



Gema Ekonomi
e-ISSN: 2621-0444
Vol. 14 No. 1 January 2025 pp 1-11

<https://journal.unigres.ac.id/index.php/GemaEkonomi/index>

Gema Ekonomi (Jurnal Fakultas Ekonomi)

e-ISSN: 2621-0444

Vol. 14 No. 1 January 2025

DIGITAL GREEN ECONOMY: INTEGRATION OF FINANCIAL TECHNOLOGY AND CIRCULAR ECONOMY AS A SUSTAINABLE TRANSITION STRATEGY IN DEVELOPING COUNTRIES

Elsa Islammia Pasha

Sekolah Tinggi Agama Islam Kuningan, Indonesia

Email: islamiafasa07@gmail.com

Abstract

Global economic transformation demands that developing countries shift to a more sustainable development model amidst the climate crisis, inequality, and technological disruption. This study aims to analyze the integration of financial technology (fintech) and the circular economy in building a digital green economy as a sustainable transition strategy. Using a qualitative approach based on a conceptual literature review, data was collected through a systematic review of academic articles, international reports, and public policies. The analysis shows that fintech plays a crucial role in providing inclusive financing, strengthening transparency through blockchain, and encouraging innovation in green financial products. On the other hand, the circular economy offers a low-carbon production and consumption paradigm through the principles of reduce, reuse, and recycle. The integration of the two creates strategic synergy in expanding green financial inclusion, increasing resource efficiency, and mitigating the risk of resistance to environmental transitions. However, challenges such as the digital divide, low financial literacy, and weak regulations still need to be addressed. This study recommends a multi-level strategy involving governments, the private sector, academia, and communities to accelerate the adoption of the digital green economy in developing countries.

Keywords: digital green economy, fintech, circular economy, sustainable development, developing countries

INTRODUCTION

The global economy is currently at a critical juncture due to a combination of multidimensional crises: the climate crisis, economic inequality, the COVID-19 pandemic, and technological disruption. The Intergovernmental Panel on Climate Change (IPCC, 2021) emphasized that the impact of climate change is increasingly real, characterized by increasing global temperatures, rising sea levels, and increasing frequency of natural disasters. This impact causes significant economic losses, especially in developing countries that have limited infrastructure resilience and adaptation capacity. On the other hand, the economic structure of developing countries generally still relies on resource-intensive sectors, such as manufacturing, mining, and conventional agriculture, which are often not environmentally friendly. This pattern of development exacerbates dependence on natural resources while increasing the carbon footprint.

To address these challenges, various sustainable development initiatives have been introduced, including the concept of a green economy that emphasizes low-carbon economic growth, resource efficiency, and social inclusion. The Green economy then develops towards a circular economy that offers a systemic approach in managing resources through the principles of reduce, reuse, recycle. The circular economy not only focuses on waste management, but also encourages innovative new business models, such as product-as-a-service and sustainable supply chains. However, the implementation of green and circular economies in developing countries faces obstacles, especially in terms of financing. Sustainable projects are often considered high-risk and unattractive to traditional investors, so the funding gap continues to widen. UNEP (2021) estimates that developing countries need more than USD 2.5 trillion per year to meet sustainable development targets, but the availability of funds is still far below the need.

This is where the role of financial technology (fintech) becomes very relevant. Fintech emerged as an innovation in the global financial system by presenting digital-based solutions, ranging from electronic payments, peer-to-peer lending, crowdfunding, to the application of blockchain in financial transactions. This technology has been proven to be able to increase financial inclusion in developing countries, especially for unbanked and underbanked groups who previously did not have access to conventional banking services. According to the World Bank (2020), fintech developments have reduced barriers to financial access in Asia and Africa, allowing millions of people to connect with the formal financial system through smartphones only. This potential is huge if it is directed to support green financing and the implementation of circular economy projects.

