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## **Compliance Over Capability: Digital Transformation, Resource Allocation Efficiency, and ESG Disclosure in Indonesia's Financial Sector**

**Fathiyyah Hasanah<sup>1</sup>, Siska Noviaristanti<sup>2\*</sup>**

<sup>1</sup>[fathiyyahhasanah@student.telkomuniversity.ac.id](mailto:fathiyyahhasanah@student.telkomuniversity.ac.id), <sup>2</sup>[siskamarhen@telkomuniversity.ac.id](mailto:siskamarhen@telkomuniversity.ac.id)

School of Economics and Business, Telkom University

\*Corresponding Author: Siska Noviaristanti

Email: [siskamarhen@telkomuniversity.ac.id](mailto:siskamarhen@telkomuniversity.ac.id)

### **ABSTRACT**

*Indonesian financial-sector issuers have rapidly increased ESG reporting compliance, yet whether this reflects genuine digital capability or mere adaptation to regulatory pressure remains unclear. Evidence linking digital transformation, resource allocation, and ESG outcomes is concentrated in voluntary-disclosure settings in developed and transitional markets, leaving the relationship largely untested under mandatory, standardized disclosure. This study tests whether digital transformation improves ESG disclosure among Indonesian financial firms, directly and through resource allocation efficiency (RAE) as a mediator. Using panel data from 30 firms over 2020-2024 (150 firm-year observations), digital transformation is measured via a codebook-based Digital Transformation Score from annual-report content analysis, RAE via Richardson's (2006) investment model, and ESG via a 26-indicator disclosure index from POJK No. 51/POJK.03/2017. Hypotheses are tested with two-way fixed-effects regression, cluster-robust errors, and Baron and Kenny/Sobel mediation tests. Contrary to expectations, digital transformation does not significantly improve ESG disclosure or resource allocation efficiency, resource allocation efficiency does not significantly improve ESG disclosure, and no mediated pathway is detected, holding across five robustness checks. Instead, ESG disclosure rises uniformly across firms over time, consistent with regulatory rather than firm-level drivers. ESG performance in Indonesian finance thus appears compliance-driven, not capability-driven, a boundary condition for resource-allocation-mediated models built in voluntary-disclosure markets. For regulators, raising compliance alone does not ensure sustainability quality; digital and ESG policy agendas should be integrated. For industry, digital investment should shift toward ESG-relevant decision-making, not customer-facing services alone.*

**Keywords:** *Compliance-Driven ESG, Digital Transformation, Emerging Market, Financial Sector, Panel Data, Resource Allocation Efficiency*

## INTRODUCTION

Between 2022 and 2024, the number of Indonesian issuers submitting sustainability reports rose from 505 to 724 to 917, an increase from approximately 61% to 80% and finally to nearly 97% of firms listed on the Indonesia Stock Exchange (IDX) (BEI, 2026; Jati et al., 2023; Kuswantoro et al., 2023; OJK, 2024). This is a striking compliance record for an emerging market. Yet the rise in disclosure quantity has not been matched by an equivalent rise in quality: among the fifty largest issuers by market capitalization, disclosure of Scope 1 and Scope 2 carbon emissions reached 93% in 2024, while disclosure of Scope 3 emissions, which covers indirect emissions across the value chain, reached only 28% (OJK, 2024). This asymmetry is particularly consequential for financial institutions, because the emissions a bank or insurer finances through its lending and investment portfolio, rather than the emissions from its own offices and operations, typically make up the larger share of its environmental footprint and increasingly affect how that institution is priced by capital markets (McNamara et al., 2025; Pasiouras et al., 2025). More broadly, a growing body of research cautions that rapid growth in disclosure volume under weak or newly introduced enforcement regimes can reflect symbolic compliance rather than substantive change in underlying practice (Ștefănescu & Suciu, 2026). The coexistence of near-universal formal compliance with limited substantive disclosure raises a basic question: does Indonesia's rapid ESG reporting growth reflect a genuine strengthening of firms' underlying sustainability capability, or does it primarily reflect adaptation to regulatory pressure?

Financial institutions occupy a strategic position in answering this question. As financial intermediaries, they allocate capital, price risk, and underwrite the activities of households, firms, and governments; because the sector is systemic, heavily regulated, and grounded in public trust, its conduct carries broad consequences for economic stability and sustainable development (Oanh & Dinh, 2024; OECD, 2022; Shan et al., 2023). In Indonesia, financial institutions face simultaneous pressure to raise operational efficiency, strengthen governance, and satisfy investor and regulator demands for transparency, pressures that are intensified by accelerating digitalization, intensifying competition from financial technology lenders and the tightening of sustainable-finance policy (Dilla et al., 2024; Hidayat-ur-Rehman & Hossain, 2025).

