017) found that Intellectual Capital efficiency is associated with firm performance, while Prasetiyo and Annisa (2025) identified Intellectual Capital as a strategic resource supporting competitive

advantage and firm value. Environmental Disclosure is treated differently in this study: it is not an internal resource or a direct measure of Green Accounting, but an organizational practice that reflects the firm's capacity to collect, organize, and communicate environmental information.

2.2 Dynamic Capability Theory

While RBV emphasizes the possession of strategic resources, Dynamic Capability Theory explains how firms integrate, develop, and reconfigure those resources in changing environments (Teece et al., 1997). This perspective is particularly relevant to Corporate Resilience, which reflects the ability to anticipate, respond to, adapt to, and recover from disruptions. Bento et al. (2021) emphasize resilience as an important capability in the oil and gas industry. ESG Performance may support risk management and stakeholder relationships, Environmental Disclosure may strengthen transparency, and Intellectual Capital may provide knowledge and competencies for adaptation and innovation. Consistent with this view, Wang et al. (2026) found that ESG Performance contributes to enterprise resilience, while Daadmehr (2024) linked resilience with firms' ability to survive and recover from shocks and its implications for valuation

2.3 Stakeholder Theory

Stakeholder Theory emphasizes that firms should consider parties affected by or able to affect corporate activities, including investors, regulators, employees, communities, and suppliers (Freeman, 1984). The theory is particularly relevant to ESG Performance and Environmental Disclosure because these practices communicate how firms address environmental, social, and governance responsibilities. Pramesti et al. (2024) show that sustainability disclosure can improve transparency and accountability and respond to stakeholder information needs. In environmentally sensitive industries such as oil and gas, transparent environmental communication may strengthen stakeholder trust and reduce information uncertainty, thereby potentially supporting Corporate Resilience. Together, RBV, Dynamic Capability Theory, and Stakeholder Theory provide the theoretical basis for examining how ESG Performance, Environmental Disclosure, and Intellectual Capital may influence Corporate Resilience and, ultimately, Firm Value.

2.4 Hypothesis Development

ESG Performance and Corporate Resilience

ESG Performance reflects how firms manage environmental, social, and governance issues and may strengthen Corporate Resilience through better risk management, governance, stakeholder relationships, and organizational preparedness. From the RBV and Dynamic Capability perspectives, ESG-related capabilities can help firms identify risks, coordinate organizational responses, and adapt to changing conditions. Empirical studies provide support for this expectation. Broadstock et al. (2021) found that stronger ESG performance was associated with better financial performance and lower financial risk during the COVID-19 crisis. In the oil and gas context, Maghyereh and Awartani (2026) reported that stronger ESG performance was associated with lower systemic risk, particularly during periods of declining oil prices. Wang et al. (2026) further found that ESG Performance contributes to enterprise resilience, particularly in environmentally sensitive industries. Although these findings generally support a positive relationship, evidence in the Indonesian oil and gas context remains limited. Therefore, stronger ESG Performance is expected to be associated with greater Corporate Resilience.

H1: ESG Performance is positively associated with Corporate Resilience.

2.5 Environmental Disclosure and Corporate Resilience

Environmental Disclosure provides stakeholders with information about a firm's environmental activities, impacts, policies, resource use, emissions, and management practices. For oil and gas firms, such information is particularly relevant because their operations are exposed to environmental risks and regulatory scrutiny. From the Stakeholder Theory perspective, transparent environmental disclosure may strengthen communication with investors, regulators, communities, and other stakeholders, reduce information uncertainty, and demonstrate the firm's responsiveness to environmental responsibilities. Environmental Disclosure may also reflect organizational processes for identifying, organizing, and communicating environmental risks and responses, which are relevant to Dynamic Capability Theory. However, Environmental Disclosure should not be interpreted as equivalent to Green Accounting. In this study, it represents the intensity of environmental information communicated through corporate reports rather than the complete implementation of an internal environmental accounting system. Pramesti et al. (2024) indicate that sustainability disclosure can improve transparency and accountability, while Wiguna et al. (2026) show that the consequences of environmental information may depend on its credibility and external assurance. These findings suggest that credible environmental disclosure may support organizational responsiveness and resilience, particularly in environmentally sensitive industries. Therefore, greater Environmental Disclosure is expected to be associated with stronger Corporate Resilience.

H2: Environmental Disclosure is positively associated with Corporate Resilience.

2.6 Intellectual Capital and Corporate Resilience

Intellectual Capital represents knowledge, employee competencies, organizational systems, experience, and other knowledge-based resources that enable firms to perform and adapt. In the oil and gas industry, technological expertise, managerial knowledge, operational experience, and innovation capabilities are important because firms operate in complex and changing environments. Under the RBV, these resources may provide strategic advantages because they are difficult to imitate. Ozkan et al. (2017) found that Intellectual Capital efficiency is associated with firm performance, while Prasetiyo and Annisa (2025) identified Intellectual Capital as a resource associated with innovation, productivity, profitability, and market value. More directly, Ju et al. (2023) demonstrated that Intellectual Capital can contribute to Organizational Resilience through knowledge development and innovation, and Alnasser et al. (2024) highlighted the role of organizational agility and innovation in strengthening the relationship between Intellectual Capital and resilience. Consistent with Dynamic Capability Theory, knowledge and competencies can help firms learn from disruptions, develop new responses, and reconfigure resources when conditions change. Thus, firms with stronger Intellectual Capital are expected to demonstrate greater Corporate Resilience.

H3: Intellectual Capital is positively associated with Corporate Resilience.

2.7 Corporate Resilience and Firm Value

Corporate Resilience reflects a firm's ability to anticipate, withstand, respond to, adapt to, and recover from disruptions while maintaining essential functions. Resilient firms may be better able to maintain operational continuity, protect cash flows, preserve stakeholder relationships, and reduce the adverse consequences of external shocks. These capabilities may reduce uncertainty concerning future performance and consequently influence investors' valuation assessments. Hillmann and Guenther (2021) emphasize the importance

of organizational resilience under uncertain environmental conditions. Daadmehr (2024) shows that resilience is associated with firms' ability to survive and recover from unexpected shocks and has implications for expected returns and valuation, while Li et al. (2025) find that firm resilience is associated with value creation and risk mitigation. Nevertheless, resilience may not immediately translate into higher market value because investors may recognize its benefits only when such capabilities generate observable economic outcomes. Therefore, the relationship between Corporate Resilience and Firm Value remains an empirical question in the Indonesian oil and gas context.

H4: Corporate Resilience is positively associated with Firm Value.

2.8 ESG Performance and Firm Value

ESG Performance may influence Firm Value through risk management, governance quality, stakeholder relationships, and investors' perceptions of the firm's long-term prospects. Stakeholder Theory suggests that stronger ESG practices may improve transparency, accountability, legitimacy, and stakeholder confidence, while RBV views ESG-related capabilities as organizational resources that may support long-term performance. Empirical evidence, however, remains mixed. Hamidi and Utama (2026) report that overall ESG Performance and its social and governance dimensions are positively associated with Firm Value, whereas the environmental dimension is not significant. Broadstock et al. (2021) also show that stronger ESG performance can be associated with lower financial risk during periods of crisis. These findings suggest that ESG Performance may provide a positive signal concerning the firm's ability to manage non-financial risks, although market responses may vary across industries and ESG dimensions. Given the environmental sensitivity of the oil and gas industry, stronger ESG Performance is therefore expected to be associated with higher Firm Value.