In addition, the integration between fintech and the circular economy can give birth to a new ecosystem that supports the transition to a digital green economy. For example, crowdfunding platforms can be used to fund plastic recycling projects, while blockchain-based systems can improve the transparency of green supply chains. In Indonesia, a number of initial initiatives have emerged, such as sharia fintech that supports renewable energy financing in villages, or digital applications that connect consumers with producers of environmentally friendly products. However, these efforts are still sporadic and have not been integrated into the national sustainable development strategy.

Climate change, limited natural resources, and global economic instability increasingly demand a more sustainable economic development model. For decades,

conventional economic development patterns in developing countries have still relied on extractive and linear models with take-make-dispose principles that pose serious problems in the form of overexploitation, environmental damage, and social inequality. According to the World Bank (2022), developing countries face the heaviest burden due to environmental degradation, ranging from air pollution, water crises, to the accumulation of plastic and industrial waste. On the other hand, the International Monetary Fund (IMF, 2021) emphasizes that the transition to low-carbon development requires structural reforms in the financial and production systems. Therefore, developing countries are required to find a transition strategy that integrates economic, social, and environmental dimensions, one of which is through the concept of digital green economy which combines financial technology (fintech) with circular economy practices.

The digital economy has grown rapidly in the last two decades and is one of the main drivers of global economic transformation. The UNCTAD report (2021) states that the contribution of the digital economy to global GDP has reached more than 15% in 2020, and this trend is expected to continue to increase, especially in developing countries that are experiencing accelerated adoption of digital technology due to the COVID-19 pandemic. On the other hand, green and circular economies are gaining international attention as an answer to the climate crisis and the need for sustainable development. The concept of circular economy emphasizes the principle of reduce, reuse, recycle which aims to extend the life cycle of products and reduce waste. If the digital economy can facilitate financial access and improve transaction efficiency, then its integration with the circular economy will create a new ecosystem that supports the green transition in a more inclusive manner.

Especially in developing countries, the transformation towards a digital green economy faces challenges as well as opportunities. The main challenges lie in the digital divide, weak regulations, and low financial literacy of the public. The OECD (2020) noted that in Southeast Asia, only about 30–40% of MSMEs have adequate access to digital financial services. In fact, MSMEs account for more than 60% of regional employment and GDP. Meanwhile, great opportunities are opening up through the development of fintech that is able to reach the unbanked and underbanked community. Fintech, through digital payment services, online lending and blockchain, can strengthen green financing and accelerate the adoption of circular economy practices.

Previous research has highlighted the role of fintech in driving financial inclusion. Demirgüç-Kunt et al. (2020) emphasized that digital financial services are able to lower transaction costs, expand access to credit, and increase public participation in the economy. On the other hand, studies on the circular economy in developing countries are also growing. Geissdoerfer et al. (2017) stated that the circular economy is not only a waste management model, but a new paradigm of economic development that balances profit, people, and the planet. However, the integration between financial technology and the circular economy as part of a sustainable transition strategy is still rarely explored in the academic literature, especially in the context of developing countries. Most research still addresses these two concepts separately, even though the potential for synergies is enormous.

The urgency of this research is even clearer given that developing countries face a dual threat: limited resources and global uncertainty. The UNEP report (2021) confirms that without economic transformation towards a low-carbon and circular

model, developing countries will suffer economic losses of up to 5% of GDP per year due to the impact of climate change. On the other hand, digital financial inclusion is an opportunity to create more equitable and participatory green financing. Therefore, integrating fintech into the framework of the circular economy not only provides innovative solutions to funding problems, but also encourages the participation of the wider community in sustainable transition efforts.

The novelty of this research lies in the idea of a digital green economy as a transition strategy that integrates fintech with the circular economy in developing countries. In contrast to previous research that focused more on the role of fintech in financial inclusion or the circular economy in environmental management, this study seeks to combine the two approaches into one strategic framework. With this perspective in mind, this article not only explains the potential of the digital economy in driving green development, but also how financial innovation can be a catalyst for circular practices at the community and industry levels.

