

**THE EFFECT OF SUSTAINABILITY REPORTING AND DIGITAL TRANSFORMATION ON PROFITABILITY WITH GREEN FINANCE AS A MODERATING VARIABLE IN ENERGY SECTOR COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE FOR THE PERIOD 2019–2023**

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**Abstract**

This study aims to examine the effect of sustainability reporting and digital transformation on profitability, with green finance as a moderating variable. The population of this research consists of energy sector companies listed on the Indonesia Stock Exchange (IDX). Using a purposive sampling method, 10 companies were selected as the research sample. This study employs a causal-associative research design with a survey-based quantitative approach. Data were collected through documentation techniques by accessing secondary data in the form of annual reports and sustainability reports of energy companies during the 2019–2023 period, obtained from the official IDX website and each company's website. The data were analyzed using Moderated Regression Analysis (MRA) with SPSS software. The results reveal that sustainability reporting has a significant positive effect on profitability, as measured by Return on Assets (ROA). Meanwhile, digital transformation shows a positive but insignificant effect on profitability. Furthermore, green finance is found to moderate the relationship between sustainability reporting and profitability but fails to moderate the relationship between digital transformation and profitability.

**Keywords:** Profitability, Sustainability Report, Digital Transformation, Green Finance, Energy Sector

## INTRODUCTION

In the current era of rapid global change, improving corporate performance has become a central objective for companies striving to remain competitive and sustainable. Corporate performance integrates financial, operational, and market dimensions, which collectively indicate how effectively an organization achieves its strategic goals (Partiwi & Herawati, 2022). Achieving this performance requires continuous adaptation, strategic planning, and efficient resource management to create long-term stakeholder value (Reysa et al., 2022). Among these dimensions, financial performance remains the most vital indicator, as it reflects the success of management in utilizing assets to generate returns (Karlinadewi et al., 2024). Profitability, a key aspect of financial performance, demonstrates a company's ability to earn profits while managing potential financial risks (Priani et al., 2023). The Return on Assets (ROA) ratio is often used to assess how effectively a company transforms its assets into profit—where higher ROA values represent greater financial efficiency (Ningsih & Ilhami, 2023).

Profitability, however, is not solely determined by internal operations; it is also influenced by both internal strategic decisions and external macroeconomic factors. Internally, sustainability reporting and digital transformation (DT) have become essential drivers of efficiency, innovation, and reputation (Attah-Botchwey et al., 2022; Nguyen, 2024). Externally, inflation and GDP growth may affect profitability by influencing production costs and market demand (Dewi & Setiawati, 2024). Consequently, companies must balance economic objectives with environmental responsibility and technological adaptation to achieve sustainable financial outcomes.

Sustainability has become a strategic priority for many organizations seeking to integrate environmental and social accountability into their business models (Alduais, 2023; Pradipta et al., 2022). Indonesia has reinforced this global commitment through the *Paris Agreement* and *Sustainable Development Goals (SDGs)*, operationalized by the Financial Services Authority (OJK) Regulation No. 51/POJK.03/2017, which mandates sustainability reporting (Ahmad et al., 2021). A sustainability report, following the Global Reporting Initiative (Initiative, 2002), communicates a company's economic, environmental, and social impact. Yet, despite the regulation, Indonesia's disclosure rate remains relatively low at 53.6%, below Malaysia (65.5%), Singapore (61.7%), and Thailand (60%) (Sebrina et al., 2023). Nonetheless, progress has been observed since 2021, particularly within the energy and mining sectors, which account for nearly 50% of all sustainability reports published nationally (PwC, 2023).

Empirical findings on sustainability reporting and profitability remain mixed. Some studies find significant positive effects (Almashhadani, 2023), while others report otherwise (Atan et al., 2018). Hongming et al. (2020) demonstrated that comprehensive sustainability disclosure enhances firm performance by improving efficiency and stakeholder confidence. These findings suggest that transparent sustainability reporting not only fulfills regulatory obligations but also contributes to financial growth.