In parallel with the tightening of ESG regulation, Indonesian finance has undergone rapid digital transformation, particularly after the COVID-19 pandemic. On 26 October 2021, the Financial Services Authority (Otoritas Jasa Keuangan, hereafter OJK) launched the Digital Banking Transformation Blueprint (Cetak Biru Transformasi Digital Perbankan), a policy document covering five elements, namely data, technology, risk management, collaboration, and institutional arrangement, intended to accelerate digital transformation across the national

banking industry (Kristiyana et al., 2021). In principle, digitalization can improve transparency and information quality, reduce information asymmetry, and strengthen accountability; recent firm-level evidence supports this general mechanism, showing that digital transformation significantly enhances information transparency partly by reducing managerial myopia and increasing external monitoring (Gao et al., 2025). Beyond the financial sector specifically, Indonesian research has also documented how digital tools such as blockchain can enhance traceability and transparency across complex supply chains, a capability with clear relevance to the verification challenges underlying ESG (Alamsyah et al., 2023). At the same time, rapid digital adoption in Indonesian banking carries its own frictions: survey evidence shows that security concerns and inconsistent password-management behavior remain widespread among Indonesian mobile banking users, suggesting that digital adoption and digital trust do not automatically move together (Candiwan & Rianda, 2024). Whether greater technology adoption in Indonesian finance has in practice been accompanied by the integrated systems and effective data use required to manage ESG strategically, however, remains an open empirical question rather than an established fact; this study treats the connection as a gap to be tested, not as a premise to be assumed.

This gap is potentially sharpest in resource allocation. Resource allocation efficiency reflects a firm's ability to direct funds and assets to their most productive, value-adding uses while avoiding over- and under-investment (Richardson, 2006). Sustainable and green financing in Indonesia grew substantially over this period, from IDR 927 trillion in 2019, then equivalent to approximately 20% of total bank lending, to IDR 1,959 trillion in 2023, approximately 29% of total lending industry-wide (OJK, 2024). The absolute growth is therefore accompanied by a comparatively modest increase in relative share, suggesting that resource allocation toward sustainable activity has not kept pace with the scale of stated regulatory commitments.

Prior research offers competing accounts of how digitalization relates to sustainability. Using Chinese listed firms, Lu et al. (2024) find that digitalization transformation improves ESG performance by strengthening internal control and green innovation, while Duan and Zhang (2025) show that enterprise digital transformation raises resource allocation efficiency by optimizing human capital structure, fostering innovation, and mitigating information asymmetry. Sang et al. (2025) argue that the effect of digital transformation on ESG performance is often indirect, operating through internal mechanisms, especially resource allocation efficiency and the narrowing of technological gaps, rather than through a direct channel. Closer to the present setting, Siswanti et al. (2024) find that digital transformation supports sustainable business performance in Indonesia, but indirectly, through the mediating roles of corporate governance and financial performance rather than through a direct effect, a pattern this study's own findings later resonate with. Dalimunthe et al. (2025) show that governance mechanisms,

rather than ownership structure alone, drive green banking disclosure and its effect on return on equity among Indonesian banks, while Herdiana and Nugrahanti (2025) document that digital technologies, including big data analytics, artificial intelligence, and robotic process automation, are reshaping audit quality and governance structures in Indonesian accounting practice, though adoption remains uneven across firms. Most of the international evidence, however, comes from manufacturing and technology firms in developed or transitional markets, and the Indonesian studies cited above, while informative on governance, audit practice, and financial performance, do not directly test the digital transformation-resource allocation-ESG pathway in a mandatory-disclosure financial-sector setting.

Three considerations follow from this literature, presented here in order of importance. First, and most fundamentally, evidence on how digital transformation relates to ESG performance is concentrated in voluntary-disclosure settings in developed and transitional markets; how the relationship behaves in an emerging market with mandatory, standardized ESG disclosure, where firms cannot simply choose whether to report, is largely untested. This distinction matters empirically as well as theoretically: cross-country evidence shows that the capital market effects of ESG disclosure depend materially on whether reporting is mandated by government institutions rather than left to voluntary comply-or-explain regimes (Krueger et al., 2024), which is precisely the mandatory setting this study examines. Second, studies that position resource allocation efficiency as the mechanism linking digitalization to ESG outcomes, rather than testing a direct effect alone, remain scarce, particularly outside manufacturing. Third, this study contributes methodologically by measuring digital transformation through a codebook-based Digital Transformation Score (DTS) derived from content analysis of annual reports, an approach that has rarely been applied to Indonesian financial firms and that complements the survey- and index-based measures used in prior research. The study addresses these considerations using panel data from financial firms listed on the IDX over 2020-2024, a period selected because it captures both the acceleration of digital adoption following the COVID-19 pandemic and the intensifying enforcement of ESG disclosure requirements under POJK No. 51/POJK.03/2017, making it a period in which both forces operate concurrently rather than sequentially.

