Exploring the Potential of Fintech Adoption in Advancing Green Economic Growth in Indonesia: An Initial Concept and Perspective

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Abstract. This paper will explore the potential of Financial Technology (Fintech) implementation to boost the Indonesian green economic growth, emphasizing its use in promoting sustainable financial inclusion, enhancing access to green investment, and supporting environmentally responsible innovation. This phenomenon coincides with the country's increasing commitment to promoting a green economy as part of its sustainable development agenda. However, the challenge lies in how fintech adoption can be effectively aligned with environmental objectives to generate inclusive and sustainable economic growth. Many fintech initiatives in Indonesia remain focused on financial inclusion and efficiency, with limited emphasis on ecological sustainability and green investment. This study employs a conceptual and qualitative descriptive approach, synthesizing literature, policy documents, and existing data on fintech and green economy frameworks in Indonesia.

Keywords: Financial Technology, Green Economy, Financial Inclusion

1 Introduction

1.1 The Challenges of Indonesia Conventional Growth

Indonesia's economic expansion has long been anchored in natural resource extraction, and the mining industry remains one of the largest contributors to national Gross Domestic Product (GDP). This dependence is most visible at the regional level. In East Kalimantan, mining accounts for more than 45% of Gross Regional Domestic Product, with Sangatta operating as one of the country's largest coal production center [1]. Intensive extraction, however, has generated substantial environmental costs, including soil erosion, biodiversity loss, and contamination of land and water ecosystems [2]. Comparable trade-offs between resource revenue and ecological degradation have been documented in other resource-rich provinces [3]. This pattern reflects a broader structural challenge: Indonesia's conventional growth model continues to impose significant ecological costs.

1.2 The Concept of Green Economy

Within human society, ecological balance functions as a fundamental precondition for sustaining social, economic, cultural, and other essential activities. A green economy is generally understood as an economic model that improves human wellbeing and social equity while significantly reducing environmental risks and ecological

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W. Sari et al. (eds.), *Proceedings of the 5th Mulawarman International Conference on Economics and Business (MICEB 2025)*, Advances in Economics, Business and Management Research 406,
https://doi.org/10.2991/978-94-6239-815-3_6

trust, and sociodemographic characteristics. Technology acceptance research on P2P lending and QRIS uptake consistently shows that perceived risk and trust matter alongside usefulness and convenience, demonstrating how behavioral factors shape the diffusion of fintech across consumer groups.

Technological advancement also carries risks that must be taken into account. Because digital payment systems process sensitive financial and personal data, security is a decisive condition behind their convenience and benefits. Phishing and social-engineering attacks remain among the most common threats facing users of digital financial services [10], and the wider expansion of internet-based crime intensifies consumer protection concerns as adoption deepens [11].

The purpose of this study is therefore to explore the extent to which policy can shape the opportunities and risks of fintech adoption for digitally driven green economic growth in Indonesia. The resulting framework offers insight into the role of fintech as a catalyst of economic transformation and guidance for policymakers, business actors, and the public in maximizing its benefits for sustainable development.

2 Literature Review

2.1 Green Economic

A wide variety of viewpoints are presented in the literature on the green economy, which reflects its multidisciplinary nature and includes social policy, economics, and environmental research. In this study, researchers used the Green Economy theory proposed by Pearce, Markandya, and Barbier's tahun 1989 "Blueprint for a Green Economy" set the groundwork for understanding how to integrate economic and environmental policy. The United Nation Environment Program (UNEP) defines green economy as one that results in improved human wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities. It is low carbon, resource efficient, and socially Inclusive. In simple terms, it is an economy in which emphasizes on producing lower carbon emissions and on resourcefully accommodating all social groups. Its primary goals are to lower pollution and carbon emissions, improve resource and energy efficiency, and stop biodiversity loss.

The green economy is defined as growth that is efficient in its use of natural resources and minimizes pollution and environmental damage. Based to all of these definitions, the green economy is a paradigm that includes implications for potentially efficiency and risk mitigation in the use of natural resources or prosperity and growth [12].

Measurement tools for the green economy remain under active development, particularly the indicators and methods capable of describing green performance accurately and representatively so that indices can be compared across time and region. Green economy indicators are widely argued to require embedding within a broader conceptual framework in order to support public policy development effectively. Existing international frameworks, however, give limited emphasis to comprehensive measures of human wellbeing and do not fully capture the interdependence between economic and social governance systems [12].

