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BRIDGING TECHNOLOGY AND SUSTAINABILITY: EMPIRICAL INSIGHTS INTO GREEN FINTECH-DRIVEN ACCOUNTING PRACTICES

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Abstract

This study examines the role of Green Financial Technology (Green Fintech) in promoting sustainable accounting practices among publicly listed companies in Indonesia. Using a quantitative approach with secondary data from sustainability reports and ESG disclosures, the study evaluates the impact of Green Fintech adoption on corporate transparency and environmental performance. The analysis reveals that the integration of digital financial solutions—such as green investment platforms, ecological data analytics, and blockchain-based reporting—contributes significantly to improving ESG performance, carbon disclosure, and the adoption of circular economy practices. Furthermore, stakeholder engagement mediates the relationship between Green Fintech and firm performance, while the implementation of circular economy principles strengthens this link. This research contributes to the growing body of literature on sustainable accounting by presenting an empirical model that highlights the strategic value of digital environmental innovation. The findings offer practical implications for corporate managers, regulators, and Fintech developers seeking to enhance sustainable value creation in emerging economies.

Keywords*: Green Fintech, Sustainability Accounting, ESG, Circular Economy, Financial Performance*
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INTRODUCTION

In recent years, sustainability accounting has emerged as a critical element in corporate reporting, reflecting a global shift toward responsible environmental, social, and governance (ESG) practices. As regulatory demands and investor expectations intensify, firms are increasingly required to disclose not only financial performance but also their contributions to sustainable development. However, traditional accounting systems often lack the agility and transparency needed to capture complex environmental and social data. In this context, Green Financial Technology (Green Fintech) has gained traction as a promising innovation that integrates digital finance with sustainability goals, offering a transformative tool for enhancing environmental accountability in the corporate sector.

Green Fintech refers to the application of financial technology to support environmentally sustainable practices. This includes innovations such as blockchain-based sustainability reporting,

digital carbon tracking, green investment platforms, and ESG analytics. These tools enable companies to automate environmental disclosures, track sustainability metrics more accurately, and enhance stakeholder trust. Particularly in emerging markets like Indonesia, where regulatory enforcement of environmental disclosure remains uneven, Green Fintech has the potential to bridge institutional gaps and strengthen sustainability performance at scale.

The primary objective of this research is to empirically examine the impact of Green Fintech adoption on sustainability accounting practices among publicly listed companies in Indonesia. The study aims to analyze the direct influence of Green Fintech on environmental disclosure, investigate the mediating role of stakeholder engagement, and assess how circular economy practices moderate the relationship between Green Fintech and firm performance. This integrated framework responds to the growing need for empirical evidence linking digital innovation to sustainability outcomes in corporate settings.

This study makes several contributions to the existing literature. Theoretically, it advances the discourse on the intersection between digital transformation and sustainability accounting by offering an empirical model that incorporates ESG, Fintech, and circular economy principles. It extends prior research by embedding stakeholder theory and the Resource-Based View (RBV) to explain how firms can leverage Green Fintech as a strategic asset for sustainable value creation. Practically, this research provides actionable insights for corporate decision-makers, sustainability officers, and Fintech developers seeking to align digital innovation with environmental goals.

The novelty of this study lies in its focus on the underexplored nexus between Green Fintech and accounting practices within the sustainability context. While previous studies have addressed ESG disclosure or Fintech adoption separately, this research bridges the two by empirically demonstrating how Green Fintech tools can enhance environmental transparency and firm performance. Furthermore, it contextualizes the analysis within the Indonesian capital market—an emerging economy with evolving sustainability frameworks—thereby contributing unique regional insights to the global literature.

The empirical results of this study reveal that Green Fintech adoption significantly improves the quality and scope of sustainability reporting among firms. This effect is partially mediated by stakeholder engagement and amplified by the presence of circular economy practices. Firms that actively integrate Green Fintech solutions into their accounting and disclosure processes demonstrate higher ESG scores, better compliance with sustainability standards, and stronger investor confidence. These outcomes suggest that digital innovation, when strategically aligned with environmental goals, can serve as a key driver of sustainable corporate performance.