Accordingly, the study addresses four research questions: (1) How does digital transformation affect ESG performance? (2) How does digital transformation affect resource allocation efficiency? (3) How does resource allocation efficiency affect ESG performance? (4) Does resource allocation efficiency mediate the relationship between digital transformation and ESG performance? The corresponding objective is to test each of these relationships empirically in the Indonesian financial-sector context. Addressing these questions contributes to three literatures: first, the institutional conditions under which digital capability translates into sustainability outcomes; second, the mediating

mechanisms through which digital transformation affects ESG performance; and third, the empirical evidence on ESG in mandatory-disclosure emerging markets, a setting that remains underrepresented relative to voluntary-disclosure contexts in developed economies.

## LITERATURE REVIEW

Four theories jointly inform this study, each anchored to a specific link in the hypothesized causal chain rather than treated as a separate list. *The Resource-Based View* explains the first link: digital capability functions as a valuable, firm-specific strategic resource that raises governance transparency and disclosure quality, motivating a direct effect of digital transformation on ESG performance (H1) (Barney, 1991). *Dynamic Capabilities Theory* explains the second link: digital transformation is not merely a resource but a reconfiguration capability that allows a firm to redeploy capital toward more productive uses, motivating a direct effect of digital transformation on resource allocation efficiency (H2) (Teece et al., 1997). *Information Processing Theory* supplies the mechanism underlying this second link: digital technologies expand a firm's capacity to process complex, uncertain information, which reduces investment deviation by narrowing the information asymmetry between managers and capital providers (Duan & Zhang, 2025; Galbraith, 1973). *Stakeholder Theory* explains the third link: efficient resource use gives a firm the financial capacity to satisfy the sustainability expectations of a broad set of stakeholders, motivating a direct effect of resource allocation efficiency on ESG performance (H3) (Freeman, 2015). *Institutional theory* then qualifies all three links at once: under coercive regulatory pressure, firms converge on similar disclosure practices regardless of their underlying capability, so mandatory disclosure may compress inter-firm variation in ESG outcomes and attenuate the direct effects that the first three theories predict, an argument that becomes central to interpreting this study's results in the discussion section (DiMaggio & Powell, 1983).

The research model adapts Sang et al. (2025), who position resource allocation efficiency as an internal channel through which digital transformation improves ESG performance. This study deliberately omits their second mediator, the technological gap (TechGap), for a theoretical rather than a purely practical reason. In the Indonesian financial sector, regulatory guidance under the OJK's Digital Banking Transformation Blueprint has promoted a comparatively standardized baseline of digital infrastructure across banks, and recent evidence on Indonesian banking confirms that digital transformation outcomes in this sector are shaped more by how firms convert digital resources into capabilities than by unequal access to the underlying technology itself (Abdurrahman, 2025; Kristiyana et al., 2021). This reduces inter-firm technological heterogeneity as a source of variation. In parallel, the productivity literature holds that technology's benefits

require organizational complements rather than the technology gap alone, making resource allocation efficiency the more relevant internal mechanism to examine here (Syverson, 2011). Because ESG reporting in Indonesia is mandatory and uniform under POJK No. 51/POJK.03/2017, this institutional setting further reduces the salience of TechGap as a differentiator and reinforces resource allocation efficiency as the study's central mechanism (Mutia, 2025).

### **Hypothesis Development**

Digital transformation is expected to improve ESG performance because digital technologies enhance a firm's capacity to monitor, measure, and manage sustainability. From an information-processing perspective, big-data analytics and integrated systems allow environmental, social, and governance information to be processed more accurately and closer to real time; from a resource-based perspective, digital capability is a strategic resource that raises governance transparency and disclosure quality (Lu et al., 2024; Sang et al., 2025). This mechanism plausibly operates differently in Indonesian finance than in the manufacturing settings most of this literature is drawn from: financial-sector digital transformation is embedded in a specific regulatory architecture, mandatory ESG disclosure, and standardized digital-infrastructure guidance, which together shape how directly digital capability can translate into ESG outcomes in this sector (Abdurrahman, 2025). This caution is reinforced by evidence that digital adoption among Indonesian financial-service users is uneven in trust and security behavior, suggesting that customer-facing digitalization does not necessarily translate into the internal capability improvements H1 presupposes (Candiwan & Rianda, 2024). Thus:

