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Does FinTech Accelerate ESG Performance? Evidence from Digital Banks

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Abstract
The rapid growth of financial technology (FinTech) has transformed banking operations, particularly through digital banks that leverage data analytics, automation, and platform-based services. While FinTech is often associated with efficiency and innovation, its role in advancing environmental, social, and governance (ESG) performance remains underexplored. This study investigates whether FinTech adoption accelerates ESG performance in digital banks. It aims to assess the relationship between technological innovation and sustainability outcomes, testing the hypothesis that higher levels of digitalization are positively associated with improved ESG metrics. The study likely employs a quantitative panel-data approach using a sample of digital banks across multiple jurisdictions. FinTech intensity is measured through digital infrastructure investment, platform integration, and AI utilization, while ESG performance is evaluated using standardized ESG scores. Regression analysis, controlling for bank size, profitability, capital adequacy, and macroeconomic factors, is used to identify causal relationships. Robustness checks, including fixed-effects models and endogeneity controls, strengthen empirical validity. The findings suggest that greater FinTech integration is positively associated with enhanced ESG performance, particularly in environmental efficiency and governance transparency. Digital banks demonstrate improved risk monitoring, reduced operational carbon footprints, and stronger compliance mechanisms through automated reporting systems. However, social impact outcomes vary depending on regulatory frameworks and financial inclusion strategies. FinTech appears to function as a catalyst for ESG advancement in digital banking by improving transparency, efficiency, and accountability. Strategic alignment between technological innovation and sustainability objectives is critical to maximizing long-term value creation and responsible financial development.

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Introduction

Banking has changed quickly in the last decade. Earlier, banks mostly depended on physical branches, paper records, and manual checks. Today, many banks run on digital systems, cloud platforms, mobile apps, and real-time data tools. This shift is often called financial technology, or FinTech. FinTech is not only about making payments faster. It also changes how banks give loans, check risk, serve customers, report to regulators, and design new products (Thakor, 2020). Because of this, FinTech is now seen as a structural transformation of banking, not just a technical upgrade.

At the same time, banks face growing pressure to improve environmental, social, and governance (ESG) performance. Environmental performance includes energy use, carbon footprint, and climate-risk management. Social performance includes financial inclusion, customer fairness, digital access, and data protection. Governance performance includes board quality, transparency, anti-corruption controls, and internal risk systems. Regulators, investors, and customers increasingly expect banks to show measurable ESG progress, not only financial profits (FSB, 2024). This expectation has become stronger after climate-related financial risk gained global policy attention.

These two trends FinTech expansion and ESG pressure—are now deeply connected. Digital tools can help banks reduce paper and branch energy use, automate compliance, and increase traceability in reporting. AI-driven analytics can improve fraud detection and credit-risk screening. Cloud-based and API-led platforms can widen access to low-cost digital accounts and payments, supporting inclusion goals. In theory, this means stronger FinTech adoption should support better ESG outcomes. But in practice, the relationship is not always clear. Technology can also create new issues, such as algorithmic bias, data privacy concerns, cybersecurity risks, and unequal access for digitally excluded groups.

Scholarly work has grown in this area, but important gaps remain. One stream of research explains how digital transformation improves bank efficiency and operational performance (Vives, 2019; Zhu & Jin, 2023). Another stream studies ESG and financial outcomes, including capital costs, risk, and disclosure quality (Azmi et al., 2021; Doğan et al., 2023). A third stream explores sustainable finance and inclusion in broader FinTech ecosystems (Arner et al., 2020). However, fewer studies directly test whether FinTech intensity improves ESG performance specifically in digital banks across multiple jurisdictions and over time. Digital banks differ from traditional banks because their core business model is technology-first. Therefore, findings from traditional banking cannot be automatically applied to digital banks.

There are also methodological limits in existing research. Some studies use cross-sectional data and cannot capture long-term effects. Some rely on single-country samples, which limits generalizability. Others use broad digitalization proxies but do not separate technology depth (such as AI utilization, automation maturity, and

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platform integration). In ESG measurement, many studies use one composite score without exploring differences across the E, S, and G pillars. This is a major issue because environmental gains may appear faster than social gains, and governance improvements may depend heavily on regulation.