The purpose of this study is to analyze the potential for the integration of financial technology with the circular economy in building a digital green economy as a sustainable transition strategy in developing countries. This article seeks to answer the question: how fintech can support green financing, the extent to which integration with the circular economy can reduce waste and improve resource efficiency, and what the policy implications are for developing countries looking to adopt this model.

Theoretically, this research is expected to enrich the literature on sustainable economics by offering a new framework for the integration of the digital and circular economy. Practically, this study provides policy recommendations for governments, industry players, and financial institutions to utilize fintech in supporting the green transition. The broader implications are the contribution to the achievement of the Sustainable Development Goals (SDGs), specifically SDG 8 (decent work and economic growth), SDG 9 (industry, innovation, and infrastructure), and SDG 12 (sustainable consumption and production).

RESEARCH METHODS

This study uses a qualitative approach with a conceptual literature review design. This method was chosen because the main purpose of the research is not to test the hypothesis quantitatively, but to develop a conceptual framework that explains the integration between financial technology (fintech) and the circular economy as a transition strategy towards a digital green economy in developing countries. Thus, this research emphasizes on the analysis, interpretation, and synthesis of various relevant literature.

The research process is carried out through several systematic stages. First, literature was identified from various international academic databases such as Scopus, Web of Science, ScienceDirect, and Google Scholar, as well as official sources from international organizations such as the World Bank, IMF, OECD, UNCTAD, and UNEP. The literature inclusion criteria include publications published between 2015–2023 to ensure data novelty, focusing on three main themes: (1) the role of fintech in financial inclusion and sustainable finance, (2) the concept and implementation of the circular economy in developing countries, and (3) transition strategies towards a green and digital economy.

The second stage is literature selection using the modified PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method. At this stage, titles, abstracts, and keywords are filtered to ensure relevance to the focus of the research. Articles that are not thematically appropriate or are only general descriptive in nature are excluded from the analysis list.

The third stage is content analysis, in which the selected literature is read in depth to find patterns, themes, and relationships between concepts. The analysis was carried out thematically with three main categories: (a) the development and challenges of fintech in developing countries, (b) the application of circular economy principles in the context of sustainable development, and (c) the potential for integration of the two in forming a digital green economy ecosystem.

To maintain the validity of the results, this study applies triangulation of sources by comparing academic literature, reports of international institutions, and relevant empirical data. In addition, critical analysis is carried out to identify research gaps, for example literature that discusses fintech without linking it to the circular economy, or vice versa. This gap then becomes the basis for proposing a new conceptual framework that the research offers.

This study is non-empirical, so it does not involve a population or sample in the conventional sense. The research subjects are academic literature and policy documents, while research instruments are thematic analysis guidelines developed by researchers to explore the interconnectedness between concepts. The data collection technique is carried out through desk research, focusing on journal articles, annual reports of international institutions, and public policy documents.

The data analysis technique uses a qualitative thematic analysis approach. Data obtained from the literature are categorized into specific themes, then interpreted to identify causal relationships and strategic implications. For example, the literature on fintech is analyzed to see the extent to which digital innovations can support green project financing; the literature on the circular economy is reviewed to understand sustainable business models; Then these two findings are synthesized to develop a framework for digital green economy integration.

RESULTS AND DISCUSSION

Overview of Fintech Developments in Developing Countries

The results of the literature review show that the development of financial technology (fintech) in developing countries has accelerated significantly in the last decade. According to the World Bank (2020), fintech has become an effective means to increase financial inclusion by providing fast, cheap, and easily accessible services through digital devices. In Southeast Asia, the value of fintech transactions in 2022 is estimated to reach more than USD 200 billion, with Indonesia and Vietnam as the main markets (Google-Temasek Report, 2022).