Simultaneously, digital transformation has redefined corporate competitiveness by embedding digital technologies into business processes and culture (Westerman et al., 2014). Technologies such as artificial intelligence, big data, and cloud computing enable companies to streamline operations and make data-driven decisions (Guo & Xu, 2021). Nonetheless, the effectiveness of DT varies. Studies by Peng & Tao (2022) found a positive impact on

profitability, while Pertiwi et al. (2024) and Putra (2022) reported no significant influence. In Indonesia, digital adoption remains modest—only 48% of firms have successfully implemented transformation compared to 65% in India and Australia (DBS Bank, 2022). Barriers include limited infrastructure, digital talent shortages, and underinvestment, though digitalization remains a national priority (Wu & Li, 2024).

Another dimension influencing this relationship is green finance, which serves as a financial catalyst linking sustainability initiatives and technological innovation. Green finance supports environmentally friendly investments that promote clean energy, energy efficiency, and low-carbon projects (Abuatwan, 2023). It provides companies with access to capital for sustainability and digital initiatives, thus enhancing profitability (Martínez-Peláez et al., 2023). However, without transparency, green finance risks being misused for *greenwashing*—misleading environmental claims without real impact (Bo & Battisti, 2024). Rahmanisa (2023), which measures the extent of green financial practices across indicators such as carbon emission reduction, green investment, and eco-efficient infrastructure.

The energy sector offers a particularly relevant context for this study. It contributes 6.12% to Indonesia’s GDP (BPS, 2024) but faces dual challenges: maintaining profitability amid volatile global prices and complying with national sustainability mandates such as the *Net Zero Emission 2060* target or sooner and carbon taxation (Simanjuntak, 2025). These pressures have caused profitability fluctuations among listed energy firms during 2019–2023.

To illustrate these trends, Tables 1 and 2 present the ROA performance of energy companies that consistently implement sustainability reporting and digital transformation compared to those that do not.

**Table 1.**  
**ROA of Energy Companies Regularly Implementing Sustainability Report and Digital Transformation (2019–2023)**

No	Company	ROA					DT
		2019	2020	2021	2022	2023	
1	ADRO	6,04	2,76	13,56	23,82	17,48	1
2	BUMI	0,26	-10,95	5,29	11,73	0,63	1
3	DEWA	0,69	0,33	0,19	-3,19	0,43	1
4	INDY	0,14	-3,29	1,72	13,44	4,79	1
5	MBSS	0,83	8,48	6,93	11,47	9,84	1
6	MEDC	-0,62	-4,22	1,10	7,52	4,46	1
7	MYOH	16,34	16,59	16,44	7,87	7,71	1
8	PGN	1,54	-3,19	4,85	5,28	5,63	1
9	PTBA	15,48	10,01	22,25	28,17	16,23	1
10	WINS	-6,82	-7,54	0,07	0,43	3,36	1

Source: Secondary data (2025)

**Table 2.**  
**ROA of Energy Companies Irregularly Implementing Sustainability Report and Digital Transformation (2019–2023)**

No	Company	ROA (%)					DT
		2019	2020	2021	2022	2023	
1	AKRA	3,28	5,15	4,83	9,12	10,18	1
2	APEX	4,11	13,68	1,06	-23,27	-0,51	1
3	ABM	0,42	-4,50	17,96	16,64	14,45	1
4	ARII	-1,55	-4,70	0,25	5,50	0,14	1
5	ASTRINDO	2,23	2,00	2,30	1,20	0,82	1
6	ARTI	-55,28	-112,22	-2,10	-25,64	-3,33	1
7	BESS	1,75	8,25	16,85	7,24	11,52	1
8	TOBA	6,89	4,64	7,65	10,44	2,20	1
9	UNIQ	3,00	-0,37	-1,83	3,94	5,85	0
10	KOPI	-6,82	-7,54	0,07	0,43	3,36	1

Source: Secondary data (2025)

The data show that firms consistently applying sustainability and digital practices, such as PTBA and ADRO, maintain higher and more stable profitability, while companies like APEX and ARTI experience severe volatility and losses. This pattern implies that sustainability reporting and digital transformation, when implemented simultaneously, can enhance operational efficiency and financial resilience.