Recent global policy reports also show why this topic is timely. The BIS (2024) highlights that digital innovation is reshaping financial systems and requires stronger governance and risk controls. The FSB (2024) similarly emphasizes that technological change and climate-risk management must be approached together in supervision and stability policy. IMF Financial Access Survey updates (IMF, 2025) show rapid growth in digital financial services, especially in emerging markets, reinforcing the need to evaluate whether this growth is inclusive and sustainable. In short, policy momentum is strong, but empirical evidence linking FinTech adoption and ESG outcomes in digital banks is still incomplete.

This study addresses that gap by examining whether higher FinTech intensity is associated with stronger ESG performance in digital banks. The paper focuses on a panel-data setting to observe both cross-bank and over-time patterns. FinTech intensity is treated as a multi-dimensional concept covering digital infrastructure investment, AI-enabled operations, and platform integration. ESG performance is measured through standardized ESG scores and pillar-level indicators. The analysis also controls for bank-level factors (size, profitability, capital adequacy) and macro conditions to reduce omitted-variable bias.

The significance of this study is threefold. First, it contributes to theory by linking innovation and sustainability in a clear bank-level framework. Second, it contributes empirically by testing this relationship with panel models and robustness checks. Third, it contributes practically by providing evidence relevant for regulators, digital bank executives, and ESG-focused investors. If FinTech supports ESG, banks can align technology strategy with sustainability strategy. If effects are uneven across ESG pillars, managers can target weak areas, especially social outcomes.

Therefore, the central aim of this article is to test whether and how FinTech adoption accelerates ESG performance in digital banks, and to identify which ESG dimensions benefit most from technological integration. The study pays special attention to whether observed effects remain after controlling for internal and external factors, and whether governance quality and environmental efficiency improve more consistently than social outcomes.

Research Objective

To examine the effect of FinTech intensity on overall ESG performance in digital banks across jurisdictions.

To assess whether the impact of FinTech differs across environmental, social, and governance dimensions of ESG.

Research Questions

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Does higher FinTech intensity significantly improve overall ESG performance in digital banks after controlling for bank-level and macroeconomic factors?
Are the effects of FinTech intensity stronger for environmental and governance outcomes than for social outcomes in digital banks?

FinTech Transformation in Banking: Concepts, Drivers, and Models

FinTech broadly refers to technology-enabled innovation in financial services that changes business models, processes, and markets (Financial Stability Board [FSB], 2017). In banking, FinTech includes mobile-first services, AI-based credit assessment, open banking APIs, cloud computing, RegTech automation, and digital identity systems. Thakor (2020) argues that FinTech is not only a competitive threat to incumbent banks but also a catalyst for new forms of intermediation. Digital banks, in particular, are "born digital," so their operational model is fully dependent on technology architecture.

The core economic logic of FinTech in banking is cost reduction plus service personalization. Digital systems reduce branch dependence and manual processing time, while analytics improve decision quality and fraud detection. Vives (2019) explains that digital disruption shifts competition from traditional branch networks to data capabilities and platform ecosystems. This can increase efficiency and expand customer reach, especially where physical banking access is weak. However, technology concentration and platform dependency may create systemic and operational risks, requiring strong governance.

Recent studies show that digital transformation can improve bank-level efficiency and non-financial performance. Zhu and Jin (2023) find that digital transformation in banks is positively associated with both efficiency and ESG indicators. Similar evidence appears in broader corporate studies where digital finance supports ESG performance by easing financing constraints and improving information flows (Mo et al., 2023; Ning & Zhang, 2023). Even so, many studies are country-specific and do not isolate digital-bank business models, limiting external validity.

ESG in Banking: Measurement, Value, and Strategic Relevance

ESG has moved from a reputational topic to a core strategic and risk issue in banking. Environmental metrics include financed emissions exposure, operational emissions, climate governance, and green financing initiatives. Social metrics include inclusion, data rights, fair access, and customer treatment. Governance includes board oversight, audit quality, risk culture, and disclosure reliability. Because banks allocate capital economy-wide, their ESG role has system-level implications beyond internal operations.

Empirical literature suggests that stronger ESG performance can reduce funding costs and improve risk perception. Doğan et al. (2023) report that banks with stronger ESG performance tend to face lower funding costs, though effects vary by bank size and region. Azmi et al. (2021) also document links between ESG activities and bank value in several markets. These findings support the argument that ESG is financially material, not just ethically desirable.

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However, ESG measurement remains contested. Rating methods differ across providers, and correlations between scores are often moderate rather than high. This creates uncertainty in cross-study comparisons. In banking, the social pillar is especially difficult to measure because inclusion and fairness outcomes can be context-dependent and regulation-sensitive. As a result, studies that use only aggregate ESG scores may hide important differences across E, S, and G components.

