

The Convergence of Fintech and Green Finance: Digital Financial Solutions for Hospital Sustainability

Fatimah*, Eka Wisarini Putri, Bayu Narindra, Rian Andriani

ARS University, Bandung, Indonesia

Corresponding Author: fatimahtoha@gmail.com*,

wpbalieka@gmail.com, bayunarindra@gmail.com, rian_andriani@ars.ac.id,

Abstract

The implementation of green financial technology and financing in hospitals requires a comprehensive strategic approach to maximize the positive impact on institutional sustainability. A comprehensive study of the convergence of financial technology and green financing confirms the strategic potential of integrating these two dimensions in strengthening the sustainability of hospital operations. Digital transformation in the healthcare sector has opened strategic opportunities to integrate financial technology with green finance to achieve hospital operational sustainability. This research analyzes the convergence between financial technology and green finance in the context of healthcare institutional sustainability through a comprehensive library research approach. The research method involves systematic analysis of academic literature from reputable databases focusing on publications from 2021 to 2025. The inclusion criteria set include to ensure the relevance and up-to-date of information, articles published in indexed and reputable journals, as well as studies that explicitly address financial technology, green finance, or sustainability in the health sector. Findings indicate that digital financial technology provides a positive contribution to the economic sustainability of healthcare institutions through operational efficiency improvement and financing access facilitation. The synergy between green finance and financial technology creates a financial ecosystem that drives sustainable transformation with an amplifying impact on achieving triple bottom line objectives. Determinants of financial technology adoption are influenced by perceived ease of use, trust, facilitative conditions, and adequate digital infrastructure. Effective implementation requires an adaptive regulatory framework, information-communication technology infrastructure investment, and inter-institutional collaboration. This research provides strategic recommendations for policymakers and healthcare practitioners in adopting digital financial solutions that support long-term sustainability with a holistic approach integrating economic, environmental, and social dimensions in a sustainable healthcare delivery ecosystem.

Keywords: Financial Technology, Green Finance, Digital Solutions, Hospital Sustainability

1. Introduction

Digital transformation in the healthcare sector has opened up strategic opportunities to achieve the sustainability of hospital operations through the integration of financial technology and green financing. Healthcare organizations are now setting more progressive sustainability targets to improve financial performance without draining social and environmental capital, where a sustainable and resilient health system is an important catalyst for economic competitiveness (Li et al., 2021). In this context, digital financial technology plays a strategic role as a mechanism that not only improves operational efficiency but also encourages healthcare institutions to maintain better environmental, social, and corporate governance

standards. Digital transformation can reduce waste and service costs by increasing effectiveness while maintaining quality, as well as providing personalized patient-centered care on a global scale through a decision support system that has the potential to improve the performance and quality of healthcare (Fragão-Marques & Ozben, 2023). The convergence between financial technology and healthcare has shown great potential in bringing about significant changes to accessibility, affordability, and patient health outcomes, especially in the context of long-term sustainability (Shukla et al., 2025). The sustainability of a digitally transformed health system is essential to ensure sustainable access to quality healthcare services and simplify the management of medical resources through chronic disease management and prevention of unplanned hospitalizations by leveraging telemedicine and remote monitoring (Bocean & Vărzaru, 2025). However, there is still a knowledge gap on how digital financial solutions can be effectively integrated to support hospital sustainability, especially in balancing technological innovation with environmental responsibility. Therefore, this study aims to analyze the convergence between financial technology and green finance in the context of hospital sustainability through a comprehensive literature review, identifying best practices, implementation challenges, and formulating strategic recommendations for health sector policymakers and practitioners in adopting digital financial solutions that support long-term sustainability goals.

Although the literature has explored the implementation of financial technology in various sectors and the impact of green financing on organizational sustainability, there is a significant research gap regarding the synergistic integration of these two dimensions in hospital-specific contexts. Previous research has tended to address financial technology and green finance separately, focusing on the banking, manufacturing, or public services sectors, but has not comprehensively analyzed how the convergence of the two can optimize the operational sustainability of hospitals that have the unique characteristics of being capital-intensive organizations with high social responsibility. Furthermore, there is no conceptual framework that integrates digital financial technology mechanisms with green financing instruments to create a sustainable financial ecosystem in health institutions. Therefore, the novelty of this research lies in the development of an integrative perspective that connects three critical elements, namely the adoption of financial technology, the implementation of green finance practices, and the achievement of hospital sustainability targets through a triple bottom line approach that includes economic, environmental, and social dimensions. The research also fills the literature gap by providing a strategic roadmap for hospital managers and policymakers in designing and implementing digital financial solutions that are not only operationally efficient but also responsive to the global sustainability agenda.