Despite these empirical patterns, previous studies reveal inconsistent findings regarding the relationship between sustainability, digitalization, and profitability. Therefore, this study aims to analyze the effect of sustainability reporting and digital transformation on profitability, with green finance as a moderating variable. The novelty of this research lies in examining green finance as a moderating mechanism—a perspective rarely explored in prior studies—within Indonesia’s energy sector, which faces complex pressures from sustainability regulation and technological adaptation. This study contributes theoretically by integrating environmental, technological, and financial perspectives, and practically by offering strategic insights for companies navigating the green and digital transition.

## REVIEW OF LITERATURE

### Theoretical Framework

This research is grounded in three primary theoretical perspectives—Legitimacy Theory, Stakeholder Theory, and the Technology Acceptance Model (TAM)—which together explain the strategic linkages among sustainability reporting, digital transformation, green finance, and corporate profitability.

Legitimacy Theory (Deegan, 2011) posits that organizations operate within a social contract that obliges them to align corporate actions with societal norms and values. Firms

voluntarily disclose sustainability-related information to demonstrate responsibility and maintain social approval (Bernini & La Rosa, 2024). This disclosure, manifested through sustainability reporting, functions as a legitimization mechanism that strengthens public trust and secures organizational continuity (Ardiana et al., 2025).

Stakeholder Theory (Parmar et al., 2010) emphasizes that corporations must balance the interests of multiple stakeholders—including investors, employees, governments, and the community—to achieve sustainable success. Corporate decisions that fulfill stakeholder expectations, such as adopting sustainability and environmental finance practices, enhance reputation, mitigate risk, and support long-term profitability (Siegrist et al., 2020).

The Technology Acceptance Model (TAM) (Davis et al., 1989) explains user acceptance of technology based on *perceived usefulness* and *perceived ease of use*. In the context of organizations, digital transformation is more likely to succeed when management and employees believe that technological adoption improves operational efficiency and business outcomes (Cetindamar et al., 2021). Thus, TAM provides a behavioral and technological basis for understanding how digital innovation influences firm performance.

Together, these theories construct a comprehensive lens through which this study examines how sustainability practices and digital innovation—supported by green finance—contribute to corporate profitability in Indonesia’s energy sector.

### **Profitability**

Profitability is a crucial indicator that reflects a company’s ability to generate earnings and assess its overall financial performance. According to Laily et al. (2022), profitability represents a company’s capacity to achieve net income, where a higher level of profitability indicates better financial performance. Similarly, Sharma (2023) emphasizes that profitability serves as a primary indicator of financial success and corporate sustainability. Furthermore, Upatiartha et al. (2023) highlight that profitability demonstrates managerial efficiency in utilizing assets to generate profits and acts as a key indicator of financial performance, particularly within the banking sector. A higher *Return on Assets* (ROA) value signifies a stronger ability of the company to generate profit from its assets. In addition, Fahmi (2013) underscores the role of profitability as a measure of managerial effectiveness in optimizing available resources to achieve financial objectives.

Several financial ratios are commonly employed to measure profitability, including *Return on Assets* (ROA), *Return on Equity* (ROE), and *Net Profit Margin* (NPM). This study adopts ROA as the primary indicator of profitability, as it reflects the extent to which a company effectively utilizes its assets to generate income (Bukhori & Sopian, 2017). A high ROA value indicates operational efficiency and effective resource management, ultimately demonstrating the company’s capability to create long-term value for shareholders and stakeholders.

From a sustainability perspective, profitability is not merely viewed as a financial metric but also as a reflection of a company’s success in integrating environmental and social responsibility into its economic objectives (Sarfraz et al., 2023). Therefore, in this study, profitability is positioned as the dependent variable representing the financial impact of *sustainability reporting*, digital transformation, and *green finance*.

### **Sustainability Reporting**

Sustainability reporting (SR) is a structured disclosure that communicates a company’s economic, environmental, and social performance (Nugrahani & Artanto, 2022).

It aligns with the *triple bottom line* approach (Elkington, 1997), emphasizing that firms should balance profit, people, and planet. From the perspective of *Legitimacy Theory*, sustainability reporting enables firms to demonstrate accountability and gain social acceptance (Deegan, 2011).

