



Sustainability in Digital Banking: Green FinTech and Environmentally Responsible Practices

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ABSTRACT

This paper explores the evolving intersection between digital banking and environmental sustainability, focusing on the emergence of Green FinTech and eco-conscious banking practices. It highlights how digital banking platforms, through Green FinTech innovations, are reducing carbon footprints, promoting environmental awareness, and transforming financial services into agents of sustainable development. The literature review draws on five key studies reflecting theoretical perspectives on green banking adoption, green credit performance, technology integration (AI, blockchain, IoT), carbon tracking tools, and risk management frameworks for AI sustainability. Objectives include evaluating how digital banking platforms reduce environmental impacts, examining technology-driven green initiatives, understanding the performance implications of green finance, and identifying hurdles and policy recommendations. Employing a qualitative approach built on secondary literature, industry examples, and frameworks like SWOT and PESTEL, the analysis shows that digital-only operations, carbon-offset systems, and innovative green credit products enable banks to serve both customers and the planet. However, barriers such as low stakeholder pressure, regulatory uncertainty, technology access gaps, and short-term profit focus limit adoption. The paper recommends policy mandates for ESG engagement, incentives for green FinTech innovation, carbon-awareness tools integration,



sustainable software practices, and stronger digital responsibility frameworks. By transitioning to greener digital banking, financial institutions can reduce environmental harm while bolstering their operational efficiency and stakeholder trust. Future work should further quantify emission reductions, assess customer behavior change, and explore regulatory variations across markets.

Introduction

Context and Rationale

With global awareness of climate change surging, industries across the board are reevaluating their environmental impact. The financial sector, particularly traditional banking, significantly contributes to carbon emissions through paper-based processes, brick-and-mortar branches, and energy-intensive data centers. In response, digital banking and FinTech offer opportunities to reduce environmental footprints while enhancing financial inclusion and service efficiency.

Emergence of Green FinTech

Green FinTech embodies financial innovation with environmental responsibility. Examples include digital banks issuing cards from sustainable materials, platforms planting trees per transaction, and apps tracking users' carbon footprints based on spending. Beyond consumer-facing shifts, Green FinTech leverages AI, blockchain, IoT, and big data to inform green lending, ESG tracking, and automated transparency in sustainable finance.

Significance

As digital transformation accelerates, embedding sustainability into banking processes is critical. Going beyond cost and convenience, Green FinTech aligns financial services with global environmental goals. Yet, adoption varies geographically—especially in emerging markets like India, which face institutional inertia and regulatory ambiguity.

Literature Review

Aracil, E. et al. (2021). Sustainability in digital banking and the role of Green FinTech are rapidly growing areas within financial services, addressing urgent environmental challenges and integrating eco-friendly practices into banking operations.



Chandran, M.C. (2023) :Early literature on sustainable banking emphasized the integration of environmental, social, and governance (ESG) criteria in banking strategies and decision-making. As digitalization accelerated, attention shifted towards the unique contributions of digital banking—such as reducing paper use, energy consumption, and physical resource intensity—highlighting concrete pathways for minimizing the industry’s carbon footprint.

Stauropoulou, A. (2023):Green FinTech leverages innovative technologies for environmental goals, including blockchain, artificial intelligence (AI), machine learning, and big data analytics. Blockchain supports transparency in carbon credit markets, while AI-driven analytics optimize energy use and inform ESG investment decisions. Digital and paperless transactions significantly cut resource consumption in day-to-day banking, and open banking ecosystems foster broad-based sustainability through collaboration.

Objectives of the study

1. Evaluate how digital banking and Green FinTech initiatives reduce environmental impacts.
2. Examine technology-driven strategies (AI, blockchain, IoT) that support environmentally responsible practices.
3. Analyze how green credit and eco-conscious product design affect bank performance and customer engagement.
4. Identify institutional, regulatory, and stakeholder-related barriers to adoption of green banking.