2.2 Fintech Adoption for Green Economy

The potential use of fintech for the green economy has been explored in the scope of banking [13], highlighting how digital financial innovations can accelerate sustainable transitions by improving the efficiency, accessibility, and transparency of green financing. Whereas in Indonesia, fintech has increasingly been integrated into national strategies supporting green and sustainable development. The Financial Services Authority (OJK) has promoted digital finance through its Sustainable Finance Roadmap, which includes guidelines for green lending, digital microfinance, and the adoption of environmental, social, and governance (ESG) principles within fintech operations. Furthermore, collaborations between fintech firms, banks, and government agencies have led to innovative solutions such as digital carbon footprint calculators, green digital wallets, and app-based renewable energy investment schemes. These initiatives demonstrate the growing relevance of fintech as both a facilitator and accelerator of Indonesia's transition toward a low-carbon, inclusive, and resource-efficient economy.

3 Research Method

This study employs a qualitative descriptive approach supported by the Narrative Content Analysis (NCA) method that is used to explore how fintech adoption may contribute to advancing green economic growth in Indonesia. This approach design would enable the researchers to provide an in-depth and contextualized understanding of emerging concepts, policy directions, and technological dynamics related to the green economy and digital finance.

3.1 Research Approach

Narrative Content Analysis is used to examine how existing literature, policy narratives, and institutional documents describe the relationship between fintech development and the green economy. This method focuses on identifying patterns, themes, and storylines across texts to understand this paper:

1. How fintech adoption is framed within Indonesia's sustainable development agenda,
2. The perceived opportunities and constraints for integrating fintech with green initiatives, and
3. The broader socio-economic narratives surrounding digital financial inclusion, green investment, and environmental governance.

This approach is appropriate because fintech and the green economy are evolving concepts in Indonesia, and their linkages are primarily discussed in narrative and conceptual formats rather than through comprehensive empirical models.

3.2 Data Sources

The research used on this paper consisted on:

1. Academic literature on fintech adoption, green economy frameworks, sustainable finance, and digital inclusion in Indonesia and comparable contexts;
2. National policy documents such as the RPJMN 2020–2024, the Low Carbon Development Indonesia (LCDI) framework, OJK's Sustainable Finance Roadmap, and BAPPENAS documents on the Green Economy Index;
3. Industry and institutional reports from the Financial Services Authority (OJK), Bank Indonesia (BI), the World Bank, UNEP, IMF, and other international organizations;

These documents were selected based on their relevance to Indonesia's digital transformation and green economy agenda, and their reliability in providing verified, policy-oriented insights.

3.3 Data Collection Procedure

Data collection followed three steps:

1. Identification and retrieval of documents through academic databases (Scopus, Google Scholar), institutional repositories (OJK, BAPPENAS, BI), and official government websites.
2. Screening and selection of materials based on inclusion criteria: relevance to fintech, green economy, sustainable finance, and Indonesia's policy context; published from 2015–2025; and produced by recognized academic or policy institutions.
3. Compilation and organization of selected documents into thematic categories related to financial inclusion, digital innovation, environmental sustainability, and green investment.
4. Data Analysis

   Narrative Content Analysis was conducted in four stages:

   a. Coding: Extracting key statements, narratives, and thematic elements related to fintech, sustainability, and policy directions.
   b. Categorization: Grouping codes into broader themes such as digital financial inclusion, green fintech innovation, regulatory support, and environmental outcomes.
   c. Interpretation: Connecting emerging themes to theoretical frameworks such as the Green Economy paradigm and digital financial inclusion theory.
   d. Synthesis: Integrating findings into a conceptual perspective on how fintech adoption could strengthen Indonesia's green economic transition.

3.4 Research Limitations

As a conceptual and narrative-based study, the analysis does not incorporate primary data or quantitative modelling. Therefore, the findings provide insight into potential relationships and policy directions rather than empirical causal conclusions. Future studies should include primary data which can be based on field surveys, interviews with regulators and fintech actors, or empirical assessments of green fintech performance.