Based on these findings, the study recommends that regulatory bodies encourage the integration of Green Fintech into corporate sustainability frameworks through incentives and digital infrastructure support. Firms are also advised to invest in capacity-building for digital sustainability tools and foster collaboration with Fintech providers to enhance transparency and accountability. In conclusion, this study reinforces the transformative potential of Green Fintech in reshaping sustainability accounting and accelerating the transition toward responsible corporate governance in emerging markets.

LITERATURE REVIEW AND HYPOTHESES

The intersection of digital transformation and environmental sustainability has opened new research directions in the accounting field, especially through the lens of Green Financial Technology (Green Fintech). Rooted in the Resource-Based View (RBV) theory, firms that possess and utilize unique digital capabilities—such as ESG data systems, green analytics platforms, and blockchain-based disclosure tools—can achieve sustainable competitive advantages (Majid et al., 2022a). The RBV argues that resources must be valuable, rare, inimitable, and organized to yield superior performance. Green Fintech fits this framework by offering firms the ability to gather, manage, and disclose environmental data in ways that are more efficient and credible than traditional systems

Miglionico (2022). Moreover, stakeholder theory reinforces the notion that organizations should consider the expectations of a broader set of stakeholders, including environmental advocates and socially conscious investors. Digital sustainability platforms facilitate transparency and accountability to these groups, ultimately enhancing corporate legitimacy (Gleißner et al., 2022).

Empirical studies have demonstrated a significant link between digital innovation and ESG performance. Wang et al. (2022) using evidence from emerging markets, find that Fintech development enhances corporate ESG performance by providing tools that allow for improved environmental monitoring and reporting. Ahmad et al. (2022) show that financial technologies, when combined with green openness, result in better environmental outcomes across developing economies. Similarly, (Nasreen et al., 2023) argue that technological progress plays a critical role in enabling environmental sustainability by improving institutional quality and governance. These studies support the premise that Green Fintech adoption may positively influence corporate sustainability accounting by improving the quality, frequency, and integrity of environmental disclosures.

In line with these findings, several scholars have emphasized the direct application of digital platforms to sustainability accounting systems. For example, Laique et al. (2023) provide evidence that environmental management systems supported by digital technologies can significantly improve the breadth and credibility of circular economy disclosures. Rehman & Holý (2022) further suggest that green and sustainable technological innovation can serve as key drivers for environmental performance, particularly when they are institutionalized in accounting and reporting functions. Majid et al. (2022) argue that the integration of environmental accounting into corporate strategies enhances transparency and aligns with stakeholder interests. Based on these insights, the following hypothesis is proposed:

H1: Green Fintech adoption has a positive effect on sustainability accounting performance in public companies

While the direct relationship between Fintech and sustainability reporting is critical, the role of stakeholder engagement as a mediating variable has also been explored in recent literature. Nasreen et al. (2023) indicate that environmental progress driven by technology requires inclusive and participatory institutional mechanisms. Engagement with regulators, customers, communities, and investors ensures that digital tools are used not only for compliance but also for value co-creation. Miglionico (2022) notes that advanced digital platforms allow for real-time stakeholder interaction in the context of climate risk management and environmental transparency. In this light, stakeholder engagement is positioned not as a passive outcome but as an active channel that enhances the efficacy of Green Fintech implementation. This leads to the second hypothesis:

H2: Stakeholder engagement mediates the relationship between Green Fintech and firm performance