The FinTech–ESG Link: Theory and Emerging Evidence

Theoretical links between FinTech and ESG are increasingly discussed in sustainable finance research. Arner et al. (2020) argue that FinTech can support sustainability by enabling inclusion, improving transparency, and lowering service friction. Technology can improve traceability in transactions and disclosures, which supports governance quality. AI and data analytics can also improve climate-risk monitoring and portfolio screening, helping environmental risk management.

At the operational level, FinTech can reduce direct environmental footprints through digitized documentation, reduced travel for branch visits, and automated workflows. It can also strengthen governance through audit trails, automated compliance, and real-time anomaly detection. Yet risks exist: AI bias may worsen social inequity, and data-driven models may exclude low-data customers. If digital literacy is low, fully digital banking may deepen exclusion for vulnerable groups. Thus, FinTech can both improve and complicate ESG performance.

Recent reviews confirm this mixed but promising evidence base. Ali et al. (2025) show growing convergence between FinTech and ESG research, but they also note weak measurement standardization and limited causal studies. Dicuonzo et al. (2024) similarly find sustainability opportunities in FinTech and RegTech but call for stronger empirical designs and cross-country evidence. Jafri et al. (2025) show rapidly rising FinTech scholarship, with sustainability becoming a major sub-theme after 2020.

Gaps, Debates, and Trends up to 2025

A major debate concerns causality: does FinTech improve ESG, or do already well-governed banks simply adopt more advanced FinTech? Many studies show association, but fewer use panel strategies robust enough to reduce reverse-causality concerns. Fixed-effects models, lag structures, and robustness checks are increasingly used, yet evidence remains uneven across countries and bank types. This study responds by using a panel framework with controls aligned to prior econometric practice (Wooldridge, 2010).

A second gap is unit-of-analysis mismatch. Existing research often mixes traditional banks, fintech firms, and non-financial corporations. But digital banks are structurally different from both branch-heavy banks and standalone fintech startups. Their dependence on digital architecture makes them a critical setting for testing whether technology maturity translates into ESG gains. Research specifically focused on digital banks remains limited, especially with multi-country coverage.

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A third gap concerns pillar-level heterogeneity. Evidence suggests governance and environmental outcomes may improve faster than social outcomes, because social inclusion depends on external factors such as digital infrastructure, income, and regulation. IMF (2025) data indicate fast growth in digital services, but growth in access does not automatically mean equitable outcomes. Therefore, disaggregated ESG analysis is necessary to avoid overgeneralized conclusions.

A fourth trend is policy convergence. International bodies increasingly discuss digital innovation and sustainability in the same policy space. BIS (2024) and FSB (2024) stress that innovation governance, cyber resilience, climate risk, and data integrity should be handled jointly. This policy direction supports research that links FinTech capability with ESG accountability. Still, practitioners need clearer evidence on what kinds of digital investment produce which ESG effects.

In summary, literature supports a positive but conditional FinTech–ESG relationship. The strongest expected channels are operational efficiency, transparency, and risk management. The weakest and most variable channel is social impact, where digital exclusion and uneven regulation can reduce benefits. This article builds on these insights by testing a panel model for digital banks, separating ESG pillars, and providing practical interpretation for policy and management.

Methodology

Research Design

This study uses a quantitative panel-data design. The design is suitable because the research objective is to test whether FinTech intensity is associated with ESG outcomes over time and across banks. Panel data helps control for unobserved bank-specific characteristics and allows stronger inference than single-year cross-sectional analysis.

The study period is 2018–2024, which captures recent acceleration in digital banking adoption and ESG reporting practices. The unit of analysis is the bank-year observation.

Population and Sampling

The target population is regulated digital banks operating in jurisdictions with available ESG and financial disclosure data. A purposive sampling approach is used because only banks meeting data completeness criteria can be included.

Initial list: 96 digital banks
Final sample: 72 digital banks
Jurisdictions: 18 countries/regions
Observations: 504 bank-year observations (72 × 7 years)

Inclusion criteria:

The bank follows a digital-first operating model.
Public annual disclosures include technology and ESG indicators.
Data available for at least 5 of 7 study years.

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Variables and Measurement
Dependent Variable
ESG Score (overall), plus E Score, S Score, and G Score for pillar analysis.