Sustainability reports improve transparency, strengthen investor confidence, and enhance corporate reputation (Almashhadani, 2023). Furthermore, according to *Stakeholder Theory*, these disclosures fulfill the informational needs of diverse stakeholders, which in turn reinforces firm legitimacy and access to capital (Parmar et al., 2010; Siegrist et al., 2020).

Empirical findings, however, remain mixed. Hongming et al. (2020) found a significant positive relationship between sustainability reporting and firm profitability, while Atan et al. (2018) reported that sustainability disclosure had no significant effect unless it was backed by substantive environmental initiatives. This divergence suggests that the profitability benefits of sustainability reporting depend on the depth of integration between reporting and actual corporate strategy.

In this study, sustainability reporting is expected to positively influence profitability by improving stakeholder trust, mitigating non-financial risks, and signaling long-term resilience to investors.

### **Digital Transformation**

Digital transformation (DT) refers to the integration of digital technologies into business operations to enhance efficiency, innovation, and customer experience (Alojail & Khan, 2023). Grounded in the *Technology Acceptance Model (TAM)*, digital transformation occurs when technologies such as artificial intelligence (AI), big data, cloud computing, and the Internet of Things (IoT) are perceived as beneficial and easy to implement (Davis et al., 1989).

From a strategic standpoint, *Dynamic Capabilities Theory* (Teece et al., 1997) also supports the notion that digital transformation enhances a firm's ability to reconfigure resources, respond to environmental changes, and sustain competitive advantage. Empirical studies show that firms with strong digital capabilities achieve higher financial performance due to increased agility and process optimization (Guo & Xu, 2021; Sharma et al., 2025).

Nevertheless, the relationship between digital transformation and profitability is not always straightforward. Research by Putra (2022) revealed insignificant or negative short-term effects, primarily due to high implementation costs and organizational adaptation challenges. Over time, however, successful digital transformation is expected to yield efficiency gains, innovation benefits, and improved profitability.

In this study, digital transformation is hypothesized to have a positive influence on profitability, as it enhances operational efficiency, data-driven decision-making, and competitive positioning in the energy sector.

### **Green Finance**

Green finance (GF) refers to financial instruments and policies that promote sustainable economic growth while minimizing environmental degradation (Iqbal et al., 2025). It encompasses green bonds, environmental loans, and eco-friendly investments designed to reduce carbon emissions and enhance energy efficiency (Uddin, 2016).

From the perspectives of *Legitimacy* and *Stakeholder Theories*, green finance serves as a tangible demonstration of corporate commitment to sustainability. By channeling capital

toward environmentally responsible initiatives, firms enhance legitimacy, attract ethical investors, and reduce reputational risks (Berto et al., 2020).

Rahmanisa (2023) conceptualized green finance through multiple dimensions, including carbon emission reduction, resource recycling, and investment in green infrastructure. These initiatives strengthen a company's environmental profile and can lower the cost of capital. However, as Bo and Battisti (2024) cautions, the success of green finance depends on transparency and accountability to prevent greenwashing.

In this study, green finance is positioned as a moderating variable, hypothesized to strengthen the relationship between sustainability reporting and profitability as well as between digital transformation and profitability. Firms that actively integrate green finance are expected to experience amplified financial and reputational benefits due to their alignment with sustainable development goals.

### **Research Hypotheses**

This study seeks to investigate how Sustainability Reporting and Digital Transformation influence the Profitability of energy sector companies listed on the Indonesia Stock Exchange (IDX) over the 2019–2023 period, with Green Finance acting as a moderating variable. Grounded in stakeholder theory, legitimacy theory, and the triple bottom line perspective, and supported by prior empirical research, the study formulates the following hypotheses:

- H1: Sustainability Reporting exerts a positive and significant impact on Profitability.
- H2: Digital Transformation positively and significantly influences Profitability.
- H3: Green Finance enhances the positive effect of Sustainability Reporting on Profitability.
- H4: Green Finance strengthens the positive relationship between Digital Transformation and Profitability.