In addition to stakeholder mediation, the integration of circular economy practices is hypothesized to moderate the effectiveness of Green Fintech on firm performance. Laique et al. (2023) argue that firms with extensive circular economy strategies—such as product redesign, closed-loop production, and waste reduction—derive greater benefits from digital sustainability systems. Puschmann et al. (2020) emphasize that green Fintech solutions help quantify the impact of circular strategies by providing lifecycle data, resource use indicators, and carbon accounting metrics. In a related study, Rehman & Holý (2022) find that digital platforms enable continuous improvement and innovation in green logistics and production, which are core to circular economy adoption. When circular practices are well-established, the contribution of Green Fintech to firm performance is expected to be significantly stronger. Thus, the final hypothesis is:

H3: Circular economy practices positively moderate the effect of Green Fintech on firm performance, such that the effect is stronger when circular practices are more prevalent

METHODS

Research Design

This study employs a quantitative, explanatory research design aimed at examining the relationship between Green Fintech adoption and sustainability accounting performance in publicly listed companies in Indonesia. The research framework is grounded in the Resource-Based View and stakeholder theory, which form the conceptual foundation for analyzing the direct, mediating, and moderating effects among variables. The study utilizes secondary data from company annual reports, sustainability reports, and ESG disclosures collected from public companies listed on the Indonesia Stock Exchange (IDX) between 2020 and 2023. This approach enables the empirical testing of hypotheses concerning Green Fintech, stakeholder engagement, circular economy practices, and corporate performance.

Population and Sample

The population of this study includes all publicly listed companies in Indonesia that publish sustainability reports and disclose ESG-related information in accordance with GRI or OJK guidelines. Using purposive sampling, the selected sample consists of 120 companies across sectors that are most exposed to environmental regulations—namely, manufacturing, energy, basic materials, and consumer goods. These sectors were chosen because they tend to have higher environmental impacts and are more likely to adopt Green Fintech innovations in response to increasing sustainability demands (Laique et al., 2023; Rehman & Holý, 2022).

Table 1. Sample Distribution by Sector (IDX-validated categories)

Sector	Number of Firms
Basic Materials	20
Consumer Non-Cyclicals	15
Consumer Cyclicals	15
Energy	10
Healthcare	10
Industrials	20
Infrastructures & Utilities	10
Technology & Telecommunications	10
Transportation and Logistics	10
Total	**120**

Source: Processed from IDX and company sustainability reports (2025)

Data Collection and Instrument Development

Data were collected from publicly available corporate reports, including annual reports, sustainability disclosures, and ESG reports published between 2020 and 2023. To assess the extent of Green Fintech adoption, a coding instrument was developed based on indicators such as the use of digital carbon tracking tools, blockchain-based ESG systems, green crowdfunding platforms, and AI-driven environmental analytics. The presence of stakeholder engagement initiatives was measured through qualitative content analysis of stakeholder-related disclosures. For circular economy practices, the indicators included lifecycle assessment, product redesign, waste reduction, and resource efficiency disclosures—drawn from frameworks found in Puschmann et al. (2020) and Laique et al. (2023).

Instrument validity was ensured through expert judgment and prior benchmarking studies. Three independent reviewers validated the coding structure based on previously published frameworks in green finance and sustainability accounting (Majid et al., 2022; Miglionico, 2022).

Data Analysis Technique

Data were analyzed using Structural Equation Modeling (SEM-PLS) with SmartPLS 4.0. This technique was chosen due to its robustness in analyzing complex models with latent variables and its suitability for smaller sample sizes. The model includes one independent variable (Green Fintech adoption), one mediating variable (stakeholder engagement), one moderating variable (circular economy practices), and one dependent variable (firm sustainability performance).

Descriptive statistics and Pearson correlation were used to test assumptions and check preliminary relationships. The SEM-PLS analysis followed a two-step approach: first, assessing the measurement model for reliability and validity (composite reliability, AVE, discriminant validity), and second, evaluating the structural model to test path coefficients, mediation, moderation, and model fit. Bootstrapping with 5,000 samples was conducted to determine the significance levels of all hypotheses.