4 Result & Discussion

4.1 Result

An exploration of fintech adoption and its relationship to green eco-nomic developments that support digital transformation in Indonesia from 2015 to 2024 reveals a strong and positive correlation between the two variables. Descriptive analysis shows that fintech adoption in Indonesia has grown rapidly over the past decade. The value of electronic money (e-money) transactions increased more than tenfold during the period, supported by the widespread use of QRIS since its introduction in 2019. The significant growth in the role of fintech in Indonesia is also shown by the high role of platforms that support the inclusivity of Indonesian fintech, one of which is that lending plat-forms such as peer-to-peer (P2P) record loan disbursements reaching trillions of rupiah per year. This development shows positive results for fintech adaptation to support digital transformation in creating an inclusive digital financial ecosystem in Indonesia.

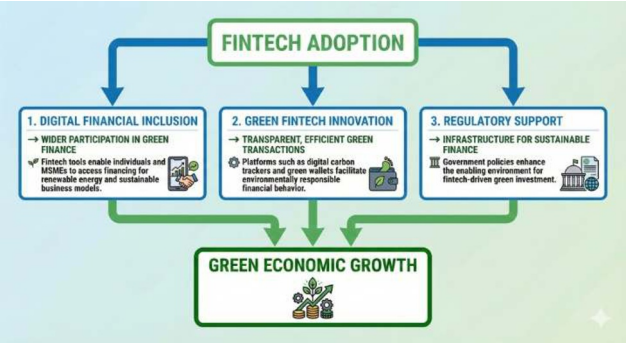


Figure 1.
Potential of Fintech–Green Economy Linkages in Indonesia

Theoretically, fintech can be used in advancing green economic growth through several mechanisms. First, fintech enhances digital financial inclusion, which expands access to financial services for underserved communities and MSMEs, allowing them to participate in green financing instruments such as renewable energy loans, eco-friendly business credits, and sustainable agricultural financing. Second, fintech drives green innovation, particularly through digital plat-forms that support environmental monitoring, carbon footprint tracking, and sustainable investment portfolios. Third, fintech acts as an enabler of efficient and transparent green transactions, allowing real-time verification, reduced transaction costs, and automated reporting mechanisms that support compliance with environmental standards.

The results show that the increase in the use of fintech, which can be measured through transaction volume and user participation, contributes to the expansion of the digital economy, especially in sectors such as e-commerce and digital commerce. For example, the growth of non-cash payment transactions through e-money or other e-wallet plat-forms (such as DANA, OVO, and GOPAY) is positively associated with increased sales and transactions in e-commerce, reflecting the role of digital payments in facilitating the growth of online transactions in Indonesia.

Similarly, the growth of P2P landing or various other online lending instruments (PINDAR) has been linked to increased access to loan credit for micro, small, and medium enterprises (MSMEs) from all sectors in Indonesia, which in turn supports business expansion and contributes to the growth of GDP from the digital sector in Indonesia. These findings also show that control variables such as digital literacy ability and internet provider access play an important role in strengthening the impact of fintech adoption to be able to run. Provinces with higher internet access and stronger digital literacy scores show more tangible impacts and benefits of fintech services, this is also able to prove that infrastructure and human resources are important drivers of digital economy transformation [14]. On the other hand, rural areas with limited internet coverage and low people's ability to experience digital literacy tend to be slower, this situation can also limit the potential contribution of fintech to their local economy.

Furthermore, the results of the study highlight that government initiatives such as QRIS promotion, ease of accessibility, digital transaction roadmap, and OJK regulations to support fintech inclusivity in Indonesia are able to provide a conducive environment for fintech growth. This regulatory and policy framework not only increases trust in fintech services but also reduces systemic risks, thereby strengthening fintech's long-term contribution to the digital economy. In summary, the results of this study confirm that the adoption of the fintech ecosystem and support for its development significantly accelerate the growth of a digital-based green economy in Indonesia. By increasing financial inclusion, facilitating digital commerce, and expanding accessibility, fintech has become a key driver of the digital economy. However, the benefits are not evenly distributed across regions, demonstrating the importance of sustainable investment in the provision of digital infrastructure, education towards financial literacy awareness and digital transformation, and regulatory oversight to ensure inclusive and sustainable growth in Indonesia. Beyond the defintion of fintech as a technology trend, it is a transformational force that has the ability to drive a shift towards a more inclusive and sustainable digital economy.