H5: ESG Performance is positively associated with Firm Value.

2.9 Environmental Disclosure and Firm Value

Environmental Disclosure may influence Firm Value by reducing information asymmetry and providing investors with information concerning environmental responsibilities, risk management, and potential regulatory or reputational exposure. This relationship is particularly relevant in the oil and gas industry because environmental risks can affect both operational continuity and stakeholder perceptions. Stakeholder Theory suggests that transparent environmental communication can strengthen corporate legitimacy and stakeholder confidence, although the market response may depend on the quality and credibility of the disclosed information. Pramesti et al. (2024) find that ESG Disclosure does not significantly affect Firm Value among Indonesian energy firms, while Wiguna et al. (2026) indicate that the valuation consequences of environmental information may depend on credibility and external assurance. The mixed evidence suggests that disclosure alone may not automatically create market value, but credible and relevant environmental information may reduce uncertainty and improve investor assessment. Accordingly, a positive relationship remains theoretically plausible and is tested in this study.

H6: Environmental Disclosure is positively associated with Firm Value.

2.10 Intellectual Capital and Firm Value

Intellectual Capital may contribute to Firm Value by supporting innovation, efficiency, organizational competencies, and future economic benefits that may not be fully reflected in conventional financial statements. From the RBV perspective, knowledge-based resources can provide competitive advantages because they are difficult to imitate and substitute.

Ozkan et al. (2017) found that Intellectual Capital components are associated with financial performance, while Pramesti et al. (2024) reported a positive relationship between Intellectual Capital and Firm Value among Indonesian energy firms. Prasetiyo and Annisa (2025) similarly position Intellectual Capital as a strategic resource associated with innovation, productivity, profitability, and market value. These findings suggest that firms possessing stronger intellectual resources may be better positioned to generate future economic benefits and sustain competitive advantages. Therefore, stronger Intellectual Capital is expected to be associated with higher Firm Value.

H7: Intellectual Capital is positively associated with Firm Value.

2.11 Corporate Resilience as an Intervening Mechanism between ESG Performance and Firm Value

The direct relationship between ESG Performance and Firm Value may not fully explain how ESG-related practices generate economic consequences. ESG Performance may first strengthen organizational capabilities, risk management, governance, stakeholder relationships, and preparedness, which can contribute to Corporate Resilience. Resilience may subsequently help firms maintain operational continuity and reduce the negative consequences of external shocks, potentially supporting Firm Value. Wang et al. (2026) provide evidence that ESG Performance contributes to Enterprise Resilience, while Daadmehr (2024) links resilience with survival, recovery, expected returns, and valuation. These findings provide a theoretical and empirical basis for considering Corporate Resilience as a potential pathway between ESG Performance and Firm Value. However, this intervening relationship has not been sufficiently established among Indonesian oil and gas firms and therefore requires empirical testing.

H8: Corporate Resilience is a potential intervening mechanism in the relationship between ESG Performance and Firm Value.

2.12 Corporate Resilience as an Intervening Mechanism between Environmental Disclosure and Firm Value

Environmental Disclosure may affect Firm Value indirectly when environmental information is supported by organizational capabilities that enable firms to respond to the risks and expectations identified through such disclosure. From Stakeholder Theory, credible environmental disclosure can strengthen relationships with investors, regulators, communities, and other stakeholders. From Dynamic Capability Theory, the processes involved in identifying, communicating, and responding to environmental issues may contribute to the firm's capacity to cope with disruption. Pramesti et al. (2024) show that sustainability disclosure does not necessarily translate directly into Firm Value, while Wiguna et al. (2026) indicate that the market consequences of environmental information may depend on credibility and external assurance. These findings suggest that Environmental Disclosure may require organizational resilience to translate environmental information and stakeholder communication into more stable organizational outcomes and potentially Firm Value. Thus, Corporate Resilience is examined as a potential intervening mechanism.

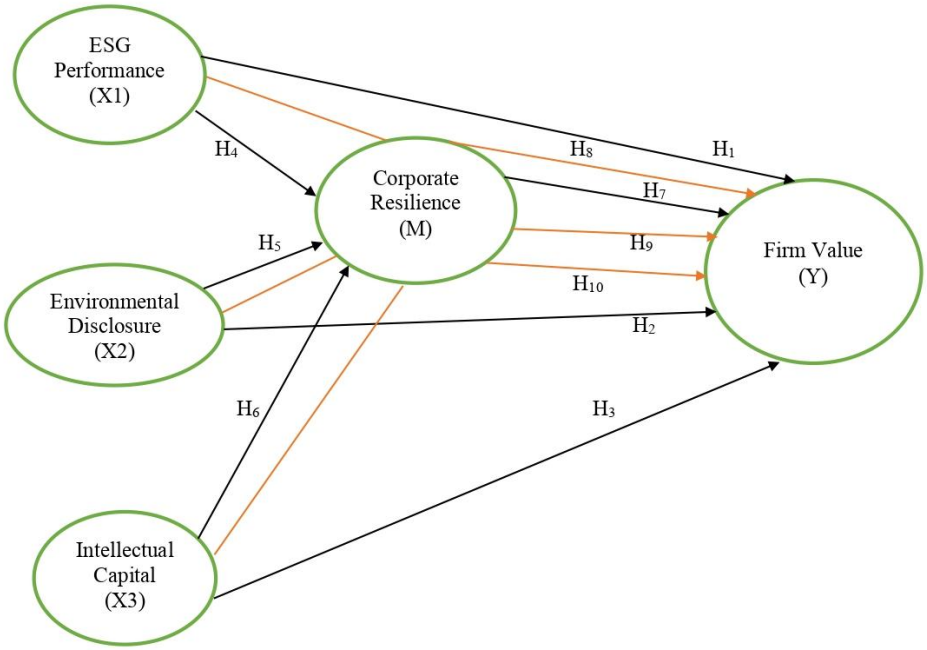
H9: Corporate Resilience is a potential intervening mechanism in the relationship between Environmental Disclosure and Firm Value.

2.13 Corporate Resilience as an Intervening Mechanism between Intellectual Capital and Firm Value

Intellectual Capital may create economic value not only through efficiency and innovation but also through the firm's ability to adapt when conditions change. Knowledge, competencies, organizational experience, and innovation capabilities can help firms develop responses to unexpected events and reconfigure resources when existing strategies become less effective. Ju et al. (2023) demonstrate that Intellectual Capital can contribute to Organizational Resilience through knowledge development and innovation, while Alnasser et al. (2024) highlight the role of agility and innovation in strengthening the relationship between Intellectual Capital and resilience. Li et al. (2025) further show that firm resilience is associated with Firm Value. Taken together, these findings suggest a potential pathway in which Intellectual Capital strengthens Corporate Resilience, which may subsequently contribute to Firm Value. However, whether this indirect relationship exists among Indonesian oil and gas firms remains an empirical question.