#### **H1. Digital transformation has a positive effect on firm ESG performance.**

Digital transformation is also expected to raise resource allocation efficiency. Greater information-processing capacity reduces asymmetry and supports more accurate capital-allocation decisions, curbing over- and under-investment (Duan & Zhang, 2025). From a dynamic-capabilities perspective, technology-enabled reconfiguration allows firms to redeploy resources more optimally (Teece et al., 1997). In the financial sector specifically, digital capabilities enable more automated, data-driven credit assessment and capital allocation decisions that are harder to divert toward politically or managerially motivated lending, which improves the reallocation of capital toward lower-risk, higher-value uses (Wu et al., 2025). Thus:

#### **H2. Digital transformation has a positive effect on resource allocation efficiency.**

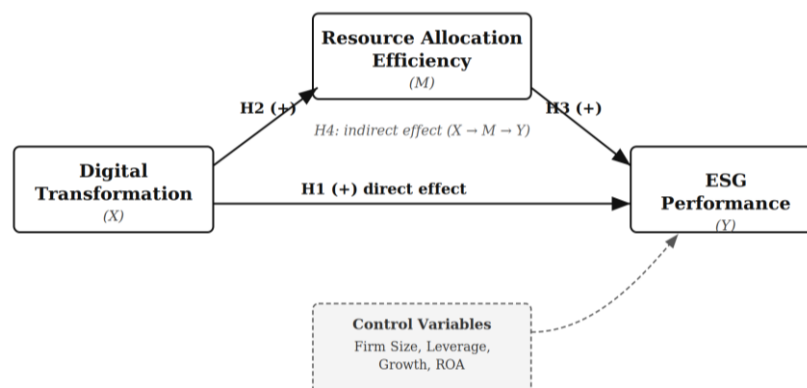
Firms that allocate resources efficiently should have greater financial capacity to fund sustainability initiatives. Under the Resource-Based View, efficient resource use enables firms to direct capital toward environmentally and socially valuable activities and stronger governance; recent evidence confirms that firms with higher investment efficiency tend to achieve better ESG outcomes because efficient capital allocation frees resources for sustainable and socially responsible initiatives (Wang et al., 2025). An alternative explanation should be acknowledged, however: efficient firms may instead be more financially disciplined and narrowly focused on return-maximizing projects, which could make them less inclined to direct resources toward ESG activities that do not have an immediate financial payoff. The net direction of this relationship is therefore an empirical question rather than a foregone conclusion, and the mandatory disclosure regime examined in this study provides one setting in which to test it. Thus:

**H3. Resource allocation efficiency has a positive effect on firm ESG performance.**

Integrating the preceding arguments, digital transformation is expected to influence ESG indirectly: by first improving resource allocation efficiency (H2), which in turn improves ESG performance (H3). This indirect pathway is the core of the model developed by Sang et al. (2025). Thus:

**H4. Resource allocation efficiency mediates the effect of digital transformation on firm ESG performance.**

Figure 1 presents the conceptual framework integrating the four hypotheses. Digital transformation is modelled as influencing ESG performance both directly (H1) and indirectly through resource allocation efficiency (H2 and H3), with the indirect pathway constituting the mediation hypothesis (H4). Firm size, leverage, growth, and return on assets are included as control variables.



**Figure 1.** Conceptual Framework  
Source: Adapted from Sang et al. (2025)

## RESEARCH METHODOLOGY

This study employs a quantitative, explanatory design using secondary panel data: the same 30 firms are observed repeatedly across 2020-2024 rather than as independent cross-sections. The population comprises financial-sector firms listed on the Indonesia Stock Exchange. A purposive sampling procedure requiring continuous listing, complete annual and sustainability reports over 2020-2024, and the exclusion of firms whose structure would distort the financial variables (e.g., a pure holding company and a subsidiary subject to double counting) yields a final sample of 30 firms and 150 firm-year observations. The 2020-2024 window was selected because it spans both the post-pandemic acceleration of digital adoption and the intensifying enforcement of ESG disclosure under POJK No. 51/POJK.03/2017.

The independent variable, digital transformation, is measured through a codebook-based Digital Transformation Score (DTS) (Duan & Zhang, 2025; Sang et al., 2025). A dictionary of 234 digital keywords, grouped into six categories (digital infrastructure and platforms; digital banking services and products; cyber security and digital governance; automation, data, and artificial intelligence; ecosystem, innovation, and digital transformation; and digital insurance and multifinance services), is applied to each annual report via text extraction, with DTS computed as the frequency of digital keywords relative to total report words. Because this is a frequency-based measure, DTS reflects digital-transformation density in reported narrative rather than implementation sophistication, a scope condition revisited in the Limitations section.