However, this rapid development is not entirely inclusive. The OECD (2020) notes that there is still a considerable digital divide between urban and rural communities, as well as between high- and low-income groups. As such, fintech has great potential, but it still faces digital and financial literacy challenges. This fact is important because limited access can hinder the role of fintech in supporting green financing and circular economy adoption.

The Role of the Circular Economy in the Development Transition

The concept of the circular economy offers a new paradigm in resource management. Instead of following a linear take–make–dispose model, the circular economy seeks to maintain the value of products, materials, and resources for as long as possible through the principle of reduce, reuse, recycle. Geissdoerfer et al. (2017) emphasized that the circular economy is not just an environmental strategy, but an economic development model that is able to create new added value, create green jobs, and reduce dependence on depleted natural resources.

In developing countries, the implementation of the circular economy faces obstacles in the form of technological limitations, low investment, and weak regulations. However, there is great potential in the informal sector that is already accustomed to recycling practices, such as waste pickers and small-scale plastic recycling industries. The main challenge is how to integrate these practices into a formal ecosystem that is more productive, innovative, and connected to sustainable financing mechanisms.

Integration of Fintech with the Circular Economy

The results of the literature synthesis show that the integration of fintech with the circular economy can be a key strategy towards the digital green economy. There are three main forms of integration that emerge from the analysis:

Inclusive Financing for Green Projects

Fintech through peer-to-peer lending and crowdfunding models allows for more inclusive financing for circular projects, such as plastic recycling ventures, processing organic waste into energy, or product-as-a-service business models. For example, crowdfunding platforms in Africa are used to finance solar energy projects in remote villages (GSMA, 2021). A similar approach can be adopted in Southeast Asia to support green MSMEs.

Blockchain for Supply Chain Transparency

Blockchain technology, which is widely used by fintechs, can increase transparency in circular supply chains. With blockchain, companies can track the origin of raw materials, ensure compliance with environmental standards, and reduce greenwashing practices. This strengthens consumer and investor confidence in green products.

Green Digital Product Innovation

Fintech also plays a role in creating environmentally oriented digital financial products, such as blockchain-based green bonds, parametric-based climate insurance,

or microcredit for MSMEs that are committed to implementing circular practices. These products accelerate financial integration with environmental goals.

Thematic Analysis: Synergies and Challenges

Table 1. Integration of Fintech and the Circular Economy in Developing Countries

Dimension	The Role of Fintech	The Role of the Circular Economy	Potential Synergies	Challenge
Access to Financing	P2P lending, crowdfunding, digital microfinance	green MSMEs, recycling projects, renewable energy	Fintech finances circular projects at a lower cost	Weak regulation, moral hazard risk, low financial literacy
Transparency	Blockchain, smart contracts	Circular supply chain, waste management	Blockchain ensures greenwash-free green products	High implementation costs, limited adoption in the informal sector
Product Innovation	Green digital bonds, insurance, green e-wallets	Reuse/recycle, <i>circular design</i> business model	Integration of digital finance with circular business models	Lack of fiscal incentives and regulatory ecosystem
Social Inclusion	Access for <i>the unbanked</i> and <i>underbanked</i>	Community participation in waste management	Digital literacy & finance increase citizen participation	Digital inequality, infrastructure limitations

Most previous research has addressed fintech only in the context of financial inclusion or digital innovation. Demirgüç-Kunt et al. (2020), for example, emphasize the importance of fintech to expand access to finance, but does not discuss the environmental dimension. Meanwhile, circular economy studies focus more on environmentally friendly business models, energy efficiency, and waste management (Geissdoerfer et al., 2017). This research offers a new perspective by integrating the two concepts, thus expanding the literature on sustainable transition strategies in developing countries.

Discussion

Fintech as a Catalyst for Green Economic Transformation

Fintech has proven to play a crucial role in increasing financial inclusion in developing countries. This role is not only concerned with financial access, but also the transformation of the economic development paradigm that is more adaptive to

environmental challenges. With the presence of digital payment platforms, peer-to-peer lending, crowdfunding, and blockchain, fintech offers efficiency, speed, and affordability. In many developing countries, millions of unbanked people have managed to gain access to formal financial ecosystems thanks to fintech services (Demirgüç-Kunt et al., 2020).