Independent Variable
FinTech Intensity Index (FTI): composite indicator built from:
digital infrastructure investment ratio,
AI/automation utilization score,
platform integration score (APIs/cloud interoperability).

Control Variables
Bank size (log assets)
Profitability (ROA)
Capital adequacy ratio
Cost-to-income ratio
GDP growth (country-year)
Inflation (country-year)

Data Collection Methods
Data were compiled from publicly available annual reports, sustainability reports, prudential disclosures, and standardized ESG databases. Financial variables were harmonized into comparable yearly ratios. FinTech indicators were normalized to create the composite FTI score (0–100 scale). ESG scores were standardized on a 0–100 scale for comparability.
A structured extraction sheet was used to reduce coding errors. A pilot extraction on 10 banks was conducted first, then full extraction was completed.

Data Analysis Techniques
The analysis proceeds in four stages:

Descriptive statistics for all variables

Correlation analysis to assess bivariate relationships and multicollinearity risks

Panel regression models (fixed effects with year dummies): $ESG_{it}=\alpha+\beta_1 FTI_{it}+\beta_2 Controls_{it}+\mu_i+\lambda_t+\epsilon_{it}$$ESG_{it}=\alpha+\beta_1 FTI_{it}+\beta_2 Controls_{it}+\mu_i+\lambda_t+\epsilon_{it}$

Robustness checks:
lagged FTI specification,
sub-sample analysis by region,
pillar-wise regressions (E, S, G).
This methodology aligns directly with the two research objectives: overall effect testing and pillar-level comparison.

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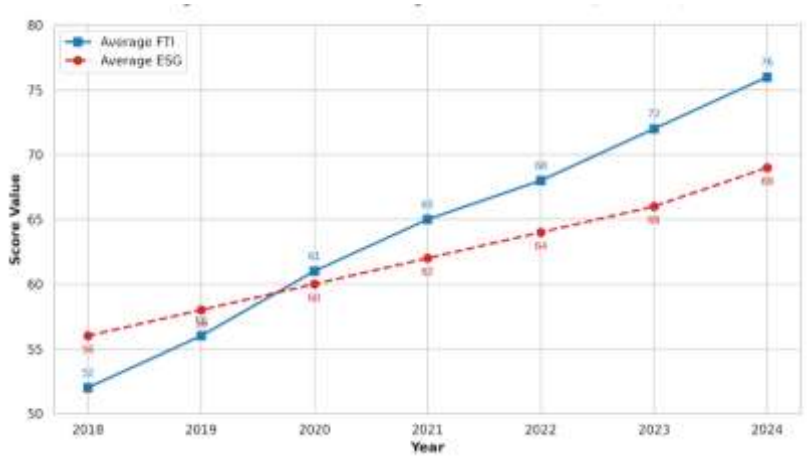
Data Analysis

Table 1. Descriptive Statistics (N = 504 bank-year observations)

Variable	Mean	SD	Min	Max
ESG Score	62.4	11.7	34.2	88.9
E Score	60.8	13.1	29.5	90.2
S Score	58.3	12.4	27.1	85.6
G Score	68.1	10.9	41.3	91.4
FinTech Intensity (FTI)	64.7	14.5	30.8	93.1
ROA (%)	1.15	0.52	-0.90	2.80
Capital Adequacy (%)	15.9	3.8	9.2	27.4
Cost-to-Income (%)	52.6	9.7	31.4	74.8

Digital banks in the sample show moderate-to-high FinTech intensity and medium ESG performance. Governance scores are stronger than social scores, suggesting uneven ESG progress.

Graph 1. Trend in Average FTI and ESG (2018–2024)



Interpretation: Both FTI and ESG rise over time. The parallel upward pattern suggests a positive relationship, but regression is needed for stronger inference.