The mediating variable, resource allocation efficiency (RAE), is derived from Richardson's (2006) optimal-investment model: expected investment is estimated from lagged Tobin's Q, cash flow, leverage, growth, and size, with efficiency operationalized as the negative absolute residual ( $EFF = -|\varepsilon|$ ); values closer to zero indicate less deviation from optimal investment and therefore greater efficiency. Richardson's model was developed for non-financial firms, whose investment is dominated by fixed assets and capital expenditure rather than loans and financial assets; studies using this model typically exclude financial institutions for this reason. Applying it here is a deliberate extension, and the resulting imprecision in capturing financial-sector investment dynamics is acknowledged as a limitation.

The dependent variable is measured by a self-constructed disclosure index of 26 binary indicators (8 environmental, 10 social, 8 governance) derived from POJK No. 51/POJK.03/2017, with the score equal to fulfilled indicators divided by 26. This index measures whether a firm has disclosed information corresponding to each regulatory item, not whether it has achieved the underlying outcome. The variable is therefore more precisely an ESG disclosure score than an ESG performance score in the outcomes sense; the manuscript retains "ESG

performance” for consistency with the hypotheses and the adapted model, with this distinction stated explicitly here and carried through the Results and Discussion.

Firm size (natural log of total assets), leverage, growth, and return on assets serve as control variables. Growth is included because higher-growth firms require larger volumes of new investment, which mechanically widens the scope for over- or under-investment and must be held constant when isolating the effect of digital transformation on resource allocation efficiency.

**Table 1.** Operationalization of Variables

| Variable                           | Measurement                                                                                                                                               | Scale |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Digital Transformation (X)         | Digital Transformation Score (DTS) = (count of digital keywords / total annual-report words) $\times$ 100, from a 234-keyword codebook in six categories. | Ratio |
| Resource Allocation Efficiency (M) | EFF = $- \varepsilon $ from Richardson's (2006) expected-investment model (residual of actual on expected investment).                                    | Ratio |
| ESG Performance (Y)                | ESG score = fulfilled indicators / 26 binary indicators (8 E, 10 S, 8 G) under POJK No. 51/POJK.03/2017.                                                  | Ratio |
| Firm Size (control)                | Natural log of total assets.                                                                                                                              | Ratio |
| Leverage (control)                 | Total liabilities / total assets.                                                                                                                         | Ratio |
| Growth (control)                   | (Revenue <sub>t</sub> – Revenue <sub>t-1</sub> ) / Revenue <sub>t-1</sub> .                                                                               | Ratio |
| ROA (control)                      | Net income / total assets.                                                                                                                                | Ratio |

**Source:** Processed by the researchers (2026)

Because ESG and DTS are constructed through coding, their reliability is assessed through content validity and intercoder reliability rather than internal-consistency measures. All indicators and keywords are drawn directly from the regulatory framework and the digital-transformation literature, satisfying content validity. Intercoder reliability, computed on a 10% independently re-coded subsample, is strong: for ESG, prevalence-robust coefficients are almost perfect (PABAK = 0.851; Gwet AC1 = 0.917), correcting for the kappa paradox induced by high indicator prevalence; for DTS, agreement is almost perfect across coefficients (Cohen's  $\kappa$  = 0.895; PABAK = 0.896; Gwet AC1 = 0.896).

Hypotheses are tested with panel regression. Model selection follows the Chow, Hausman, and Breusch-Pagan LM tests. The Chow test rejects a pooled model ( $F(29,111) = 21.78$ ;  $p < 0.001$ ) and the LM test confirms significant random effects ( $\chi^2 = 174.13$ ;  $p < 0.001$ ). Although the Hausman test nominally fails to reject the random-effects model ( $\chi^2(9) = 9.27$ ;  $p = 0.412$ ), the identifying assumption of random effects, that individual effects are uncorrelated with regressors, is violated by a large negative correlation reaching  $-0.701$  in the RAE model; because this assumption is violated, the fixed-effects estimator is retained as the consistent choice regardless of the Hausman result. Given the pronounced, uniform time trend

in ESG disclosure, a two-way (firm and year) fixed-effects specification with cluster-robust standard errors at the firm level is adopted as the primary model, clustering being necessary because each firm is observed repeatedly over five years and firm-specific shocks are likely correlated across its own observations over time. Mediation is tested via the Baron and Kenny (1986) procedure and the Sobel test across three models: ESG on DTS; RAE on DTS; and ESG on DTS and RAE jointly. The Sobel test assumes normality of the indirect effect, an assumption bootstrapped confidence interval does not require; a bootstrapped robustness check (5,000 resamples) is recommended alongside it.

## RESULT AND DISCUSSION

The central finding of this study, developed across the analyses below, is that ESG disclosure in Indonesia's financial sector over 2020-2024 tracks uniform regulatory pressure rather than firm-level differences in digital capability or resource allocation efficiency: it is compliance-driven rather than capability-driven.