H10: Corporate Resilience is a potential intervening mechanism in the relationship between Intellectual Capital and Firm Value**.**

Figure 1. Research framework diagram



3. Methodology

3.1 Research Design

This study employs a quantitative explanatory design using firm-year panel data to examine the relationships among ESG Performance, Environmental Disclosure, Intellectual Capital, Corporate Resilience, and Firm Value. The study covers 16 oil and gas companies listed on the Indonesia Stock Exchange during 2020–2024, resulting in 80 firm-year observations. Panel data are used because the same firms are observed repeatedly across five years, allowing the analysis to account for firm-specific characteristics and changes over time. All variables are treated as observed firm-year measures rather than latent constructs. The analysis was conducted using Stata 17. Model estimation proceeds through two separate panel equations: the first examines the associations of ESG Performance, Environmental Disclosure, and Intellectual Capital with Corporate Resilience, while the second examines their associations with Firm Value after incorporating Corporate Resilience. This structure

provides the basis for evaluating both direct relationships and the proposed indirect associations through Corporate Resilience.

3.2 Population, Sample, and Data Sources

The population of this study comprises oil and gas companies listed on the Indonesia Stock Exchange (IDX) during 2020–2024. The oil and gas sector was selected because its operations are closely associated with environmental risks and increasing demands for environmental accountability and disclosure. Previous studies on Indonesian oil and gas companies have used annual reports and sustainability reports to examine environmental disclosure based on the GRI 300 Environmental Standards (Qothrunada & Handayani, 2023). Similarly, Istiningrum and Pratama (2024) examined environmental disclosure and firm value among Indonesian oil, gas, and mining companies, demonstrating the relevance of environmental information in this sector.

The sample was selected using purposive sampling based on the availability and consistency of data required to measure all study variables. The final sample comprises 16 oil and gas companies observed continuously from 2020 to 2024, resulting in 80 firm-year observations (16 companies × 5 years). The firm-year observation is used as the unit of analysis because the same firms are observed repeatedly across the study period. Financial and accounting data were obtained from annual reports and financial statements, Environmental Disclosure data were obtained from annual and sustainability reports, ESG Performance data were obtained from Bloomberg ESG data and recorded using the Bloomberg ESG Score reported for each firm-year observation. The resulting dataset was organized as a balanced panel and analyzed using Stata 17.

3.3 Measurement of Variables

Table 1. Operationalization of Research Variables

Variable	Indicator	Measurement	Source
ESG Performance (X1)	ESG Score	Bloomberg ESG Score	Bloomberg
Environmental Disclosure (X2)	Modified GRI 300-based Environmental Disclosure Index	30 harmonized environmental disclosure items; item-level content analysis; ED = (Σ disclosed items / 30) × 100	Annual reports and sustainability reports; GRI Standards; modified checklist based on the GRI 300 series
Intellectual Capital (X3)	VAIC	VAIC	Pulic (2004)
Corporate Resilience (M)	Composite Resilience Index (CRI)	Composite index based on Financial, Operational, Adaptive, and Recovery Resilience	Daadmehr (2024); Duit (2016); Wang et al. (2026); adapted and developed by the authors
Firm Value (Y)	Market Value & Assets	Tobin's Q	Brainard & Tobin (1968); Lindenberg & Ross (1981)

All variables were operationalized as observed firm-year measures. ESG Performance was measured using the Bloomberg ESG Score. Environmental Disclosure was measured using a modified GRI 300-based index comprising 30 harmonized environmental disclosure items, calculated as the proportion of disclosed items relative to the total applicable items.

Intellectual Capital was measured using VAIC, consisting of Human Capital Efficiency, Structural Capital Efficiency, and Capital Employed Efficiency. Corporate Resilience was measured using a Composite Resilience Index (CRI) incorporating Financial, Operational, Adaptive, and Recovery Resilience. Firm Value was measured using Tobin's Q. The measurement procedures emphasize observable indicators, calculation rules, source documents, and data consistency rather than latent-variable measurement criteria.

3.4 Environmental Disclosure Measurement

Environmental Disclosure is operationalized as the extent to which a firm reports substantive environmental information in its corporate reports. The measure is constructed using a modified GRI 300-based Environmental Disclosure Index designed to provide a consistent firm-year measure across the 2020–2024 observation period. The instrument covers 30 harmonized disclosure items representing materials, energy, water and effluents, biodiversity, emissions, waste, and environmental compliance.

Each disclosure item was coded using an item-level content analysis procedure. A score of 1 was assigned when substantive disclosure corresponding to the specified GRI item was identified in the firm's annual report, sustainability report, or GRI Content Index. A score of 0 was assigned when the item was relevant but no substantive disclosure was identified after examination of the relevant reporting sections. An N/A classification was retained only when the report provided a traceable basis indicating that the item was not applicable or not material. Where the available evidence was insufficient to make a defensible coding decision, the item was retained as pending until further verification.

To maintain comparability across reporting periods, the coding framework was harmonized across changes in the GRI Standards. For earlier reporting periods, GRI 307-1 was used for environmental compliance, while GRI 2-27 was used for the corresponding compliance disclosure under the GRI 2021 framework, where applicable. The GRI 11 Oil and Gas Sector Standard was used as sector context rather than as an additional denominator of the disclosure index.

The Environmental Disclosure Index is calculated as:

$$ED_{it} = (\Sigma \text{ Disclosed Items}_{it} / 30) \times 100$$

The denominator is fixed at 30 for all firm-year observations to maintain comparability across firms and reporting periods. Items classified as N/A are not counted as disclosed items and therefore do not increase the numerator.

Where ED_{it} represents the Environmental Disclosure score of firm i in year t, and the numerator represents the number of substantive disclosure items identified in the firm's reporting documents. The resulting index ranges from 0 to 100, with higher values indicating greater environmental disclosure intensity.

To enhance reproducibility, each firm-year coding decision was documented in an evidence audit trail linking the coded GRI item to the underlying report and page location. The audit therefore follows the sequence: source document → GRI item → coding decision → disclosure index.

Table 2. Modified GRI 300-Based Environmental Disclosure Instrument

GRI Category	Disclosure Items	Number of Items
GRI 301 – Materials	301-1 to 301-3	3
GRI 302 – Energy	302-1 to 302-5	5
GRI 303 – Water and Effluents	303-1 to 303-5	5

GRI Category	Disclosure Items	Number of Items
GRI 304 – Biodiversity	304-1 to 304-4	4
GRI 305 – Emissions	305-1 to 305-7	7
GRI 306 – Waste	306-1 to 306-5	5
Environmental Compliance	307-1 / GRI 2-27	1
Total		**30**

GRI 307-1 is used for earlier reporting periods, while GRI 2-27 is used for the corresponding environmental compliance disclosure under the GRI 2021 framework, where applicable. The checklist is a modified and harmonized research instrument and is not presented as the complete set of GRI disclosures. The 30-item instrument was applied consistently across all firm-year observations to provide a comparable disclosure-intensity measure

Table 3. Construction of the Composite Resilience Index (CRI)