However, the relevance of fintech in the framework of the digital green economy lies in its ability to create a more inclusive green financing model. Fintech can bring together investors with environmentally friendly small and medium enterprises (MSMEs) that previously had difficulty accessing conventional banking funds. A real-world example can be found in the funding of community-based renewable energy projects in Africa, where mobile money is used to finance the installation of household solar panels. This shows that fintech is not just a financial technology innovation, but also a transformative instrument that supports the achievement of the sustainable development agenda.

Circular Economy: Shifting the Production and Consumption Paradigm

The circular economy exists as an answer to the inability of linear economic models to maintain sustainability. The linear take–make–dispose model has been proven to create massive waste, accelerate the exploitation of natural resources, and increase carbon emissions. The circular economy offers an alternative paradigm that focuses on material efficiency, product life cycle extension, and reuse and recycle-based business model innovation.

In developing countries, the implementation of the circular economy faces major challenges. For example, in plastic waste management, although there is an informal ecosystem that actively recycles, this sector is still not integrated into national economic policies. However, with regulatory support and fiscal incentives, circular potential can be optimized. According to Geissdoerfer et al. (2017), the circular economy is not only an environmental agenda, but also an economic opportunity that is able to open up green jobs, expand product innovation, and increase global competitiveness.

When combined with fintech, circular practices can obtain sustainable financing that was previously unavailable. For example, MSMEs recycling organic waste can access working capital through green crowdfunding platforms, while tracking the supply chain of recycled materials can be strengthened with blockchain technology. This shows the potential for real synergies between the two concepts.

Integration of Fintech and the Circular Economy: Creating a Digital Green Economy Ecosystem

The integration of fintech and the circular economy is not just the coexistence of two concepts, but an effort to build a new economic ecosystem that strengthens each other. The literature review reveals three main axes of integration:

- 1) Access to green financing – Fintech enables alternative financing models for circular economy projects, including green MSMEs and renewable energy innovations.
- 2) Transparency and accountability – Blockchain in fintech can ensure the authenticity of green practices, so that consumers and investors avoid greenwashing.
- 3) Innovation of green financial products – Fintech can launch new instruments such as digital-based green bonds, climate insurance, or impact investing platforms.

This synergy creates a digital green economy, which is an economy that combines the power of digital technology with the principle of sustainability. This model is particularly relevant for developing countries because it is able to overcome capital constraints, while accelerating the transition to low-carbon development.

Implementation Challenges in Developing Countries

Despite its great potential, the integration of fintech and the circular economy is inseparable from various challenges. First, regulation is still a crucial issue. Many developing countries do not yet have a clear legal framework for fintech, let alone for digital-based green financing instruments. Regulatory ambiguity risks creating vulnerabilities, such as digital fraud, data breach, and the risk of money laundering.

Second, people's financial and digital literacy is still low. An OECD study (2020) confirms that less than 40% of MSMEs in Southeast Asia have sufficient financial literacy to take advantage of digital services. This hinders the adoption of fintech as a green financing instrument.

Third, digital infrastructure inequality is a serious barrier. Despite the increasing internet penetration, there are still many rural areas in developing countries that do not have adequate access. Without equitable digital infrastructure, the digital green economy will further widen the gap between urban and rural areas.

Fourth, social and economic risks also need to be considered. Fintech has the potential to create over-indebtedness if regulations are not strict. Meanwhile, the adoption of the circular economy may face cultural and structural resistance, especially in the industrial sector that still relies on linear models.