RESULT

Table 2. Descriptive Statistics

Variable	Mean	Standard Deviation	Min	Max
Green Fintech Adoption	3.87	0.65	2.5	5.0
Sustainability Accounting	4.12	0.58	3.1	5.0
Stakeholder Engagement	3.95	0.62	2.7	5.0
Circular Economy Practices	3.76	0.71	2.9	4.9
Firm Performance	4.03	.59	3.0	5.0

Source: Processed in 2025

The results of the descriptive statistics indicate a relatively high level of Green Fintech adoption among Indonesian public companies (M = 3.87, SD = 0.65), suggesting that digital sustainability tools have begun to be integrated into business processes and reporting. Sustainability accounting also shows a strong average score (M = 4.12), implying a growing institutional response to ESG reporting pressures. Likewise, stakeholder engagement (M = 3.95) and circular economy practices (M = 3.76) are moderately implemented, while firm performance (M = 4.03) shows consistency across the sample.

Table 3. Correlation Matrix

	Green Fintech	Sustainability Accounting	Stakeholder Engagement	Circular Economy	Firm Performance
Green Fintech	1.0	0.52	0.47	0.38	0.44
Sustainability Accounting	0.52	1.0	0.51	0.42	0.59
Stakeholder Engagement	0.47	0.51	1.0	0.36	0.53
Circular Economy	0.38	0.42	0.36	1.0	0.49
Firm Performance	0.44	0.59	0.53	0.49	1.0

Source: Processed in 2025

The correlation matrix confirms a significant and positive relationship among all variables. Notably, Green Fintech is moderately correlated with Sustainability Accounting (r = 0.52) and Firm Performance (r = 0.44), providing initial support for the notion that technological transformation is a meaningful enabler of sustainability initiatives. These findings are consistent with Wang et al.

(2022) who demonstrate that Fintech adoption in emerging markets contributes directly to ESG effectiveness. Similarly, Puschmann et al. (2020) argue that the digitalization of environmental accounting processes enhances corporate transparency and operational agility.

Hypothesis 1: Green Fintech → Sustainability Accounting

The results indicate a significant positive effect of Green Fintech adoption on sustainability accounting performance. This finding validates H1, confirming that companies leveraging green digital technologies are more likely to exhibit robust and credible sustainability accounting systems. This is in line with Laique et al. (2023), who argue that digital environmental management tools support comprehensive disclosures, especially when integrated with circular practices. Miglionico (2022) further emphasizes that regulatory technology (RegTech) enhances firms' climate risk reporting capacities, thereby reinforcing accounting accuracy and relevance.

This result also aligns with the Resource-Based View (RBV) which asserts that digital capabilities are valuable, rare, and difficult to imitate—positioning Green Fintech as a strategic resource that enhances accounting quality and environmental accountability. The adoption of blockchain ESG platforms, AI for carbon tracking, and real-time ESG dashboards exemplifies how technology underpins modern sustainability accounting.

Hypothesis 2: Mediation of Stakeholder Engagement

The analysis supports H2, revealing that stakeholder engagement partially mediates the relationship between Green Fintech and firm performance. Companies that invest in digital sustainability systems often use them to strengthen transparency and communication with stakeholders, as also noted by Rehman & Holý (2022) These tools help firms understand stakeholder concerns, improve responsiveness, and build legitimacy, particularly in industries with high environmental exposure.

Stakeholder theory provides a strong theoretical foundation here. Firms that meet the informational needs of diverse stakeholders tend to secure greater trust and long-term support. Nasreen et al. (2023) also highlight that inclusive engagement—enabled by digital platforms—has a significant role in transforming ESG policies into value-generating strategies. This confirms that stakeholder engagement is not merely a compliance exercise but a critical path through which technology can influence financial and environmental outcomes.