2. Literature Review.

2.1 *Integration of Financial Technology with Sustainable Development Goals*

The convergence between financial technology and sustainable development has been a focus of significant research in the contemporary literature. Research conducted by (Hasan et al., 2024) uses a systematic literature review approach by integrating human and machine analysis processes to identify how financial technology can affect the achievement of the Sustainable Development Goals set by the United Nations. The study focuses on three main dimensions namely inclusive finance, economics, and the environment which shows that financial technology contributes to expanding investment opportunities by including environmental projects and increasing the diversity and participation rate of savers and lenders. Through this

process, financial technology improves market completeness and can accelerate economic growth through the achievement of higher productivity and sustainable growth through diversification, technological improvement, entrepreneurship, creativity, and innovation. Furthermore, the research findings confirm that financial technology can accelerate investment in poverty eradication and reduce income inequality, which is in line with specific sustainable development goals and shows that financial technology is the right new technology for financial services.

2.2 The Impact of Financial Technology on Health Outcomes in the Health Service Sector

The implementation of financial technology in the health sector has shown a positive impact on improving public health outcomes, especially in the Asian region. Empirical studies conducted by (Jing et al., 2022) Investigate the influence of financial technology on health outcomes in Asian economies during the period 2007 to 2019 using two-stage least squares estimation techniques and generalized method of moments. The results of the study confirmed the negative impact of the presence of ATM machines and debit cards on infant mortality rates, while both indicators had a positive impact on the life expectancy of people living in Asian economies regardless of the estimation techniques used. Similarly, the relationship between internet penetration and infant mortality rates showed a negative correlation, whereas the relationship was positive in the context of the internet and life expectancy. These findings confirm that the amalgamation of technology and the financial sector helps improve health outcomes in Asian economies, so the integration of financial technology into the health sector should be an integral part of any health policy in emerging Asian economies to achieve long-term health system sustainability.

3. Research Method

This study uses a qualitative library research approach to explore and analyze the convergence between financial technology and green financing in the context of hospital sustainability. The library research method was chosen because it allows researchers to conduct an in-depth study of various scientific literature, theories, concepts, and empirical findings that have been previously published in order to build a comprehensive understanding of the phenomenon being studied. This approach involves the systematic collection, evaluation, and synthesis of relevant secondary sources to identify patterns, trends, and knowledge gaps in the field of study that is the focus of the research. The data collection process was carried out through a search of academic literature from various reputable electronic databases such as Scopus, Web of Science, Google Scholar, PubMed, and ScienceDirect using specific keywords that include "fintech", "financial technology", "green finance", "sustainable finance", "hospital sustainability", "healthcare financial innovation", "digital financial solutions", and a Boolean combination of these terms. The inclusion criteria set include publications in the period 2021 to 2025 to ensure the relevance and up-to-date of information, articles published in indexed and reputable journals, as well as studies that explicitly address financial technology, green finance, or sustainability in the health sector. The literature selection process is carried out through the screening stages of titles and abstracts, followed by the reading of the full text to ensure suitability with the research objectives, where literature that does not meet the methodological criteria or does not make a substantial contribution to the understanding of the research topic will be excluded. The validity of the research is strengthened through transparency in the literature selection process and clarity in the documentation of analytical procedures that allow replication by other researchers (Snyder, 2019).

4. Findings and Discussions

4.1 The Role of Digital Financial Technology in Strengthening the Economic Sustainability of Health Institutions

The transformation of digital financial technology has shown substantial contribution to strengthening economic sustainability in the healthcare sector through various strategic mechanisms. The implementation of technology-based financial platforms allows healthcare institutions to optimize operational efficiency and improve financial performance without neglecting social and environmental responsibility aspects. Research conducted by (Meiling et al., 2021) confirms that financial technology developments have a robust positive impact on the sustainable performance of healthcare companies in the Asia-Pacific region, where collaboration between conventional financial institutions and financial technology platforms creates a complementary effect that facilitates financing at the individual and institutional levels. This phenomenon shows that the adoption of financial technology does not replace the role of traditional financial institutions, but rather strengthens their capacity to provide more inclusive and efficient financial services. Further (Dai et al., 2024) explains that financial technology contributes positively to economic sustainability through the reduction of greenhouse gas emissions and air pollution, although rapid technological advances also present systemic complexities and risks that need to be carefully managed. The integration of financial technology with natural resource management and urbanization creates complex dynamics in the achievement of sustainable development goals. (Rizwana et al., 2025) found that fintech adaptation has a significant impact on green finance but has a limited impact on green innovation and sustainability performance directly in Indonesia's banking sector, indicating the need to strengthen regulatory frameworks and strategic adoption to maximize the contribution of financial technology to sustainability initiatives. This reflects the challenges of financial technology integration in emerging markets that require intensive collaboration between financial institutions to drive comprehensive sustainability efforts.