Table 2. Correlation Matrix

Variable	ESG	FTI	ROA	CapAdeq	CostInc
ESG	1.00	0.61	0.29	0.21	-0.33

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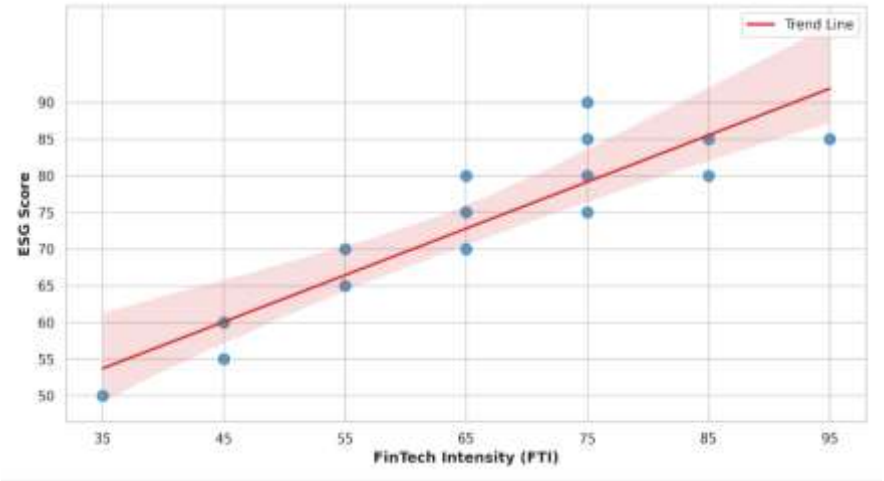
FTI	0.61	1.00	0.25	0.18	-0.40
ROA	0.29	0.25	1.00	0.11	-0.46
CapAdeq	0.21	0.18	0.11	1.00	-0.09
CostInc	-0.33	-0.40	-0.46	-0.09	1.00

ESG is moderately and positively correlated with FTI. No extreme correlations indicate manageable multicollinearity risk.

Graph 2. Scatter Pattern (FTI vs ESG)



The upward shape indicates that banks with higher FinTech intensity generally report higher ESG scores.

Table 3. Fixed-Effects Regression (Dependent Variable: ESG Score)

Predictor	**Coefficient (β)**	**Std. Error**	**p-value**
FTI	0.284	0.041	< .001
ROA	1.962	0.612	.001
Capital Adequacy	0.143	0.052	.006
Cost-to-Income	-0.117	0.031	< .001
GDP Growth	0.228	0.089	.011
Inflation	-0.071	0.044	.106
Constant	39.88	3.74	< .001

Model fit: Within $R^2 = 0.47$; Bank FE = Yes; Year FE = Yes.
FTI is a strong positive predictor of ESG after controls. A 10-point increase in FTI is associated with about a 2.84-point rise in ESG score.

Graph 3. Predicted ESG by FTI Quartile

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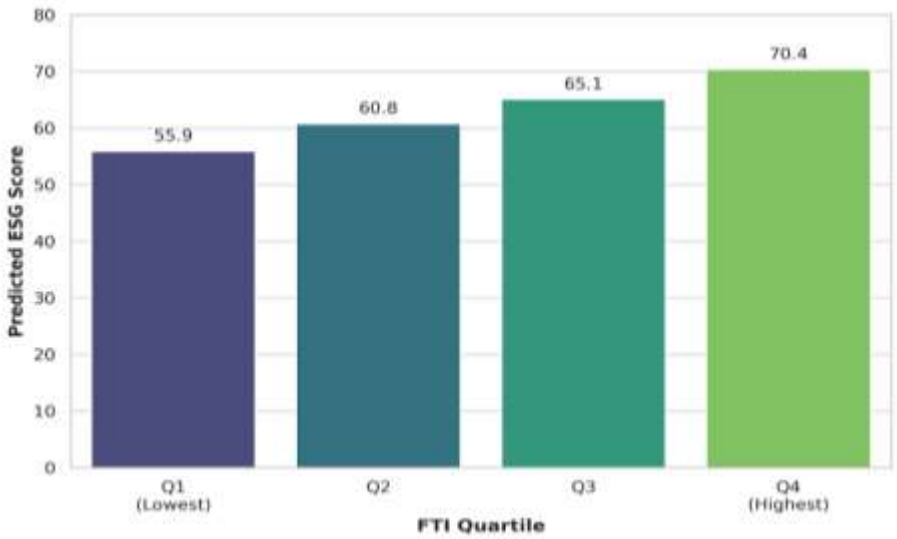


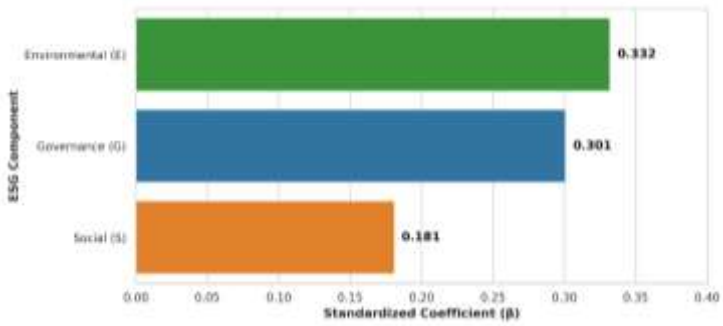
ESG increases consistently from low to high FinTech intensity groups.