Table 2 reports descriptive statistics. The ESG score averages 0.877 with a standard deviation of 0.113 and is strongly left-skewed toward the ceiling, indicating that most financial firms already achieve high disclosure compliance; this ceiling later proves central to interpreting the null results below. DTS averages 0.292 with a standard deviation of 0.116 and is approximately normally distributed, so meaningful variation exists in the independent variable. RAE is negative by construction, ranging from  $-0.371$  to  $-0.0004$ : because EFF is defined as the negative absolute residual from the investment model, values nearer zero indicate less deviation from optimal investment and therefore greater efficiency. The contrast between adequate DTS variation and compressed ESG variation foreshadows the ceiling effect that shapes the regression results.

**Table 2.** Descriptive Statistics

| Variable      | Obs | Mean   | Std. Dev. | Min    | Max     |
|---------------|-----|--------|-----------|--------|---------|
| ESG Score (Y) | 150 | 0.877  | 0.113     | 0.462  | 1.000   |
| DTS (X)       | 150 | 0.292  | 0.116     | 0.043  | 0.615   |
| RAE (M)       | 150 | -0.030 | 0.048     | -0.371 | -0.0004 |
| Size          | 150 | 18.235 | 1.749     | 14.160 | 21.500  |
| Leverage      | 150 | 0.751  | 0.162     | 0.233  | 0.945   |
| Growth        | 150 | 0.074  | 0.247     | -0.405 | 2.036   |
| ROA           | 150 | 0.015  | 0.027     | -0.181 | 0.084   |

**Source:** Stata output, 2026

Table 3 presents the three two-way fixed-effects models. In Model 1, the direct effect of DTS on ESG is negative and insignificant ( $\beta = -0.078$ ;  $p = 0.337$ ), so H1 is rejected; no control variable is significant. Notably, the year effects for 2021-2024 are all significant and increase monotonically, evidence of a systemic, sector-wide rise in ESG disclosure consistent with intensifying enforcement of POJK 51/2017. In Model 2, DTS has no effect on RAE ( $\beta = 0.002$ ;  $p = 0.973$ ), so H2 is rejected; instead, RAE is driven by financial fundamentals, growth ( $\beta = -0.152$ ;  $p < 0.001$ ) and ROA ( $\beta = 0.354$ ;  $p = 0.002$ ), and the model explains within-firm variation well ( $R^2$  within = 0.630). This high explanatory power comes almost entirely from growth and ROA rather than DTS, indicating that resource allocation in this sector is disciplined by a firm's own financial fundamentals rather than by how digitally the firm presents itself in its annual report. In Model 3, RAE has no significant effect on ESG ( $\beta = -0.242$ ;  $p = 0.269$ ) and DTS remains insignificant ( $\beta = -0.078$ ;  $p = 0.365$ ), so H3 is rejected; the negative sign on RAE, though insignificant, is consistent with the mandatory-disclosure interpretation developed below, since it suggests firms do not need to be efficient to comply. Because neither the a-path (DTS→RAE) nor the c-path (DTS→ESG) is significant, the Baron-Kenny conditions for mediation are not met.

**Table 3.** Regression Results — Three Models (Two-Way Fixed Effects, Cluster-Robust SE)

| Variable              | Model 1: ESG = f(DTS) | Model 2: RAE = f(DTS) | Model 3: ESG = f(DTS, RAE) |
|-----------------------|-----------------------|-----------------------|----------------------------|
| DTS                   | -0.078 (0.337)        | 0.002 (0.973)         | -0.078 (0.365)             |
| RAE                   |                       |                       | -0.242 (0.269)             |
| Size                  | 0.028 (0.322)         | -0.024 (0.138)        | 0.022 (0.383)              |
| Leverage              | -0.053 (0.250)        | 0.091 (0.017)**       | -0.031 (0.430)             |
| Growth                | 0.012 (0.868)         | -0.152 (0.000)***     | -0.025 (0.498)             |
| ROA                   | 0.142 (0.493)         | 0.354 (0.002)***      | 0.228 (0.297)              |
| Year FE               | Yes                   | Yes                   | Yes                        |
| Cluster SE            | Yes                   | Yes                   | Yes                        |
| N                     | 150                   | 150                   | 150                        |
| R <sup>2</sup> within | 0.323                 | 0.630                 | 0.350                      |
| corr(u_i, Xb)         | 0.292                 | -0.701                | 0.253                      |
| Prob > F              | 0.000                 | 0.000                 | 0.000                      |

**Notes:** coefficients with p-values in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Source:** Stata output, 2026.