Resilience Dimension	Indicators	Measurement Approach	Normalization	Weight
Financial Resilience (FR)	Current Ratio, Cash Ratio, Interest Coverage, DER, OCF Ratio	Financial liquidity, solvency, and cash-flow indicators	Min–max; DER reverse-coded	25%
Operational Resilience (OR)	Asset Turnover, Operating Margin, Production Stability	Operational efficiency and production continuity indicators	Min–max	25%
Adaptive Resilience (AR)	Revenue Growth, Asset Growth, CAPEX Intensity	Growth and investment indicators reflecting adaptive capacity	Min–max	25%
Recovery Resilience (RR)	ROA Recovery, Revenue Recovery, Stock Price Recovery	Recovery relative to 2019 baseline	Min–max	25%
Composite Resilience Index (CRI)	FR, OR, AR, RR	$CRI = \frac{FR^* + OR^* + AR^* + RR^*}{4}$	Score ranges from 0–1	100%

3.5 Corporate Resilience Measurement

Corporate Resilience is measured using a Composite Resilience Index (CRI) comprising four dimensions: Financial Resilience, Operational Resilience, Adaptive Resilience, and Recovery Resilience, reflecting the ability to survive financially, maintain operations, adapt to change, and recover after disruptions (Duit, 2016; Hillmann & Guenther, 2021; Daadmehr, 2024). Financial Resilience is measured by Current Ratio, Cash Ratio, Interest Coverage, Debt-to-Equity Ratio (DER), and Operating Cash Flow Ratio, with DER reverse-coded because a higher ratio indicates greater solvency pressure. Operational Resilience is measured by Asset Turnover, Operating Margin, and Production Stability, while Adaptive Resilience is

measured by Revenue Growth, Asset Growth, and CAPEX Intensity. Recovery Resilience is measured by ROA Recovery, Revenue Recovery, and Stock Price Recovery, capturing the ability to restore performance relative to a common pre-observation baseline. For the main CRI specification, 2019 is used as the baseline year, preceding the 2020–2024 observation period; therefore, all recovery indicators are anchored to each firm's 2019 performance..

3.6 Equal Weighting and Recovery Baseline.

The four dimensions of Corporate Resilience are assigned equal weights of 25% because they are treated as complementary dimensions of organizational resilience rather than as a hierarchical set of capabilities. Financial Resilience captures the firm's ability to absorb financial pressure, Operational Resilience reflects the continuity of core activities, Adaptive Resilience captures the capacity to adjust to changing conditions, and Recovery Resilience reflects the restoration of performance following disruption. Because the study does not establish a theoretically grounded basis for assigning differential weights across these dimensions, equal weighting provides a transparent, consistent, and reproducible aggregation rule and prevents any single dimension from dominating the composite index.

3.7 Sensitivity Reconstruction of the Corporate Resilience Index

To address the potential conceptual and mechanical overlap between Stock Price Recovery and Firm Value measured using Tobin's Q, a sensitivity specification of the Corporate Resilience Index was constructed by excluding Stock Price Recovery from the Recovery Resilience dimension. The alternative specification retained Financial Resilience, Operational Resilience, and Adaptive Resilience, while Recovery Resilience was recalculated using ROA Recovery and Revenue Recovery only.

The sensitivity specification used 2019 as the baseline year because the main observation period begins in 2020. ROA Recovery was calculated as the difference between the firm's ROA in year *t* and its ROA in the 2019 baseline year:

$$\textbf{ROA Recovery}_{it} = \textbf{ROA}_{it} - \textbf{ROA}_{i,\ 2019}$$

Revenue Recovery was calculated as the ratio of the firm's revenue in year *t* to its revenue in the 2019 baseline year:

$$\textbf{Revenue Recovery}_{it} = \textbf{Revenue}_{it} / \textbf{Revenue}_{i,\ 2019}$$

Both recovery indicators were transformed using min–max normalization to place the measures on a comparable 0–1 scale. Recovery Resilience in the sensitivity specification was then calculated as the equally weighted average of the two normalized indicators:

$$\textbf{RR\_NoStock}_{it} = 0.50(\textbf{ROA Recovery Norm}_{it}) + 0.50(\textbf{Revenue Recovery Norm}_{it})$$

The alternative Corporate Resilience Index, denoted as **CRI_NoStock**, was subsequently calculated by assigning equal weights of 25% to Financial Resilience, Operational Resilience, Adaptive Resilience, and the reconstructed Recovery Resilience:

$$\textbf{CRI\_NoStock}_{it} = 0.25\textbf{FR}_{it} + 0.25\textbf{OR}_{it} + 0.25\textbf{AR}_{it} + 0.25\textbf{RR\_NoStock}_{it}$$

The resulting index was expressed on a 0–1 scale, with higher values indicating greater Corporate Resilience. The sensitivity specification retained 70 firm-year observations from 14 firms because observations without sufficient information to establish the 2019 baseline and required recovery measures were excluded; this reduction from the main 80-observation panel reflects the additional baseline requirement rather than a change in the sampling criteria. The panel models were re-estimated using the same random-effects specification with year effects and firm-clustered robust standard errors, while indirect associations were

re-estimated using firm-level bootstrap resampling with 9,999 replications. This sensitivity analysis assesses whether the main inference concerning Corporate Resilience and Firm Value remains stable after excluding Stock Price Recovery.

3.8 Panel Data Analysis

Because the dataset consists of 16 firms observed repeatedly over five years, the empirical analysis uses panel regression as the primary estimation approach. Each observation represents a firm-year, allowing the analysis to account for the longitudinal structure of the data rather than treating the 80 observations as independent cross-sectional cases. The panel models are estimated separately for the two dependent variables, namely Corporate Resilience and Firm Value. This separation is important because Corporate Resilience represents the intervening variable, whereas Firm Value represents the final outcome variable.

Model 1 examines the determinants of Corporate Resilience:

$$CR_{it} = \alpha + a_1 ESGP_{it} + a_2 ED_{it} + a_3 IC_{it} + \lambda_t + \mu_i + \varepsilon_{it} \quad \ldots\ldots 1$$

Where CR_{it} represents Corporate Resilience of firm i in year t, $ESGP_{it}$ represents ESG Performance, ED_{it} represents Environmental Disclosure Intensity, IC_{it} represents Intellectual Capital, μi represents the firm-specific component, and ε_{it} represents the idiosyncratic error term. This model estimates the paths from ESG Performance, Environmental Disclosure, and Intellectual Capital to Corporate Resilience.

Model 2 examines the determinants of Firm Value:

$$FV_{it} = \alpha + c_1 ESGP_{it} + c_2 ED_{it} + c_3 IC_{it} + bCR_{it} + \lambda_t + \mu_i + \varepsilon_{it} \quad \ldots\ldots 2$$

Where FV_{it} represents Firm Value and CR_{it} represents Corporate Resilience. This specification estimates the direct relationships of ESG Performance, Environmental Disclosure, and Intellectual Capital with Firm Value while also incorporating Corporate Resilience as the potential intervening variable. The two equations are estimated separately because they represent different relationships within the proposed mechanism. The first equation provides the a-path coefficients linking the explanatory variables to Corporate Resilience, while the second equation provides the b-path coefficient linking Corporate Resilience to Firm Value. These coefficients are subsequently combined to estimate panel indirect associations through Corporate Resilience.