4.2 The Convergence of Green Finance and FinTech as a Catalyst for Sustainable Transformation

The synergy between green finance and financial technology has formed a financial ecosystem that drives sustainable transformation in various sectors of the economy including healthcare. (Macchiavello & Siri, 2020) argues that financial technology is able to respond to various shortcomings in the contemporary sustainable financing framework, particularly related to access to retail financing, disclosure of environmental-social-governance aspects, verification, and sustainability assessments, where the pandemic has accelerated the urgency of integrating technology and sustainability in traditional business models. The relevance of the connection between sustainability, finance, and technology is increasingly crucial in the context of post-pandemic economic recovery that prioritizes system resilience and adaptability. (Zaid et al., 2025) confirming the positive relationship between green finance and sustainable performance, where the adoption of financial technology serves as a moderator that strengthens the effectiveness of green finance, while digital transformation acts as a second-level moderator that amplifies the effect of moderation of financial technology in the relationship between green finance and sustainable performance. These findings indicate that digital capabilities condition the effectiveness of green financing in developing economies, so the integration of digital infrastructure and technological instruments is essential to maximize the benefits of green financing. (Wu et al., 2024) demonstrate that financial technology significantly promotes

inclusive green growth through mechanisms for expanding financial jobs, expanding financial services supply, and facilitating green technology innovation, with a more prominent impact in regions with more advanced digital infrastructure, environmental regulations, and green financing.

4.3 Determinants of Financial Technology Adoption in the Healthcare Sector

The intention of adopting financial technology in the health sector is influenced by various psychological, social, and technological factors that shape the behavior of healthcare users. (Hassan et al., 2022) identifies that perceptions of ease of use, social influence, facilitative conditions, personal innovation, and trust in financial technology services have a significant relationship with patient adoption intentions in the Bangladesh healthcare sector, where digital transformation has facilitated the shift towards new financial services through the expansion of cashless payment systems and advanced technologies. These findings provide practical implications for the healthcare sector and fintech companies in designing strategies to advance the growth of more inclusive and accessible cashless financial technology-based transactions. (Kesavan & Polisetty, 2025) Through bibliometric investigations, it is shown that successful financial technology innovations improve financial inclusion by bridging the gap between urban and rural communities, ultimately contributing to long-term economic and social sustainability. Further, effective financial innovation drives increased green investment, green initiatives, and green financing that transforms the economy from a linear model to a more sustainable circular model. This research indicates that financial technology serves as a fundamental basis and driving force for financial inclusion initiatives that facilitate the achievement of global sustainable development goals. (Macchiavello & Siri, 2020) added that while financial technology shows great potential in supporting sustainable finance frameworks, there are still relevant legal issues that need to be addressed to deliver on its promise and potential in the sustainable finance sector. new and promising.

4.4 Strategic Implications and Policy Recommendations for Hospital Sustainability

The implementation of green financial technology and financing in hospitals requires a comprehensive strategic approach to maximize the positive impact on institutional sustainability. (Meiling et al., 2021) emphasizing that financial development and information-communication technology play a positive role as a positive moderator in the relationship between financial technology developments and sustainable performance, which indicates the importance of simultaneous investment in technological infrastructure and financial capacity to optimize sustainability outcomes. Strategic recommendations for hospital managers include the development of an integrated digital ecosystem, the improvement of digital financial literacy among staff and patients, and the establishment of collaborative partnerships with financial technology service providers and green financial institutions. (Zaid et al., 2025) provides insight that the adoption of advanced financial technologies along with digital transformation can improve sustainable performance, especially in economies undergoing digital and environmental transitions such as Saudi Arabia, so the integration of digital tools and infrastructure is crucial to fully reap the benefits of green financing. Policymakers need to develop a regulatory framework that supports financial technology innovation while ensuring consumer protection and financial system stability (Janssens, 2024). (Rizwana et al., 2025) underscores the need for a strengthened regulatory framework, strategic adoption of financial technology, and increased collaboration between financial institutions to drive sustainability efforts in emerging markets.

5. Conclusion

A comprehensive study of the convergence of financial technology and green financing confirms the strategic potential of integrating these two dimensions in strengthening the sustainability of hospital operations. Digital transformation through the adoption of technology-based financial platforms creates an ecosystem that facilitates operational efficiency while maintaining a commitment to environmental and social responsibility. The synergy between financial technology innovations and green financing instruments has an amplifying effect on the achievement of triple-bottom-line sustainability goals, encompassing economic, ecological, and social dimensions. The determinants of financial technology adoption in the health sector are shaped by perceptions of convenience, trust, facilitative conditions, and the capabilities of digital infrastructure, which require strategic attention from institutional management. Effective implementation requires an adaptive regulatory framework, investment in information and communication technology infrastructure, and collaboration between financial institutions and healthcare providers. The policy recommendations emphasize the importance of developing digital financial literacy, strengthening the sustainable finance regulatory framework, and establishing an innovation ecosystem that supports the long-term transition to a sustainable and inclusive healthcare model.

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