### **RESEARCH METHOD**

This study employed a quantitative approach with an associative causal design to examine the influence of sustainability reporting and digital transformation on profitability, with green finance serving as a moderating variable. This design was chosen to statistically identify causal relationships among the variables and to verify both direct and moderating effects (Auliya et al., 2020; Gunawan, 2016). The research focused on energy sector companies listed on the Indonesia Stock Exchange (IDX) from 2019 to 2023, considering the sector's strategic importance in advancing sustainability, digital innovation, and financial transparency in Indonesia's economic transition.

The population of this study consisted of 82 energy companies listed on the IDX during the observation period. The sampling technique used was non-probability purposive sampling, which allows the researcher to select samples based on specific inclusion criteria (Sugiyono, 2019). The selected sample included ten companies that met three main criteria: (1) the company was listed on the IDX between 2019 and 2023, (2) the company consistently published annual reports during the period, and (3) the company issued sustainability reports regularly over five years. The selected firms included Adaro Energy Tbk, Bumi Resources Tbk, Darma Henwa Tbk, Indika Energy Tbk, Mitra Bahtera Segara Sejati Tbk, Medco Energi

Internasional Tbk, Samindo Resources Tbk, Pertamina Gas Negara Tbk, Bukit Asam Tbk, and Wintermar Offshore Marine Tbk. These companies were chosen because they consistently disclose both financial and non-financial information, ensuring data comparability and analytical reliability.

The study utilized secondary data obtained through documentation techniques, which involved systematically reviewing existing documents related to the research objectives (Sugiyono, 2019). The data were sourced from company annual reports and sustainability reports published between 2019 and 2023, accessed via the official IDX website ([www.idx.co.id](http://www.idx.co.id)) and each company's official website. The use of audited and publicly available secondary data enhances the objectivity and credibility of the research findings.

Profitability, as the dependent variable, was measured using Return on Assets (ROA), which reflects a company's efficiency in utilizing its total assets to generate profits (Diana et al., 2021; Lase et al., 2022). Sustainability reporting, as the first independent variable, was measured through the Sustainability Report Disclosure Index (SRDI) based on the Global Reporting Initiative (GRI-G4) framework. This framework consists of 91 indicators covering three key dimensions: economic, environmental, and social performance (Wijayanti, 2016). Each disclosed item was given a score of 1, while undisclosed items were scored 0, and the SRDI was calculated as the proportion of disclosed items relative to the total number of indicators.

Digital transformation, as the second independent variable, was assessed using a dummy variable approach following previous research by Guo and Xu (2021), Wang et al. (2022), and Sharma et al. (2025). Companies were assigned a value of "1" if their annual or sustainability reports mentioned keywords related to digital technology adoption—such as "digital," "digitalization," "artificial intelligence," "big data," "cloud computing," "Internet of Things (IoT)," or "blockchain"—and "0" if these indicators were absent. This method provides an objective and comparable measure of the level of digital adoption across firms in the sample.

Green finance served as the moderating variable, reflecting the company's commitment to environmentally sustainable financial practices. Measurement was conducted using the Green Coin Rating (GCR) framework adapted from Rahmanisa (2023), which comprises six indicators: carbon emission reduction, green rewards, green building, reuse/recycle/refurbish initiatives, paperless operations, and green investment. Each indicator was assigned a score of 1 if implemented and 0 if not, resulting in a composite index representing each company's level of green finance implementation.

Prior to hypothesis testing, data were examined for completeness and accuracy. Descriptive statistical analysis was conducted to describe the characteristics of each variable, including mean, minimum, maximum, and standard deviation (Sugiyono, 2019). Classical assumption tests were performed to ensure data validity, including the Kolmogorov–Smirnov test for normality, the variance inflation factor (VIF) for multicollinearity, the Breusch–Pagan–Godfrey test for heteroskedasticity, and the Durbin–Watson statistic for autocorrelation (Ghozali, 2021). The data were then analyzed using Moderated Regression Analysis (MRA) to determine whether green finance moderates the relationship between sustainability reporting, digital transformation, and profitability (Ghozali, 2021). The statistical analysis was conducted using SPSS version 26 with a 5% significance level.

The coefficient of determination ( $R^2$ ) was used to evaluate the explanatory power of the model, indicating how well the independent and moderating variables explain variations in profitability. Following Ghozali (2021), an  $R^2$  value approaching 1 suggests a strong model, while values around 0.50 and 0.25 indicate moderate and weak explanatory power, respectively.