3.9 Panel Model Selection

Model selection was conducted separately for the Corporate Resilience and Firm Value equations. The analysis first estimated the Pooled OLS, Fixed Effects (FE), and Random Effects (RE) models. The Breusch–Pagan Lagrange Multiplier (LM) test was then used to assess whether the panel structure was preferred to the pooled specification. The Hausman test was subsequently used to compare the FE and RE estimators and to assess whether the RE specification was inconsistent with systematic correlation between unobserved firm-specific effects and the regressors. The final estimator for each equation was selected based on these specification tests and subsequently re-estimated using firm-clustered robust standard errors.

The non-significant Hausman statistics are consistent with the use of the random-effects specification. However, a non-significant Hausman test does not establish that the unobserved firm-specific effects are uncorrelated with the regressors. Therefore, the RE specification is maintained as the main estimator under this identifying assumption rather

than being interpreted as definitively established by the Hausman test. Given the relatively small number of firms, the robustness of the resulting statistical inference is further assessed using a fixed-effects specification with wild cluster bootstrap inference.

3.10 Firm and Year Effects

Firm-specific effects were considered because firms may differ in persistent characteristics that are not fully captured by the observed variables, such as business structure, managerial practices, and operating conditions. The panel specification therefore accounts for the repeated observations of the same firms over time. Year effects were also tested separately for the Corporate Resilience and Firm Value equations by including year indicators and conducting a joint test of the year coefficients. This procedure was used to determine whether common shocks or changes across the 2020–2024 period materially affected the dependent variables.

3.11 Firm-Clustered Robust Standard Errors

Because each firm is observed repeatedly over five years, the error terms may be correlated within firms across time. To account for this dependence, the final panel models were estimated using firm-clustered robust standard errors. Clustering at the firm level allows the statistical inference to remain robust to within-firm correlation and heteroskedasticity across the 80 firm-year observations. Given the relatively small number of firms in the sample (16 firms), the results are interpreted cautiously and are complemented by bootstrap-based robustness checks.

3.12 Panel Indirect Association Analysis

Corporate Resilience was examined as a potential intervening mechanism linking ESG Performance, Environmental Disclosure, and Intellectual Capital with Firm Value. The analysis estimates indirect associations based on the product of the coefficient linking each explanatory variable to Corporate Resilience (a) and the coefficient linking Corporate Resilience to Firm Value (b), expressed as a × b. Because the empirical specification does not establish temporal ordering between the explanatory variables, Corporate Resilience, and Firm Value, the resulting estimates are interpreted as panel indirect associations rather than causal mediation effects. The analysis reports the indirect association estimate, bootstrap standard error, p-value, and percentile 95% confidence interval (CI). An indirect association is considered statistically supported when the percentile 95% CI does not include zero. The analysis therefore evaluates whether the observed panel relationships are consistent with Corporate Resilience functioning as a potential intervening mechanism, rather than establishing that changes in ESG Performance, Environmental Disclosure, or Intellectual Capital causally precede changes in Corporate Resilience and subsequently changes in Firm Value.

3.13 Robustness Analysis.

To assess the sensitivity of the statistical inference to the relatively small number of firm clusters, a wild cluster bootstrap procedure was conducted in Stata 17. The bootstrap was performed at the firm level using 9,999 replications, preserving the dependence structure of the repeated firm-year observations. The procedure was applied to the key coefficients in both the Corporate Resilience and Firm Value equations. The bootstrap results were compared with the conventional firm-clustered robust estimates to assess whether the statistical conclusions were sensitive to the small number of clusters.

4. Result and Discussion

4.1 Result

Table 4 presents descriptive statistics for 80 firm-year observations from 16 Indonesian oil and gas companies during 2020–2024. ESG Performance has a mean of 75.00, while Environmental Disclosure has a mean of 77.62. Intellectual Capital has a mean of 3.49, and Corporate Resilience has a mean of 0.486, ranging from 0.155 to 0.828. Firm Value, measured by Tobin's Q, has a mean of 1.796 and a standard deviation of 1.357. All variables contain 80 observations, confirming a balanced panel dataset.

Table 4. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ESGP	80	75.00163	10.79937	48.66	99.28
ED	80	77.61862	12.33056	33.95	95.88
IC	80	3.485125	2.325028	0.82	11.41
CR	80	0.4859419	0.137862	0.155179	0.828107
FV	80	1.796	1.357358	0.81	9.00

Table 5 shows that the pairwise correlations among the study variables are relatively low. The largest correlation among the explanatory variables is between Environmental Disclosure and Intellectual Capital (-0.2451). ESG Performance is negatively correlated with Corporate Resilience (-0.2445), while the correlation between Corporate Resilience and Firm Value is -0.0627. Overall, the correlation matrix does not indicate strong linear associations among the explanatory variables.

Table 5. Pearson Correlation Matrix

Variable	ESGP	ED	IC	CR	FV
ESGP	1.0000	-0.0652	-0.1673	-0.2445	0.1878
ED	-0.0652	1.0000	-0.2451	0.1534	-0.2716
IC	-0.1673	-0.2451	1.0000	-0.0183	-0.0912
CR	-0.2445	0.1534	-0.0183	1.0000	-0.0627
FV	0.1878	-0.2716	-0.0912	-0.0627	1.0000

Table 6 reports the variance inflation factors for the two regression equations. The VIF values range from 1.04 to 1.10, with a mean VIF of 1.07 for the Corporate Resilience equation and 1.10 for the Firm Value equation. These values indicate that the explanatory variables do not exhibit problematic multicollinearity.

Table 6. Variance Inflation Factor

Panel A. Corporate Resilience Equation

Variable	VIF	1/VIF
ESGP	1.04	0.960032
ED	1.08	0.928358
IC	1.10	0.906228
Mean VIF	**1.07**	

Panel B. Firm Value Equation

Variable	VIF	1/VIF

Variable	VIF	1/VIF
ESGP	1.10	0.905499
IC	1.10	0.905612
ED	1.10	0.912503
CR	1.09	0.920637
Mean VIF	**1.10**	

Table 7 presents the panel model selection results for each dependent variable. For the Corporate Resilience equation, the LM test is significant, indicating the presence of panel-level effects. The Hausman test produces $\chi^2(3) = 2.33$ with $p = 0.5064$. For the Firm Value equation, the LM test is also significant, while the Hausman test produces $\chi^2(4) = 1.72$ with $p = 0.7870$. The non-significant Hausman tests support the use of the random-effects specification under the maintained assumption that the unobserved firm-specific component is not systematically correlated with the regressors. Given the small number of firms, this assumption is treated as an identifying condition rather than as a definitive empirical confirmation.

Table 7. Panel Model Selection Tests

Equation	FE vs. Pooled: F-test	RE vs. Pooled: LM Test	FE vs. RE: Hausman Test	Selected Model
CR	$F(15,61) = 2.30$, $p = 0.0118$	$\chi^2(1) = 4.59$, $p = 0.0161$	$\chi^2(3) = 2.33$, $p = 0.5064$	**RE**
FV	$F(15,60) = 14.24$, $p < 0.001$	$\chi^2(1) = 76.77$, $p < 0.001$	$\chi^2(4) = 1.72$, $p = 0.7870$	**RE**

Table 8 reports the final random-effects estimation for Corporate Resilience. ESG Performance has a coefficient of -0.0022776 ($p = 0.175$), while Environmental Disclosure has a coefficient of 0.0002079 ($p = 0.868$). Intellectual Capital has a coefficient of 0.0006813 ($p = 0.935$). Thus, none of the three explanatory variables is statistically significant at the 5% level. The model has an overall R^2 of 0.0925. The Wald test is also statistically insignificant ($\chi^2(7) = 9.69$, $p = 0.2070$). These findings indicate that the observed variation in Corporate Resilience is not sufficiently explained by ESG Performance, Environmental Disclosure, and Intellectual Capital within the estimated model.