Methodology

- **Literature Synthesis:** Drawing from academic research, industry reports, and curated examples of Green FinTech initiatives.
- **Illustrative Cases:** Examples from digital banks like bunq, Tomorrow, Aspiration, TreeCard, and Panda Money illustrate diverse green banking models .
- **Analytical Framework:** Incorporating SWOT and PESTEL analyses to examine internal strengths, external constraints, technology dynamics, and policy contexts.
- **Limitations:** Based on secondary data; lacking primary quantitative assessments or field surveys.



Environmental Benefits of Digital Banking

Paperlessness & Virtual Infrastructure

Digital platforms eliminate printing, physical statements, and reduce branch energy usage. Cloud hosting with renewable energy further decreases carbon footprints .

Eco-Conscious Product Models

Banks are offering biodegradable or recycled-material cards, and planting trees per transaction—as in bunq, Tomorrow, Aspiration, TreeCard .

Tech Tools Driving Green Finance

AI, Blockchain, and IoT Enable ESG Analytics

These technologies improve transparency, enable sustainable lending assessments, automate carbon tracking, and increase ESG investment accuracy .

Green Credit Efficiency

Digital tools help banks assess environmental risk, streamline green lending, and tap regulatory support, enhancing long-term performance .

institutional and Market Barriers

Weak Stakeholder Pressure in Emerging Markets

Without strong regulations or consumer demand, banks may deprioritize green offerings—common in India and similar economies .

Profitability vs Sustainability Trade-Offs

Green products may underperform short-term compared to conventional offerings—dampening institutional incentives .

AI Carbon Footprint Overlooked

While digitization reduces paper waste, energy-intensive AI and server operations may offset gains unless managed sustainably .

SWOT Summary

Strengths	Weaknesses
Reduced paper and branch-related carbon footprints	Short-term profitability trade-offs



Innovative green products increase customer appeal	Low stakeholder and regulatory pressure
Enhanced ESG and green product efficiency via tech	AI/data infrastructure emissions
Opportunities	Threats
Policy incentives for green finance development	Greenwashing and superficial compliance
Consumer eco-awareness growing globally	Lack of standardized ESG metrics across markets
R&D in sustainable software and eco-AI systems	Digital divide limiting access in underserved regions

Policy Implications & Recommendation

Strengthen Regulatory & Stakeholder Engagement

- Mandate ESG compliance and reporting standards for banks and FinTech platforms—supported by clear guidelines and oversight mechanisms.
- Encourage institutional investor and consumer awareness campaigns to drive market demand for green banking.

Incentivize Green Digital Finance Innovation

- Provide subsidies, grants, or tax breaks for green product development, e.g., carbon-tracking apps, eco-cards, green credit platforms.
- Establish innovation sandboxes for sustainable finance startups to test and scale solutions.

Integrate Carbon Footprint Governance

- Require financial institutions to measure and report AI and data processing energy footprints within their risk frameworks—promoting green cloud use and efficient algorithms .

Promote Sustainable Software Design

- Encourage adoption of eco-aware software development practices. Green coding guidelines can reduce emissions from app usage and server workloads .

Strengthen Corporate Digital Responsibility (CDR)



- Digital financial firms should commit to CDR—embedding ethical, social, and environmental considerations in data handling, algorithm design, and user experience .

Standardize Metrics & Transparency

- Develop universal ESG and carbon-offset tracking standards across financial platforms to ensure transparency and comparability.

Conclusion

Digital banking offers a significant opportunity to reimagine financial services with environmental stewardship embedded at its core. Green FinTech initiatives—ranging from paperless workflow to carbon-tracking, sustainable investment, and AI-powered ESG tools—show how digital platforms can align profitability with planetary responsibility. The integration of blockchain, IoT, AI, and cloud-based systems amplifies this potential by enabling transparency, efficiency, and customer engagement. Yet, adoption faces barriers: regulatory inertia, stakeholder apathy, profitability trade-offs, and overlooked carbon impacts from digital infrastructure.

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