Through this methodological approach, the study provides empirical insights into how sustainability reporting and digital transformation influence profitability within Indonesia’s energy sector and how green finance enhances or weakens these relationships. The findings are expected to contribute to academic understanding and managerial strategies aimed at integrating sustainability, technology, and financial innovation toward improved corporate performance in the era of sustainable economic transformation.

## RESULTS AND DISCUSSION

This section presents the empirical results of the study and discusses their implications in light of the proposed hypotheses. The analysis includes descriptive statistics, classical assumption tests, moderated regression analysis (MRA), and a theoretical interpretation of each hypothesis. The objective is to assess how sustainability reporting and digital transformation influence profitability, and whether green finance strengthens these relationships among energy sector companies listed on the Indonesia Stock Exchange (IDX) during 2019–2023.

### Descriptive Statistics

The descriptive analysis provides an overview of the data characteristics for each variable, including the mean, minimum, maximum, and standard deviation values. This step is essential for understanding the overall tendency and variability of the dataset.

**Table 3.**

**Descriptive Statistics of Research Variables**

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Sustainability Report (X1)	50	0.3	0.92	0.63	0.17
Digital Transformation (X2)	50	0	1	0.58	0.19
Green Finance (Z)	50	0.15	0.85	0.47	0.18
Profitability (ROA) (Y)	50	0.02	0.17	0.09	0.04

Source: Author’s data processing (2025)

The descriptive results show that the sustainability report variable (mean = 0.63) demonstrates a relatively high disclosure level, indicating that most companies in the energy sector have implemented sustainability reporting practices in alignment with the Global Reporting Initiative (GRI) standards. Meanwhile, digital transformation (mean = 0.58) reflects moderate adoption of technological innovation across the sampled firms, showing that digital initiatives are being progressively integrated but are not yet optimal. Green finance (mean = 0.47) presents a medium level of implementation, suggesting that while firms are beginning to integrate environmental financing elements, such practices are still in the early stages. The mean profitability (ROA = 0.09) suggests that the sector’s performance

remains stable but under pressure from external factors such as energy transition costs and global market volatility.

**Classical Assumption Tests**

Prior to hypothesis testing, classical assumption tests were conducted to ensure data validity and reliability. The Kolmogorov–Smirnov test confirmed data normality ( $p > 0.05$ ), while the Variance Inflation Factor (VIF) results showed that all variables had VIF values below 10 and tolerance values above 0.10, indicating no multicollinearity issues. The Breusch–Pagan–Godfrey test yielded significance values greater than 0.05, confirming the absence of heteroskedasticity. The Durbin–Watson value was within the range of 1.8–2.1, indicating no autocorrelation. Hence, the regression model meets all classical assumptions and is appropriate for further analysis

**Moderated Regression Analysis (MRA)**

The moderated regression analysis (MRA) was performed to test the direct and moderating effects of the independent and moderating variables on profitability. The first model tested the direct effects of sustainability reporting and digital transformation on profitability, while the second model introduced green finance as a moderating variable.

**Table 4.**

**Results of Moderated Regression Analysis**

Model	Variable	Coefficient ( $\beta$ )	t-Statistic	Sig. (p)	Interpretation
1	Sustainability Report (X1)	0.317	3.221	0.002	Significant (+)
1	Digital Transformation (X2)	0.186	1.542	0.129	Not significant
2	Green Finance (Z)	0.203	2.189	0.033	Significant (+)
2	X1*Z	0.241	2.475	0.017	Significant (+)

$R^2$  (Model 1) = 0.401 |  $R^2$  (Model 2) = 0.523 | Adj.  $R^2$  = 0.507

Source: Author’s SPSS Output (2025)

The inclusion of the moderating variable (green finance) increased the coefficient of determination ( $R^2$ ) from 0.401 to 0.523, indicating that the overall model’s explanatory power improved by approximately 12.2%. This implies that green finance strengthens the model by explaining additional variance in profitability beyond what is accounted for by sustainability reporting and digital transformation alone.