Table 8. Final Random-Effects Model for Corporate Resilience

Variable	Coefficient	Robust SE	z	p-value	95% CI
ESGP	-0.0022776	0.0016791	-1.36	0.175	[-0.0055685; 0.0010134]
ED	0.0002079	0.0012522	0.17	0.868	[-0.0022463; 0.0026620]
IC	0.0006813	0.0083839	0.08	0.935	[-0.0157507; 0.0171134]
Year 2021	0.0323867	0.0372497	0.87	0.385	[-0.0406215; 0.1053949]
Year 2022	0.0700943	0.0441318	1.59	0.112	[-0.0164024; 0.1565910]
Year 2023	0.0595888	0.0398897	1.49	0.135	[-0.0185936; 0.1377712]
Year 2024	0.0540650	0.0575632	0.94	0.348	[-0.0587568; 0.1668869]
Constant	0.5950284	0.1735668	3.43	0.001	[0.2548437; 0.9352131]

Table 9 reports the final random-effects estimation for Firm Value. ESG Performance has a coefficient of 0.0101653 (p = 0.340), Environmental Disclosure has a coefficient of -0.0151852 (p = 0.081), Intellectual Capital has a coefficient of 0.0160250 (p = 0.640), and Corporate Resilience has a coefficient of -0.2713924 (p = 0.691). None of these coefficients is statistically significant at the 5% level. Although Environmental Disclosure has a comparatively lower p-value of 0.081, it does not meet the 5% significance criterion adopted in the study. The overall R^2 is 0.0895, while the overall Wald test is not significant at the 5% level ($\chi^2(8) = 13.38$, p = 0.0993).

Table 9. Final Random-Effects Model for Firm Value

Variable	Coefficient	Robust SE	z	p-value	95% CI
ESGP	0.0101653	0.0106562	0.95	0.340	[-0.0107205; 0.0310510]
ED	-0.0151852	0.0087028	-1.74	0.081	[-0.0322424; 0.0018720]
IC	0.0160250	0.0342759	0.47	0.640	[-0.0511544; 0.0832045]
CR	-0.2713924	0.6835101	-0.40	0.691	[-1.6110480; 1.0682630]
Year 2021	0.0423579	0.1085987	0.39	0.697	[-0.1704916; 0.2552074]
Year 2022	-0.0425056	0.1090349	-0.39	0.697	[-0.2562101; 0.1711989]
Year 2023	0.1931481	0.3958874	0.49	0.626	[-0.5827769; 0.9690731]
Year 2024	-0.1033895	0.1685194	−0.61	0.540	[-0.4336815; 0.2269025]
Constant	2.270351	1.011774	2.24	0.025	[0.2873116; 4.253391]

Table 10 reports the joint tests of the year indicators. In the main random-effects specifications, the year indicators are jointly insignificant for both Corporate Resilience ($\chi^2(4) = 3.02$, p = 0.5548) and Firm Value ($\chi^2(4) = 1.66$, p = 0.7973). The same conclusion is obtained in the fixed-effects robustness specifications, with F (4,15) = 0.86 (p = 0.5090) for Corporate Resilience and F(4,15) = 0.54 (p = 0.7086) for Firm Value. The year indicators are nevertheless retained in the regression specifications to account for common year-specific factors over the 2020–2024 observation period

Table 10. Year Effects and Model Diagnostics

Equation	Specification	Test	Statistic	p-value	Conclusion
CR	RE + Year Effects	Joint year test	$\chi^2(4) = 3.02$	0.5548	Not significant
FV	RE + Year Effects	Joint year test	$\chi^2(4) = 1.66$	0.7973	Not significant
CR	FE robustness	Joint year test	F(4,15) = 0.86	0.5090	Not significant
FV	FE robustness	Joint year test	F(4,15) = 0.54	0.7086	Not significant

Table 11 presents the panel indirect association analysis using firm-level bootstrap inference. The Indirect Association of ESG Performance through Corporate Resilience is 0.0006181, with a p-value of 0.790 and a percentile 95% confidence interval ranging from -0.0037204 to 0.0054365. The interval includes zero, indicating that the Indirect Association is not statistically supported. The Indirect Association of Environmental Disclosure through Corporate Resilience is -0.0000564 (p = 0.966), with a 95% confidenc

e interval of -0.0037738 to 0.0014754. For Intellectual Capital, the Indirect Association is -0.0001849 (p = 0.981), with a 95% confidence interval of -0.0198161 to 0.0126290. Accordingly, the analysis provides no statistically significant evidence that Corporate Resilience functions

as an intervening mechanism in the observed panel relationships between ESG Performance, Environmental Disclosure, or Intellectual Capital and Firm Value.

Table 11. Panel Indirect Association Analysis

Mediation Path	a	b	Indirect Association (a × b)	Bootstrap SE	p-value	Percentile 95% CI
ESGP → CR → FV	-0.0022776	-0.2713924	**0.0006181**	0.0023155	0.790	[-0.0037204; 0.0054365]
ED → CR → FV	0.0002079	-0.2713924	**-0.0000564**	0.0013323	0.966	[-0.0037738; 0.0014754]
IC → CR → FV	0.0006813	-0.2713924	**-0.0001849**	0.0 079168	0.981	[-0.0198161; 0.0126290]

Table 12 evaluates whether the main findings are sensitive to an alternative fixed-effects specification and small-cluster inference. The wild cluster bootstrap results provide additional evidence on the stability of the statistical inference given the limited number of firm-level clusters. For the Corporate Resilience equation, the bootstrap p-values are 0.2515 for ESG Performance, 0.2349 for Environmental Disclosure, and 0.3725 for Intellectual Capital. For the Firm Value equation, the corresponding p-values are 0.5349, 0.1205, 0.2583, and 0.7541 for ESG Performance, Environmental Disclosure, Intellectual Capital, and Corporate Resilience, respectively. All corresponding 95% confidence sets include zero. Thus, the absence of statistically significant evidence is not altered when inference is evaluated using the wild cluster bootstrap procedure**.**

Table 12. Wild Cluster Bootstrap Robustness Analysis

Dependent Variable	Predictor	FE Coefficient	Clustered p-value	WCB t(15)	WCB p-value	95% Confidence Set
CR	ESGP	-0.0019307	0.241	-1.2297	**0.2515**	[-0.005932; 0.001471]
	ED	-0.0024268	0.116	-1.6813	**0.2349**	[-0.007393; 0.002539]
	IC	0.0093693	0.310	1.0584	**0.3725**	[-0.021600; 0.037330]
FV	ESGP	0.0084366	0.380	0.9107	**0.5349**	[-0.009377; 0.033870]
	ED	-0.0113737	0.138	-1.5784	**0.1205**	[-0.034640; 0.004214]
	IC	0.0393294	0.231	1.2585	**0.2583**	[-0.039640; 0.118700]
	CR	-0.2883484	0.689	-0.4113	**0.7541**	[-1.682000; 1.262000]