Table 1. Policy Documents Reviewed and Their Relevance to Green Fintech Development

Title	Peraturan Otoritas Jasa Keuangan Nomor 51 /POJK.03/2017 Tentang: *"Penerapan Keuangan Berkelanjutan Bagi Lembaga Jasa Keuangan, Emiten, dan Perusahaan Publik"*

Summary	POJK 51/2017 on Sustainable Finance, issued by the Financial Services Authority (OJK), mandates that all financial service institutions including banks, financing companies, insurance providers, and capital market participants incorporate sustainability principles into their operations. This regulation formalises the concept of sustainable finance, which aligns financial sector growth with environmental stewardship and social responsibility. It further requires institutions to produce a Sustainability Report detailing their implementation of sustainability practices, their management of environmental and social risks, and their contributions to green development.
Review	From a policy standpoint, PJOK 51/2017 represents a significant transformation within Indonesia's financial sector. Prior to its introduction, most financial institutions primarily concentrated on commercial objectives and profit generation. The regulation encourages a shift toward long-term thinking by requiring institutions to factor in environmental risks, climate-related challenges, and social welfare consideration. Nevertheless, several challenges persist. Many institutions still find it difficult to operationalise sustainability principles in their everyday practices, while smaller financial entities often lack the expertise or resources needed to produce comprehensive sustainability reports. Moreover, the regulation offers limited technical guidance, resulting in uneven levels of progress across institutions
Relevance to Green Fintech Development	Despite its limitations, POJK 51/2017 remains highly significant for Indonesia's transition toward a green economy. By encouraging financial institutions to channel funding into environmentally responsible sectors such as renewable energy, waste management, and sustainable agriculture, the regulation facilitates a gradual redirection of capital away from environmentally detrimental activities. This shift also opens avenues for financial innovation, particularly through fintech. Fintech firms can advance sustainable finance by providing digital credit scoring for green-oriented MSMEs, offering digital carbon-tracking tools, and developing platforms that support green investment or crowdfunding for renewable energy initiatives. In this regard, POJK 51/2017 establishes an essential policy framework that enables the expansion of green fintech, which can enhance financial inclusion while simultaneously promoting environmental objectives.
Title	TAKSONOMI HIJAU INDONESIA Indonesia Green Taxonomy Edisi 1.0 - 2022 / Edition 1.0 - 2022
Summary	The Indonesia Green Taxonomy 1.0 (2022) is a national guideline created to classify economic activities based on their environmental impact. Its main purpose is to help financial institutions, businesses, and regulators identify which activities are environmentally friendly, which ones are in transition, and which ones are harmful. The taxonomy was designed to give clear standards and make sure everyone uses the same definitions when talking about "green" activities. It outlines three broad categories of activities based on their environmental impact. The first category (green), consists of activities that directly protect the environment or significantly reduce pollution. The second category (yellow), includes activities that are not fully sustainable but remain acceptable because they help minimize negative effects or serve as transitional efforts. The third category (red), encompasses activities that are environmentally harmful and should therefore be restricted.
Review	Indonesia's Green Taxonomy is also aligned with international standards adopted by global bodies such as the International Platform on Sustainable Finance (IPSF). This alignment allows Indonesia to maintain coherence with global sustainability frameworks while accommodating its own national priorities. The taxonomy provides detailed eligibility criteria for major sectors, including energy, agriculture, forestry, transportation, and waste management. Each sector is assessed according to its potential to reduce emissions and its overall contribution to advancing a low-carbon future.
Relevance to Green Fintech Development	The relevance of the taxonomy for fintech development and green economic growth is substantial. By offering a clear classification framework, the taxonomy enables fintech firms to design financial products, such as green lending schemes, renewable-energy crowdfunding platforms, and digital carbon-tracking applications, that directly target environmentally sustainable activities. It also provides investors with clearer guidance, helping them avoid greenwashing and select projects that genuinely meet sustainability standards. Over time, Indonesia's Green Taxonomy contributes to shaping a financial ecosystem that promotes innovation and accelerates the country's transition toward a greener economy.