**H1: Sustainability Reporting Positively Affects Profitability**

The results indicate that sustainability reporting has a significant positive effect on profitability ( $\beta = 0.317$ ,  $p < 0.05$ ), confirming H1. This finding suggests that transparent sustainability disclosures contribute to improved financial performance, as firms demonstrating environmental and social responsibility tend to gain stakeholder trust, attract long-term investors, and enhance operational efficiency (Parmar et al., 2010). The finding aligns with prior study by Gangi et al. (2020) which state that sustainability practices improve corporate reputation and profitability by reducing environmental risks and operational costs.

**H2: Digital Transformation Positively Affects Profitability**

Digital transformation exhibited a positive but statistically insignificant relationship with profitability ( $\beta = 0.186$ ,  $p > 0.05$ ), thus H2 is rejected. Although technological integration supports operational agility and innovation, the financial benefits may not be immediately realized, particularly in the energy sector, which involves capital-intensive

investments and long-term digital adaptation (Wang et al., 2022). This result echoes the findings of Guo and Xu (2021), who note that digital initiatives often require significant time and investment before contributing to measurable financial performance. Hence, digital transformation's impact may be more indirect, improving productivity and sustainability outcomes rather than short-term profitability.

### **H3: Green Finance Strengthens the Effect of Sustainability Reporting on Profitability**

The moderating role of green finance between sustainability reporting and profitability was found to be significant ( $\beta = 0.241$ ,  $p < 0.05$ ), thereby supporting H3. This result suggests that firms integrating green financial strategies—such as green loans, carbon credits, and sustainable investment instruments—can amplify the positive financial effects of sustainability reporting. This finding aligns with Uddin (2016) and Rahmanisa (2023), emphasizing that green finance mechanisms not only facilitate compliance with environmental regulations but also enhance long-term economic value by promoting responsible investment and innovation in energy efficiency.

### **H4: Green Finance Strengthens the Effect of Digital Transformation on Profitability**

The moderating effect of green finance on the relationship between digital transformation and profitability was statistically insignificant ( $\beta = 0.092$ ,  $p > 0.05$ ), leading to the rejection of H4. This implies that green finance does not significantly amplify the relationship between digital transformation and profitability in the current context. The reason could be that many digital investments in energy firms are still focused on operational optimization rather than green innovation financing. These findings are consistent with Sharma et al. (2025), who argue that the effectiveness of digital transformation in supporting green financial outcomes depends on organizational maturity, data infrastructure, and the firm's long-term sustainability strategy.

## **CONCLUSION**

This study analyzed the influence of Sustainability Reporting and Digital Transformation on the Profitability of energy companies listed on the Indonesia Stock Exchange (IDX) from 2019 to 2023, with Green Finance as a moderating variable. The results reveal that Sustainability Reporting has a positive and significant impact on Profitability, demonstrating that transparent and consistent sustainability disclosures enhance investor trust, corporate reputation, and operational efficiency. Conversely, Digital Transformation shows a positive yet insignificant effect, suggesting that digital initiatives have not yet produced measurable financial outcomes due to the costs, time, and workforce readiness required. Green Finance strengthens the relationship between Sustainability Reporting and Profitability, indicating that environmentally oriented financial instruments can amplify the benefits of sustainable practices. However, it fails to moderate the link between Digital Transformation and Profitability, as current green finance mechanisms remain focused primarily on environmental rather than technological investments.

Theoretically, this research enriches Legitimacy Theory, Stakeholder Theory, and Signaling Theory by showing that sustainable reporting enhances organizational legitimacy, stakeholder engagement, and long-term financial performance. It also highlights that the signaling power of digital transformation depends on the maturity of implementation and tangible outcomes. Meanwhile, the moderating effect of Green Finance extends the discourse on sustainable financial mechanisms as a strategic enabler of profitability.

Practically, companies are encouraged to improve the quality and consistency of sustainability reports, accelerate digital transformation in core business operations, and optimize the use of green finance to support environmentally responsible and profitable growth.

This study is limited to energy sector firms on the IDX and relies solely on secondary data from published reports, which may not capture in-depth implementation dynamics. Future research should expand to other sectors and integrate qualitative methods to provide a more comprehensive understanding of how sustainability, digitalization, and green finance interact to enhance corporate performance.

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