To address the potential conceptual and mechanical overlap between Stock Price Recovery and the market-based component of Tobin's Q, the Corporate Resilience Index was reconstructed without Stock Price Recovery. The alternative index retained Financial, Operational, and Adaptive Resilience, while Recovery Resilience was based only on ROA Recovery and Revenue Recovery. CRI_NoStock ranges from 0.0684 to 0.7313, with a mean of

0.4484 and a standard deviation of 0.1468. After applying data-availability and baseline-validity criteria, the sensitivity analysis retained 70 firm-year observations from 14 firms. As shown in Table 13, ESG Performance, Environmental Disclosure, and Intellectual Capital are not significantly associated with CRI_NoStock (p = 0.129, 0.576, and 0.743, respectively). In the Firm Value equation, ESG Performance remains insignificant (β = 0.009507; p = 0.440), while Environmental Disclosure becomes significantly negative (β = -0.027709; p = 0.007) and Intellectual Capital remains insignificant (β = 0.013494; p = 0.738). Importantly, CRI_NoStock is not significantly associated with Firm Value (β = -0.988737; p = 0.213).

The indirect association results further show that none of the proposed pathways through CRI_NoStock is statistically supported. The indirect associations are 0.002682 for ESG Performance (p = 0.318; 95% CI [-0.002258, 0.010166]), -0.000959 for Environmental Disclosure (p = 0.572; 95% CI [-0.008755, 0.002274]), and -0.003048 for Intellectual Capital (p = 0.717; 95% CI [-0.048941, 0.016709]); all confidence intervals include zero. Although the Environmental Disclosure result changes under the alternative CRI construction, the central inference remains unchanged: Corporate Resilience is not statistically associated with Firm Value and does not provide a statistically supported intervening mechanism between ESG Performance, Environmental Disclosure, or Intellectual Capital and Firm Value.

Table 13. Sensitivity Analysis Excluding Stock Price Recovery

Panel A. Corporate Resilience Equation

Variable	Coefficient	Robust SE	z	p-value
ESG Performance (ESGP)	-0.002712	0.001786	-1.52	0.129
Environmental Disclosure (ED)	0.000970	0.001735	0.56	0.576
Intellectual Capital (IC)	0.003083	0.009412	0.33	0.743
Year Effects	Included			
Observations	70			
Firms	14			

Panel B. Firm Value Equation

Variable	Coefficient	Robust SE	z	p-value
ESG Performance (ESGP)	0.009507	0.012308	0.77	0.440
Environmental Disclosure (ED)	-0.027709	0.010293	-2.69	0.007
Intellectual Capital (IC)	0.013494	0.040279	0.33	0.738
CRI_NoStock	-0.988737	0.793732	-1.25	0.213
Year Effects	Included			
Observations	70			
Firms	14			

Panel C. Indirect Association Through CRI_NoStock

Indirect Path	Indirect Association	Bootstrap SE	p-value	Percentile 95% CI
ESGP → CRI_NoStock → FV	0.002682	0.003248	0.318	[-0.002258, 0.010166]
ED → CRI_NoStock → FV	-0.000959	0.002758	0.572	[-0.008755, 0.002274]
IC → CRI_NoStock → FV	-0.003048	0.016536	0.717	[-0.048941, 0.016709]

4.2 Discussion

4.2.1 ESG Performance and Corporate Resilience

ESG Performance is not significantly associated with Corporate Resilience (β = -0.00228; p = 0.175), so **H1** is not supported. This finding differs from Wang et al. (2026), who report a positive relationship between ESG Performance and enterprise resilience, and Broadstock et al. (2021), who show that stronger ESG performance can reduce risk during financial crises. The difference may reflect the multidimensional CRI used in this study, which captures financial, operational, adaptive, and recovery capabilities. Consistent with Barney (1991), ESG resources may generate strategic benefits only when firms possess the capabilities to deploy them effectively. In the oil and gas industry, such translation may depend on financial flexibility, operational preparedness, technological capability, and managerial responses to commodity-price and regulatory uncertainty (Bento & Garotti, 2019; Hillmann & Guenther, 2021).

4.2.2 Environmental Disclosure and Corporate Resilience

Environmental Disclosure is not significantly associated with Corporate Resilience (β = 0.00021; p = 0.868), so **H2** is not supported. This result differs from prior studies linking environmental or sustainability disclosure with corporate outcomes (Li et al., 2018; Pramesti et al., 2024; Al Gamar & Widoretno, 2024), while Wiguna et al. (2026) emphasize the importance of information credibility and external assurance. Environmental Disclosure in this study represents reported environmental information rather than the internal implementation of Green Accounting. Therefore, disclosure may improve transparency and stakeholder communication without necessarily reflecting the financial, operational, technological, or recovery capabilities captured by Corporate Resilience.

4.2.3 Intellectual Capital and Corporate Resilience

Intellectual Capital is not significantly associated with Corporate Resilience (β = 0.00068; p = 0.935), so **H3** is not supported. This finding differs from Ju et al. (2023) and Abbas et al. (2026), who link Intellectual Capital and knowledge resources with organizational resilience, and from Ozkan et al. (2017), who associate Intellectual Capital with financial performance. A possible explanation is that VAIC captures resource efficiency but does not directly measure the ability to mobilize and reconfigure knowledge during disruption. Thus, consistent with Barney (1991) and Teece et al. (1997), valuable resources do not automatically become dynamic capabilities capable of strengthening resilience.

4.2.4 Corporate Resilience and Firm Value

Corporate Resilience is not significantly associated with Firm Value (β = -0.27139; p = 0.691), so **H4** is not supported. This finding differs from Li et al. (2025) and Daadmehr (2024), who associate resilience with value creation, risk mitigation, survival, recovery, and valuation. The difference may reflect the distinction between resilience as an internal organizational capability and Tobin's Q as a market-based measure. As Hillmann and Guenther (2021) note, resilience is multidimensional and its benefits may become visible only over time. In the oil and gas industry, investors may also place greater weight on profitability, cash flows, leverage, commodity prices, reserves, and regulatory risks.

4.2.5 ESG Performance and Firm Value

ESG Performance has a positive but statistically insignificant association with Firm Value (β = 0.01017; p = 0.340), so **H5** is not supported. The positive direction is consistent with Aydoğmuş et al. (2022) and Fatemi et al. (2018), while Broadstock et al. (2021) highlight the risk-reducing role of ESG performance. However, Hamidi and Utama (2026) show that ESG

dimensions do not necessarily have uniform valuation effects. Thus, ESG Performance may provide favorable information about corporate management and long-term prospects without producing a statistically significant valuation association in Indonesian oil and gas firms during 2020–2024.

4.2.6 Environmental Disclosure and Firm Value

Environmental Disclosure has a negative but statistically insignificant association with Firm Value (β = -0.01519; p = 0.081), so H6 is not supported at the 5% level. This result is consistent with the mixed evidence reported by Li et al. (2018), Abdi et al. (2022), Pramesti et al. (2024), and Al Gamar and Widoretno (2024). Wiguna et al. (2026) further suggest that market responses depend on the credibility and assurance of environmental information. Therefore, disclosure quantity alone may not generate higher Firm Value when investors cannot verify its economic relevance or connection with actual environmental performance.