The findings are robust. Across five checks, heteroskedasticity-robust standard errors, cluster standard errors, exclusion of the most volatile firm (BNLI), a one-year lag of DTS, and winsorization of RAE, the DTS coefficient remains insignificant at the 5% level. The lagged specification ( $\beta = -0.100$ ;  $p = 0.155$ ) and the outlier-excluded specification ( $\beta = -0.164$ ;  $p = 0.082$ ) move p-values toward, but not below, conventional thresholds; this nuance matters because it shows the null result is not overwhelming, and a larger or longer panel could plausibly detect a small effect that this study is underpowered to confirm. The Sobel test corroborates the absence of mediation, with an indirect effect of  $-0.0005$  ( $z = -0.034$ ;  $p = 0.973$ ). Consequently, all four hypotheses are statistically unsupported, while the strong, monotonic year effects ( $F(4,111) = 5.03$ ;  $p < 0.001$ ) stand out as the dominant pattern in the data.

Four strands of evidence converge on the compliance-driven interpretation stated at the opening of this section: the DTS coefficient is insignificant across every specification and robustness scenario; within-firm variation in ESG is very narrow (standard deviation of 0.035); the year effects rise significantly and uniformly across all firms; and the mediated effect through resource allocation efficiency is effectively zero. This convergence gives confidence that the null result reflects an empirical reality rather than a methodological artifact.

The insignificance of H1 is best understood through the interaction of institutional pressure and a ceiling effect. Under POJK 51/2017, sustainability disclosure is mandatory and uniform, generating what institutional theory calls coercive isomorphism (DiMaggio & Powell, 1983): pressure from a common regulator pushes firms toward the same disclosure practices regardless of their underlying capability, so that firms converge on high disclosure regardless of their digital sophistication. With mean ESG disclosure already at 0.877 and most firms clustered near the ceiling of 1.000, the within-firm variation that a fixed-effects estimator relies on is compressed, leaving little room for digital capability to differentiate outcomes. The significant, monotonically increasing year effects are the quantitative signature of this uniform, regulation-driven improvement.

The insignificance of H2 suggests that digital transformation in Indonesian finance remains concentrated in customer-facing services and communication rather than in the core of capital-allocation decision-making, though this reading should be treated as an interpretation of the pattern rather than a directly tested claim. Resource allocation efficiency is instead governed by financial fundamentals, negatively by growth and positively by profitability, consistent with the view that allocation discipline reflects a firm's financial position more than its disclosed digital intensity. The insignificance of H3, in turn, suggests that in a mandatory regime ESG follows a logic of legitimacy toward regulatory pressure rather than a logic of internal efficiency, so that efficient firms are not systematically better ESG performers than less efficient ones.

Because both constituent paths are absent, the mediation hypothesis (H4) cannot hold. This is theoretically the most consequential result: it establishes a boundary condition for the model of Sang et al. (2025). Stated explicitly, their resource-allocation-mediated pathway appears to operate under voluntary, competitive disclosure, where firms differentiate themselves to signal quality to investors, but not under mandatory, uniform disclosure, where the regulatory floor itself does the work that firm-level capability would otherwise have to do. The finding cautions against transferring models across institutional contexts without adaptation, and it aligns with evidence that, in Indonesia, the benefits of digital transformation for sustainability are more likely to travel through alternative institutional channels such as corporate governance and financial performance (Siswanti et al., 2024).

These results should be read as context-dependent rather than as evidence that digital transformation is irrelevant to sustainability. In more mature markets with competitive, quality-oriented ESG regimes, digital capability has been shown to advance ESG outcomes and allocation efficiency. Indonesia, as an emerging market with a still-consolidating ESG framework, exhibits a different pattern in which regulatory factors dominate capability factors at this stage. The implication is a non-linear, institutionally moderated relationship: under a young mandatory-disclosure regime, the effect of digital capability on ESG is muted by the regulatory floor itself; as ESG standards mature from disclosure-based to quality- and impact-based requirements, firm-level digital capability may become the differentiator that this study's data, still early in that transition, cannot yet detect.

On the direct digital-transformation-to-ESG link, the null H1 result contradicts Lu et al. (2024) and Sang et al. (2025), who find that digitalization improves ESG performance among Chinese listed firms operating under a comparatively more voluntary and competitive disclosure regime. It also contradicts Duan and Zhang (2025), whose Chinese sample shows digital transformation raising resource allocation efficiency, a link this study's H2 does not reproduce among Indonesian financial firms. Rather than treating this contradiction as a weakness, it is more accurately read as evidence that the Chinese findings do not travel unchanged into a mandatory, standardized-disclosure, single-sector emerging-market setting; the mechanism these studies document appears to require room for firms to differentiate themselves, room that Indonesia's compliance floor largely removes. The same logic extends to Wang et al. (2025), whose U.S. evidence links investment efficiency to better ESG outcomes: this study's null H3 suggests that relationship, too, is conditional on a disclosure regime where efficient firms have something to gain from signaling quality, a condition largely absent under POJK 51/2017.