Title	Strategi Nasional Literasi Keuangan Indonesia (SNLKI) 2021-2025.
Summary	The *Strategi Nasional Literasi Keuangan Indonesia* (SNLKI) 2021–2025 is a national guideline issued by the Financial Services Authority (OJK) to enhance financial literacy and inclusion across Indonesia. This policy builds upon the previous strategy, responding to the significant gap between the 2019 financial literacy index (38.03%) and the financial inclusion index (76.19%). The central vision of SNLKI 2021–2025 is to cultivate a "Well Literate" society, one with a high level of financial understanding, so that individuals are better equipped to utilize financial services and achieve sustainable financial well-being. Its core initiatives focus on the digitalisation of financial education (including the development of LMS/MOOC platforms and digital dashboards), the intensification of literacy programmes and the acceleration of Sharia financial inclusion, as well as the adoption of risk-based consumer protection strategies for priority groups. The policy aims to raise the national financial inclusion rate to 90% by 2024.
Review	Critically, the SNLKI 2021–2025 demonstrates a strong foundation as it responds to an urgent national need: the low level of financial literacy in contrast to the rapid expansion of financial access. One of the strategy's core strengths lies in its extensive emphasis on digitalized education. By utilizing Learning Management Systems (LMS), Massive Open Online Courses (MOOC), and integrated dashboard applications, the SNLKI has the potential to overcome Indonesia's vast geographic challenges, making financial education more accessible and efficient across regions, including the 3T (frontier, outermost, and disadvantaged) areas. Moreover, the policy broadens the definition of literacy to include aspects of Financial Attitude and Prudent Financial Behavior, a crucial step that ensures people not only *know* about financial products but are also able to *manage* and *plan* their finances effectively. This shift is essential for strengthening individual Financial Resilience, marking the policy as a forward-looking framework that addresses structural behavioral barriers, not just informational gaps. Several gaps must be anticipated. The persistent disparity between financial inclusion and financial literacy presents a significant risk: individuals may use fintech products or other financial services without fully understanding their associated riks, potentially increasing consumer complaints and exposure to financial fraud. Therefore, the strategy must ensure that risk-education precedes the rapid expansion of access.
Relevance to Green Fintech Development	Fintech is a central driver of the SNKIL framework. The strategy was established in response to the rapid growth of digital financial innovations, which offer substantial benefits but also introduce new risks. SNLKI explicitly positions the digitalization of financial education as a strategic priority to ensure that the public possesses adequate competencies to use fintech services—such as online lending, digital investment platforms, and cashless payment systems—safely and responsibly. Consequently, SNLKI serves as a key regulatory instrument for mitigating risks amid the accelerated expansion of Indonesia's fintech ecosystem. The relevance of SNLKI to the Green Economy and Green Financing is strategic. The policy's vision, to achieve Sustainable Financial Well-Being, aligns closely with the core principles of a green economy. Financial literacy functions as a key enabler for Green Financing initiatives. When the public becomes well-literate in understanding investment, risk, and financial planning, they are better equipped to participate in sustainable financial products such as green bonds, ESG-based mutual funds, or climate-risk insurance. SNLKI also provides an educational platform, through advanced literacy modules, that can be integrated with Green Financing-specific content. This ensures that Indonesia's transition toward a Green Economy is supported by a consumer base that is both financially capable and environmentally conscious in their financial decision-making.

4.2 Evidence of Fintech Use for The Green Economy in Indonesia

Amartha is a fintech platform founded in 2010, focusing on the digital financial ecosystem through capital, investment, and payments. Amartha is the main peer-to-peer lending fintech platform in Indonesia that supports the green economy through sustainability integration, such as tree planting and carbon emission reduction. The platform has even distributed financing of more than Rp17.3 trillion to 2.1 million women SMEs in 72,000 villages, while implementing the Amartha Lestari program to reduce carbon emissions by 30% by 2030. The initiative includes participation in the Nusantara Green Belt to plant trees in the capital city with AI and IoT monitoring, as well as planting mangroves in disaster-prone areas. By 2022, Amartha has reduced 5.93 tons of electricity emissions, recycled 939 kg of waste, and increased customer revenue by 69.7% per year.



Figure 2.
Potential of Fintech–Green Economy Linkages in Indonesia

Amartha's Relevance to the Development of the Green Economy in Indonesia. Amartha focuses on rural communities and micro-MSMEs, many of which rely directly on the environment, such as agricultural ventures, small businesses, and nature-based ventures. Therefore, capital sup-port, literacy, and environmental responsibility can simultaneously increase economic and ecological resilience. Their programs such as waste banks, waste management, bioenergy, and productive tree planting show that fintech/financing can be used as a real tool to reduce the environment and encourage communities. Models like Amartha can drive more equitable and sustainable growth through financial inclusion and collaboration across sectors (investors, companies, and communities). This will help reduce economic and access gaps, especially for women, people with disabilities, and remote com-munities.