4.2.7 Intellectual Capital and Firm Value

Intellectual Capital is not significantly associated with Firm Value (β = 0.01603; p = 0.640), so **H7** is not supported. This finding contrasts with Ozkan et al. (2017), Nguyen and Doan (2020), Deniswara et al. (2019), Pangestuti et al. (2022), Pramesti et al. (2024), and Salvi et al. (2020), who report relationships between Intellectual Capital, financial performance, disclosure, or Firm Value. The insignificant result may reflect the limitation of VAIC in capturing innovation quality, managerial capability, technological development, and organizational knowledge. Intellectual Capital may therefore generate internal benefits without producing an immediate and statistically observable increase in market valuation..

4.2.8 Corporate Resilience as a Potential intervening variable between ESG Performance and Firm Value

The panel indirect association analysis provides no significant evidence that Corporate Resilience mediates the relationship between ESG Performance and Firm Value. The estimated indirect association is 0.0006181 (p = 0.790; 95% CI [-0.0037204, 0.0054365]), so H8 is not supported. This finding differs from Wang et al. (2026), who associate ESG Performance with enterprise resilience, and from Daadmehr (2024) and Li et al. (2025), who emphasize the relevance of resilience to survival, recovery, valuation, and value creation. The absence of a significant indirect association may result from the fact that ESG Performance does not significantly strengthen the multidimensional Corporate Resilience measure used in this study, while Corporate Resilience itself is not significantly associated with Firm Value.

4.2.9 Corporate Resilience as a Potential intervening variable between Environmental Disclosure and Firm Value

Similarly, Corporate Resilience does not significantly intervene in the relationship between Environmental Disclosure and Firm Value. The estimated indirect association is -0.0000564 (p = 0.966; 95% CI [-0.0037738, 0.0014754]), indicating that H9 is not supported. This result is consistent with the mixed evidence reported by Pramesti et al. (2024) and Al Gamar and Widoretno (2024), while Wiguna et al. (2026) emphasize the importance of credibility and external assurance in determining the market relevance of environmental information. Environmental Disclosure may strengthen transparency and stakeholder communication, but disclosure alone does not necessarily indicate the organizational capabilities captured by Corporate Resilience or generate higher Firm Value.

4.2.10 Corporate Resilience as a Potential intervening variable between Intellectual Capital and Firm Value

The same pattern is observed for Intellectual Capital. The indirect association through Corporate Resilience is -0.0001849 (p = 0.981; 95% CI [-0.0198161, 0.0126290]), so H10 is not supported. This finding differs from Ju et al. (2023) and Abbas et al. (2026), who emphasize the relationship between Intellectual Capital, innovation, and organizational resilience. The difference may be related to the use of VAIC, which measures resource efficiency rather than the ability to mobilize and reconfigure knowledge during disruption. Consistent with Teece et al. (1997), valuable resources do not automatically become dynamic capabilities. Overall, the results provide no statistically significant evidence that Corporate Resilience serves as an intervening mechanism linking ESG Performance, Environmental Disclosure, or Intellectual Capital to Firm Value.

4.2.11 Sensitivity Analysis and the Measurement of Corporate Resilience

The sensitivity analysis further examines whether the measurement of Corporate Resilience is affected by the inclusion of Stock Price Recovery, given that Firm Value is measured using Tobin's Q and therefore contains a market-value component. The alternative specification removes Stock Price Recovery and reconstructs Recovery Resilience using ROA Recovery and Revenue Recovery. The results show that the main inference concerning Corporate Resilience and the indirect associations remains unchanged. Although the Environmental Disclosure coefficient in the Firm Value equation becomes statistically significant under the alternative specification, CRI_NoStock itself remains statistically insignificant (β = -0.988737; p = 0.213), and all indirect confidence intervals include zero.

This result indicates that the absence of statistical support for Corporate Resilience as an intervening mechanism is not solely attributable to Stock Price Recovery. At the same time, the alternative CRI should not be considered universally superior; it functions as a measurement robustness check. The interpretation of the main results should also recognize the identifying assumption underlying the random-effects estimator. Although the Hausman tests are consistent with the RE specification, they do not establish that unobserved firm-specific effects are unrelated to the regressors. Therefore, the findings are interpreted conditional on this assumption. Given the limited number of 16 firm-level clusters, firm-level wild cluster bootstrap inference was also applied to the fixed-effects specification. The bootstrap results do not provide significant evidence for ESG Performance, Environmental Disclosure, Intellectual Capital, or Corporate Resilience, with the corresponding 95% confidence sets including zero.

Overall, the evidence indicates that the proposed relationships are not statistically supported in the observed Indonesian oil and gas panel. The findings do not demonstrate that ESG Performance, Environmental Disclosure, Intellectual Capital, or Corporate Resilience are significant determinants of Firm Value, nor that Corporate Resilience provides a significant intervening pathway. Rather than implying that these factors are economically irrelevant, the results suggest that their benefits may depend on organizational capabilities, information credibility, industry conditions, and the ability to convert resources and practices into observable economic outcomes.

5. Conclusion and Suggestion

This study concludes that ESG Performance, Environmental Disclosure, and Intellectual Capital do not show statistically significant associations with Corporate Resilience, while Corporate Resilience also has no statistically significant association with Firm Value among Indonesian oil and gas companies during 2020–2024. Similarly, the direct relationships of

ESG Performance, Environmental Disclosure, and Intellectual Capital with Firm Value are not statistically significant at the 5% level, and the panel indirect association analysis provides no significant evidence that Corporate Resilience functions as an intervening mechanism. These findings suggest that sustainability-related practices and knowledge-based resources do not necessarily translate into measurable resilience or market value within the observed firms and period. The findings also indicate that the economic benefits of ESG-related practices may depend on firm-specific, industry, and market conditions. Therefore, firms should not view ESG practices and environmental disclosure solely as mechanisms for increasing market value, but also as part of longer-term organizational capabilities and risk management. Future managerial efforts may focus on strengthening the integration of ESG practices, environmental information, and intellectual resources into operational and strategic decision-making.

6. Limitations and Future Research

This study has several limitations that should be considered when interpreting the findings. First, the analysis is based on 16 oil and gas companies observed during 2020–2024, resulting in 80 firm-year observations, which limits the generalizability of the findings beyond the sampled firms and period. Second, the study focuses on a single industry whose environmental, regulatory, and market characteristics may differ from those of other sectors. Third, Corporate Resilience and Environmental Disclosure are operationalized using specific composite measures, and alternative measures may produce different results. Although firm-clustered robust inference, wild cluster bootstrap, and sensitivity analysis were employed to strengthen the robustness of the analysis, the relatively small number of firm-level clusters remains a consideration. Future research could extend the observation period, include other environmentally sensitive industries, employ alternative measures of Corporate Resilience and Environmental Disclosure, and examine additional firm-specific or institutional factors such as firm size, leverage, ownership structure, governance, and environmental uncertainty that may influence the relationships among ESG Performance, Corporate Resilience, and Firm Value.

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