Hypothesis 3: Moderation by Circular Economy Practices

The results also support H3, indicating that circular economy practices positively moderate the relationship between Green Fintech and firm performance. Firms with embedded circular strategies—such as lifecycle analysis, resource efficiency, and product redesign—derive greater performance gains when they adopt digital sustainability technologies. This is consistent with findings from Laique et al. (2023) and Puschmann et al. (2020) who argue that circular orientation amplifies the impact of digital systems by embedding them into core business processes.

These results suggest that Green Fintech is most effective when adopted within a strategic sustainability framework, rather than as a standalone reporting enhancement. Firms with strong circular capabilities can better leverage Fintech tools to monitor, evaluate, and improve their resource loops, leading to performance advantages and environmental stewardship. Thus, digital and circular synergies create a compound effect, validating the theoretical integration of RBV and institutional logic in this context.

Theoretical and Practical Contributions

From a theoretical standpoint, this study extends the Resource-Based View by incorporating digital sustainability capabilities as critical resources in the ESG domain. It also enriches stakeholder theory by evidencing the mediating role of engagement practices in the digital–sustainability nexus. Practically, the findings suggest that firms should not only adopt Green

Fintech but also institutionalize stakeholder dialogues and embed circular principles to fully realize environmental and financial benefits.

The results further contribute to the growing discourse on digital accountability, demonstrating that Fintech platforms can serve as both operational and governance tools in sustainability transformation. As firms face increasing pressures for transparency, integrating digital infrastructure into accounting systems becomes not just beneficial—but essential.

CONCLUSION

This study investigates the integration of green fintech into sustainability accounting practices and its impact on corporate environmental performance in Indonesian public companies. The findings confirm that digital financial innovation, when aligned with environmental objectives, serves as a critical driver in enhancing environmental accountability and sustainability reporting quality. The results show that companies that embed green fintech tools—such as automated ESG data systems, blockchain-based traceability, and digital carbon tracking—tend to exhibit higher environmental disclosure and resource efficiency, in line with prior studies emphasizing the digital transformation of sustainable finance (Wang et al., 2022; Ma et al., 2023).

From a theoretical standpoint, this research contributes to the evolving discourse on circular economy and digital sustainability by demonstrating how green fintech acts as a technological enabler that bridges financial innovation and environmental management systems. It extends prior frameworks by embedding fintech into the sustainability accounting paradigm, reinforcing the idea that financial technologies are no longer neutral tools, but value-laden infrastructures shaping corporate behavior (Puschmann et al., 2020; Miglionico, 2022).

Practically, these findings are valuable for regulators, corporate strategists, and technology developers. For regulators, the results indicate a need to establish standardized metrics and compliance frameworks to incentivize responsible fintech deployment in ESG reporting. For corporations, investing in green fintech systems may not only reduce compliance costs but also enhance stakeholder trust and long-term resilience. Additionally, fintech developers can use these insights to design accounting and reporting applications that explicitly address sustainability indicators.

Despite its contributions, this research is not without limitations. First, the study relies on secondary data from financial and sustainability reports, which may not fully capture real-time integration of fintech tools. Second, while the study focuses on public companies listed on IDX, it does not explore similar practices in SMEs or state-owned enterprises, where fintech adoption dynamics might differ. Third, the cross-sectional design limits causal inference, and future studies could adopt longitudinal or experimental designs to explore dynamic changes.

Future research could explore comparative studies between sectors with high digital maturity (e.g., banking, technology) and those with lagging digital adaptation (e.g., agriculture, extractive industries). Moreover, qualitative case studies can provide deeper insight into how managers perceive and implement green fintech systems in everyday accounting practices. There is also an opportunity to investigate the interplay between fintech governance mechanisms and environmental risk disclosure to develop a more holistic framework for digital sustainability assurance.

In conclusion, the integration of green fintech into sustainability accounting is not merely a technical shift but a strategic transformation. As Indonesia and other emerging economies advance their green transition, embedding digital tools in environmental reporting will be pivotal for ensuring transparency, stakeholder accountability, and ecological resilience.

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