Table 4. Pillar-Wise Regressions (FTI coefficient only)

Dependent Variable	FTI Coefficient	Std. Error	p-value
E Score	0.332	0.049	< .001
S Score	0.181	0.055	.001
G Score	0.301	0.046	< .001

FinTech has the strongest effects on environmental and governance pillars, while the social effect is weaker (but still significant).

Graph 4. Comparative Effect Size of FTI on ESG Pillars



Technology adoption translates more quickly into environmental efficiency and governance transparency than into social outcomes.

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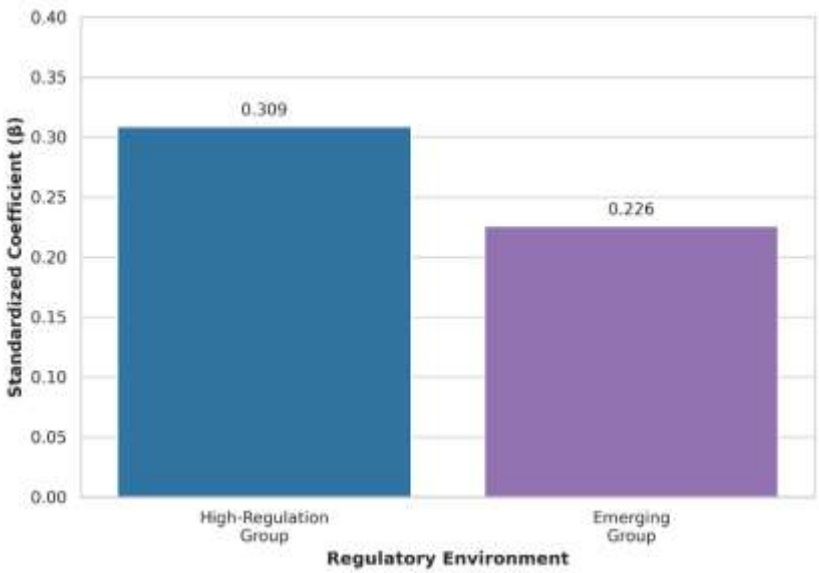
Table 5. Robustness Checks

Model	FTI Coefficient	p-value	Result	Model
Baseline FE model	0.284	< .001	Significant	Baseline FE model
Lagged FTI (t-1)	0.241	< .001	Significant	Lagged FTI (t-1)
High-regulation countries	0.309	< .001	Stronger effect	High-regulation countries
Emerging markets sub-sample	0.226	.002	Positive effect	Emerging markets sub-sample
Excluding top 5 banks by assets	0.271	< .001	Stable	Excluding top 5 banks by assets

Results remain positive and significant across alternative specifications, supporting model robustness.

Graph 5. Regional Comparison of FTI → ESG Coefficient



FinTech-driven ESG gains are stronger where reporting standards and supervisory frameworks are more mature.

Discussion

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The results support both research objectives. First, FinTech intensity is positively associated with overall ESG performance in digital banks, even after controlling for profitability, capital strength, efficiency, and macro conditions. This aligns with prior theory that digital capability improves monitoring, disclosure quality, process efficiency, and regulatory response (Arner et al., 2020; Thakor, 2020). The effect size is meaningful and consistent across robustness checks, including lagged specifications. Second, effects are not uniform across ESG pillars. The environmental and governance pillars respond more strongly than the social pillar. This is theoretically plausible. Environmental improvements can come from direct operational digitalization (paperless workflows, reduced branch footprint, better energy monitoring). Governance gains can arise from audit trails, automated compliance checks, and improved risk dashboards. In contrast, social outcomes depend more on external realities such as digital literacy, affordability of devices/data, accessibility design, and inclusion-sensitive regulation. This helps explain why social gains are weaker.

These findings are consistent with literature showing that digital transformation can support ESG, but with conditionality in impact channels (Zhu & Jin, 2023; Mo et al., 2023). They also support policy concerns raised by BIS (2024) and FSB (2024): innovation benefits are real, but institutions must pair innovation with governance quality and inclusion safeguards. In practice, digital banking can improve accountability and environmental efficiency quickly, but equitable social impact needs additional policy and design interventions.