4.3 Research Significance

For academics, this research contributes to the existing literature on the digital economy and the adoption of financial technology. Although many studies have examined fintech adoption from the perspective of user behavior or enterprise-level efficiency, fewer have empirically investigated its broader economic implications in the Indonesian context. This study fills the gap by offering evidence on how fintech supports the expansion of the digital economy through financial inclusion, e-commerce growth, and MSME empowerment [15]. As such, these findings provide valuable references for future studies in areas such as economics, business, information systems, and public policy.

For governments and regulators, the study offers insights that can strengthen policy formulation and regulatory frameworks. Along with the rapid growth of fintech, regulators face the dual challenge of driving innovation while ensuring consumer protection and systemic stability. The results of this study highlight the conditions under which fintech adoption contributes most effectively to the growth of the digital economy, thereby enabling policymakers to design supporting infrastructure. This in-sight is crucial in shaping a sustainable and inclusive fintech ecosystem in Indonesia.

For businesses and companies, this study provides practical guidance for developing strategies that significantly maximize the impact of the digital economy [16]. By identifying the areas of fintech adoption such as digital payments, online loans (pay later), or digital asset deposits that are most related to economic growth, companies can better align their services with market needs and demands and to achieve national development goals. In addition, these findings can help fintech providers in targeting the most strategic segments in the business development process with an easier and more practical system.

For the community, this research emphasizes the role of fintech in increasing financial inclusion, increasing "digital literacy" capabilities, and creating economic opportunities. In countries where a large portion of the population has limited access and knowledge to digital financial literacy, fintech offers innovative solutions that bridge access gaps, reduce transaction costs, and empower individuals to participate in the digital economy

In summary, this research is important because it integrates the exploration of academic knowledge with its real-world application, providing valuable evidence and insights for many stakeholders on how important the role of government regulation is to encourage fintech inclusivity in Indonesia. The implications go beyond under-standing fintech as a technology trend, but instead position it as a transformative force that can drive Indonesia's transition to a more inclusive and sustainable digital economy.

4.4 Comparison with Previous Research

The findings indicate that fintech adoption in Indonesia has exerted a positive influence on digital economic growth, particularly through wider financial inclusion, the expansion of digital payment systems, and support for MSMEs. Prior work has similarly emphasized the role of fintech in improving access to financial services for unbanked populations, underscoring its function in bridging the financial gap and enabling individuals and firms to participate in the digital economy. Whereas earlier studies concentrate mainly on financial access, the present study broadens the discussion by linking fintech adoption directly to national economic growth outcomes.

The findings also resonate with [17], who argue that fintech can raise efficiency, lower transaction costs, and improve customer experience in financial services. This study reaffirms those benefits while illustrating their cumulative effect on digital economy indicators such as e-commerce activity and digital transaction volume in Indonesia [18]. Where [17] analyze structural transformation within financial markets, the present study emphasizes macroeconomic implications, making its contribution broader in scope.

Although several constraints are acknowledged here, the analysis suggests that fintech adoption in Indonesia continues to generate positive economic outcomes despite them. This divergence from more cautious earlier

assessments may be attributed to rapid improvements in digital infrastructure and a supportive government posture toward fintech development in recent years, conditions not fully captured in earlier work.

The novelty of this research lies in its focus on Indonesia's digital economy and on how government regulation enables fintech adoption to support green digital economic growth, extending the discussion beyond adoption drivers, user behaviour, and financial access on which previous research has built a strong foundation.

5 Conclusion

This qualitative study finds that fintech adoption in Indonesia offers strong potential to drive green economic growth. Digital payments, P2P lending, and mobile financial services have markedly widened financial inclusion and fuelled the digital economy. When purposefully aligned with sustainable finance principles, through green lending and regulation that ties fintech-enabled inclusion to green economic goals, fintech can connect Indonesia's digital disruption with its environmental sustainability objectives. The prevailing storyline across the analyzed documents nevertheless indicates that most of Indonesia's fintech ecosystem remains oriented toward conventional financial inclusion and transactional convenience, with only nascent and fragmented integration of explicit green principles.

A successful transition toward a genuinely green fintech ecosystem is therefore contingent on deliberate regulatory steering, sustained investment in digital infrastructure and literacy, particularly in rural and eastern regions, and strengthened multi-stakeholder collaboration among regulators, financial institutions, fintech providers, and sustainability-focused entrepreneurs. Ultimately, this study concludes that fintech represents far more than a technological trend: when purposefully governed and innovatively designed, it constitutes a pivotal bridge connecting Indonesia's dynamic digital economy with its national commitment to low-carbon, socially inclusive, and ecologically sustainable development.

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