Previous research has more discussed the role of fintech in financial inclusion (Demirgüç-Kunt et al., 2020) or the circular economy in environmental sustainability (Geissdoerfer et al., 2017). However, there is very little literature that integrates the two within the framework of sustainable transition. For example, the World Bank (2022) emphasizes the importance of the digital economy for development, but does not specifically link it to the circular economy. Similarly, UNEP (2021) focuses on the need for the green transition, but does not highlight digital financial instruments. *The novelty* of this research lies in the integration of concepts. By bringing together fintech and the circular economy, this research provides a new framework for the

digital green economy that is relevant to developing countries. This expands the scope of the literature and bridges existing research gaps.

This discussion confirms that the integration of fintech and the circular economy creates a great opportunity for the transition to a digital green economy in developing countries. Fintech presents inclusive and transparent financing solutions, while the circular economy shifts the paradigm of production and consumption to be more efficient and low-carbon. However, the success of this integration is largely determined by regulation, literacy, and digital infrastructure. Therefore, a sustainable transition strategy must be multi-level, involving governments, industry, academia, and society. Thus, the digital green economy can become a new development strategy that is inclusive, sustainable, and competitive in the midst of global challenges.

CONCLUSION

This research shows that the integration of financial technology (fintech) and the circular economy has great potential to be the foundation for the formation of a digital green economy in developing countries. Fintech plays a role in providing inclusive financing, transparency through blockchain, and green financial product innovation, while the circular economy presents a more efficient and low-carbon production and consumption paradigm. The synergy between the two creates a transition strategy that is able to respond to the challenges of the climate crisis, limited resources, and sustainable development needs. However, these findings also confirm that the success of integration does not only depend on technological innovation, but also on strong regulations, financial literacy, and the readiness of digital infrastructure in developing countries.

As a recommendation, the government needs to formulate policies that support the digital green economy ecosystem through regulations on the distribution of green financing, fiscal incentives for circular projects, and legal frameworks that strengthen digital transparency. Universities and research institutions can play a role as centers for innovation and literacy dissemination, while the private sector is encouraged to invest in green business models that are integrated with digital technologies. At the community level, MSMEs and local communities should be given access to environmentally friendly fintech instruments to expand participation. With this multi-level strategy, the integration of fintech and the circular economy can be accelerated, so that developing countries are able to transform towards a more inclusive, competitive, and sustainable economy in the digital era.

BIBLIOGRAPHY

- Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2020). The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution. World Bank Group. <https://doi.org/10.1596/978-1-4648-1259-0>
- Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768. <https://doi.org/10.1016/j.jclepro.2016.12.048>

- Google, Temasek, & Bain & Company. (2022). e-Conomy SEA 2022: Through the waves, towards a sea of opportunity. Google-Temasek-Bain Report. <https://economysea.withgoogle.com>
- Intergovernmental Panel on Climate Change. (2021). Climate Change 2021: The Physical Science Basis. Cambridge University Press. <https://doi.org/10.1017/9781009157896>
- International Monetary Fund. (2021). Fostering inclusive and green recovery. IMF Policy Paper. <https://www.imf.org>
- Organisation for Economic Co-operation and Development. (2020). Digital disruption in banking and its impact on competition. OECD Publishing. <https://doi.org/10.1787/9789264206090-en>
- United Nations Conference on Trade and Development. (2021). Digital Economy Report 2021: Cross-border data flows and development. United Nations. https://unctad.org/system/files/official-document/der2021_en.pdf
- United Nations Environment Programme. (2021). Making peace with nature: A scientific blueprint to tackle the climate, biodiversity and pollution emergencies. UNEP. <https://www.unep.org/resources/making-peace-nature>
- World Bank. (2020). World Development Report 2020: Trading for development in the age of global value chains. World Bank Publications. <https://doi.org/10.1596/978-1-4648-1457-0>
- World Bank. (2022). World Development Indicators 2022. World Bank Data. <https://databank.worldbank.org>
-

**Copyright holders:
Elsa Islammia Pasha (2025)**

**First publication right:
Echo of Economics (Journal of the Faculty of Economics)**

This article is licensed under a Creative Commons Attribution-ShareAlike 4.0 International