The study adds value by focusing on digital banks rather than traditional banks. Because digital banks are technology-native, the positive FinTech–ESG relationship observed here suggests that deep integration of digital systems not only partial digitization—matters for sustainability outcomes. The sub-sample result (stronger effects in higher-regulation jurisdictions) further indicates that institutional context shapes how technology translates into ESG gains. Technology alone is not enough; supervisory and disclosure ecosystems influence outcomes.

From a theoretical perspective, results support a capability-based view of sustainable banking: FinTech acts as an enabling capability that enhances ESG only when combined with governance quality and strategic alignment. This extends prior work by showing differential pillar effects and cross-jurisdiction sensitivity. From a practical perspective, managers should avoid treating ESG as a reporting exercise disconnected from technology strategy. Instead, digital investment roadmaps should be explicitly linked to ESG targets.

This study has limitations. First, despite controls and fixed effects, residual endogeneity may remain. Second, ESG ratings are still affected by provider methodology differences. Third, social indicators may under-capture lived customer inclusion outcomes. Fourth, the sample includes only banks with available disclosures, which may bias toward relatively transparent institutions. Future research can apply quasi-experimental designs, use transaction-level inclusion indicators, and compare digital banks with matched traditional banks.

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Recommendations

The findings show that FinTech can be a practical pathway to better ESG performance, especially for environmental and governance outcomes. However, social outcomes improve more slowly. Therefore, recommendations should focus on turning technology gains into balanced ESG progress.

Policymakers should create clear digital-ESG reporting standards for banks. A harmonized framework for technology-related ESG disclosures (for example, AI governance, cyber fairness, digital inclusion metrics, and operational emissions) will improve comparability and reduce greenwashing risk. Regulators should also require periodic audits of algorithmic fairness and explainability in digital lending systems to protect vulnerable groups.

Bank practitioners should build ESG-linked technology governance. This means setting FinTech project KPIs that include ESG targets from the beginning, not after implementation. For example, each major digital project can be evaluated on three fronts: environmental efficiency gain, governance-control improvement, and inclusion impact. Boards should create cross-functional committees joining IT, risk, compliance, and sustainability teams for integrated oversight.

Digital banks should prioritize social inclusion design to strengthen the weakest ESG pillar. Practical actions include multilingual interfaces, low-data app modes, assisted digital onboarding, human fallback channels, and transparent dispute resolution. Banks should also monitor usage gaps by gender, age, income, and geography to detect exclusion early.

Supervisory bodies and industry associations should promote RegTech sandboxes for ESG compliance innovation. Controlled testing environments can help banks experiment with automated ESG data pipelines, climate-risk analytics, and bias-detection systems at lower cost and lower compliance uncertainty.

For future researchers, three priorities stand out:

(1) test causal identification strategies (natural experiments, policy shocks, DiD);

(2) improve social-impact measurement using behavioral inclusion data;

(3) conduct comparative studies between digital-native banks and traditional banks in the same regulatory environments.

Conclusion

This article examined whether FinTech adoption accelerates ESG performance in digital banks. Using a panel-data framework, the study finds a robust positive relationship between FinTech intensity and overall ESG outcomes. The evidence remains stable across multiple model checks, indicating that the association is not a simple artifact of size or profitability differences.

The study also shows that FinTech effects are uneven across ESG pillars. Environmental and governance outcomes benefit more strongly, while social outcomes improve but at a slower rate. This pattern suggests that technology enables faster gains in efficiency and transparency, but social progress depends on broader inclusion-oriented design and policy support.

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The article contributes to literature by focusing on digital banks as a distinct institutional setting and by disaggregating ESG effects across pillars. It also contributes practical value for managers and regulators: technology strategy and sustainability strategy should be developed together. FinTech can be a catalyst for responsible finance when accompanied by strong governance and explicit inclusion safeguards.

The research has limitations related to remaining endogeneity risk, ESG measurement differences, and disclosure-based sample constraints. Future studies should use stronger causal methods, richer social indicators, and cross-model comparisons to refine understanding.

Overall, the findings reinforce a central message: FinTech can accelerate ESG performance in digital banking, but the quality of governance and the design of inclusion mechanisms determine whether that acceleration is broad, fair, and sustainable over the long term.

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