At the same time, this study extends rather than contradicts Sang et al. (2025) at the model level, since the mediation pathway they propose is not falsified so much as bounded: it appears to operate specifically under voluntary, competitive

disclosure, and this study is, to the authors' knowledge, among the first to test and identify that boundary condition empirically in a mandatory-disclosure emerging market. In a related sense, this study extends Krueger et al. (2024), who show that the capital-market effects of ESG disclosure depend on whether reporting is mandated; the present findings add a firm-capability dimension to that argument, showing that mandatory disclosure does not just change market pricing of ESG information but also compresses the firm-level variation that would otherwise let capability-based theories like the *Resource-Based View* or *Dynamic Capabilities Theory* predict anything.

Finally, the findings offer direct empirical support for two lines of reasoning raised earlier. They support Ștefănescu and Suci (2026) caution that rapid growth in disclosure volume under a still-consolidating enforcement regime can reflect symbolic compliance rather than substantive change, since the uniform, ceiling-level disclosure documented here is difficult to explain any other way once digital capability and resource efficiency are both ruled out as drivers. They also support Herdiana and Nugrahanti (2025) observation, drawn from Indonesian accounting practice, that digital-technology adoption remains uneven and often concentrated in narrower functional applications rather than embedded across core decision-making, a pattern consistent with this study's reading of why DTS fails to move resource allocation efficiency. Together, these points of contradiction, extension, and support locate the study's contribution precisely: not in overturning the digital-transformation-ESG literature, but in showing where and why its predictions stop holding once disclosure becomes mandatory rather than chosen.

## CONCLUSION

This study examined whether digital transformation improves ESG disclosure in Indonesian financial firms, directly and through resource allocation efficiency, using two-way fixed-effects panel regression on 150 firm-year observations. Contrary to expectations, all four hypotheses are unsupported: digital transformation does not significantly affect ESG disclosure ( $\beta = -0.078$ ;  $p = 0.337$ ) or resource allocation efficiency ( $\beta = 0.002$ ;  $p = 0.973$ ); resource allocation efficiency does not significantly affect ESG disclosure ( $\beta = -0.242$ ;  $p = 0.269$ ); and it does not mediate the digital-transformation-ESG relationship (Sobel  $z = -0.034$ ;  $p = 0.973$ ). Rather than a failure to find an effect, this is a substantive finding in its own right: it reveals that ESG disclosure in this sector is driven by regulation rather than by digital capability, evidenced by significant and steadily rising year effects ( $F(4,111) = 5.03$ ;  $p < 0.001$ ) that stand out as the dominant pattern in the data.

The study makes three contributions. Its primary theoretical contribution is establishing a boundary condition for the resource-allocation-mediated model of Sang et al. (2025): the pathway does not hold under mandatory, uniform disclosure, which provides empirical support for an institutional reading of ESG disclosure in

emerging markets. Methodologically, the study contributes a demonstration that two-way fixed effects are necessary in sustainability panels spanning periods of regulatory change, since without year controls the uniform ESG uptrend would bias the coefficients of other regressors, and it contributes a transparent, codebook-based DTS with strong intercoder reliability applied for the first time to Indonesian finance.

Practically, the findings suggest distinct implications. For regulators, uniform mandatory reporting has successfully raised compliance, but advancing genuine sustainability quality requires integrating the digital and sustainability agendas, for example by linking digital-reporting infrastructure requirements to ESG data verification standards, rather than pursuing them separately. For industry, the results argue for redirecting digital transformation investment from customer-facing digitalization toward decision intelligence embedded in ESG risk management and data-based impact measurement, where the actual capability gap identified in this study lies. For investors and analysts, they caution against treating the intensity of digital narrative in annual reports as a proxy for genuine digital quality, and argue instead for demanding verifiable evidence of implementation, such as system audits or third-party assurance, when assessing a financial firm's digital or ESG claims.

The study has limitations. The sample of 150 firm-year observations from 30 firms is modest and specific to a single country and a single sector, so the findings should be generalized cautiously beyond Indonesian financial-sector firms. Most consequentially, the DTS proxy captures the intensity of disclosed digital narrative rather than the quality of actual implementation, a limitation that bears directly on the interpretation of the null H1 and H2 results and should be weighed accordingly. Future research could overcome this by surveying firms directly to capture implementation quality, or by using case studies to trace the process through which digital capability might translate into ESG outcomes; it could also test alternative mediating channels more suited to the Indonesian context, notably governance and financial performance, conduct cross-country comparisons across emerging markets with differing ESG regimes, and extend the observation window to detect effects that may emerge only as digital implementation matures.

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