



Digital Finance in Promoting Financial Inclusion and Economic Growth

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Abstract. Digital finance has emerged as a powerful driver of economic inclusion and growth in developing countries. By leveraging mobile banking technologies, digital wallets, and AI-driven platforms, it enables previously unbanked populations and small businesses to access essential financial services. This enhanced access to credit, savings, and insurance not only boosts economic participation but also significantly increases productivity and reduces poverty levels, especially in regions with underdeveloped infrastructure. However, the rapid expansion of digital finance also catalyzes several critical challenges. Data privacy breaches pose a significant risk to users, while regulatory fragmentation complicates compliance and cross-border transactions. Additionally, sustainability concerns need to be addressed to ensure long-term viability. To address these issues, collaborative efforts are imperative. Governments must adopt harmonized regulations to streamline the digital finance landscape. Meanwhile, tech firms should invest in AI-powered fraud detection and green fintech solutions to enhance security and sustainability. Only through such balanced innovation can digital finance fully realize its potential as a catalyst for equitable and sustainable development, ultimately benefiting millions of people in developing economies.

Keywords: Digital Finance, Financial Inclusion, Economic Development.

1 Introduction

In recent years, the rise of digital finance has made a significant impact on the wider financial sector, particularly in developing countries where a solid banking system may be absent. Digital finance leverages the Internet, big data, and artificial intelligence (AI) to remove obstacles to financial inclusion, giving millions of unbanked individuals and small-scale businesses access to essential financial services. This paper aims to explore how digital finance boosts economic development and inclusion, with a special focus on developing countries, which usually face significant challenges but also hold substantial opportunities in digital finance. Digital finance has not only made financial services more accessible but also improved economic productivity and helped reduce poverty. By applying mobile banking, digital wallets, and AI-enabled technologies, digital finance has reached people and businesses in

rural and economically disadvantaged areas, creating more opportunities for economic activities and making the economy more responsive. This paper will examine how digital finance encourages economic growth and inclusion in developing countries, as well as the implications and challenges that it presents.

2 The Role: Enhancing Financial Inclusion and Economic Participation

Digital finance employs technologies like the Internet, big data, and AI to enhance the accessibility and efficiency of financial services, including payments, lending, and insurance. Key products, such as mobile payment services (e.g., Alipay and WeChat Pay), digital lending platforms (e.g., P2P lending), cryptocurrency (e.g., Bitcoin), and digital insurance platforms (e.g., Ant Fortune Investment), make financial transactions more secure, efficient and accessible. The hallmark of digital finance is its on-demand access feature, which not only eliminates barriers in underprivileged areas but adapts easily to market changes through AI. Consequently, digital finance is being embraced globally. Among them, China has seen rapid development across multiple areas, including payments, lending, and insurance, with a high mobile payment penetration rate and a large digital finance market scale. Similarly, emerging market countries like India and Brazil are rapidly adopting digital finance, particularly in mobile payments and digital banking [1].

Additionally, digital finance supports sustainability efforts by sponsoring green projects. According to the World Bank, emerging market countries will need between US\$6.9 trillion and US\$7.6 trillion in funding to accomplish the Sustainable Development Goals (SDGs) between 2023 and 2030. This indicates that digital finance has significant potential and demand in supporting green projects and sustainable development. Since 2016, 26 emerging market countries have issued a total of US\$125 billion in green, social, and sustainability bonds. These figures demonstrate the tangible contributions of digital finance in promoting sustainable development [2].

Mobile banking and digital wallets are crucial components of digital finance, promoting greater participation in the mobile economy, especially in countries with underdeveloped banking structures [3]. In Bangladesh, for example, mobile banking has revolutionized business practices for many unbanked individuals, particularly in rural areas. It allows them to conduct transfers, open savings accounts, and obtain micro-loans without visiting a bank [4]. According to the Bangladesh Bank, the transaction volume of mobile financial services (MFS) in Bangladesh reached Tk 1.6474 trillion in December 2024, with a total annual volume of Tk 17.37 trillion—a 28.42% increase from 2023. By the end of December 2024, the total number of MFS accounts in Bangladesh reached 238.6 million, up by 18.2 million from 220.4 million in December 2023, showing significant user growth. The popularity of mobile financial services is attributed to their convenience in areas such as salary disbursement, remittances, and utility bill payments, making them widely accepted in both urban and rural areas. In 2024, the MFS market in Bangladesh continued to grow strongly,

demonstrating the great potential of digital finance in enhancing financial accessibility and promoting financial inclusion [5].

Similarly, digital wallets have become increasingly common in developing regions, with one in five users relying entirely on digital payment methods, highlighting their convenience and security [6]. In Oman, for instance, mobile wallets have been rapidly adopted by younger generations in less developed areas. According to a survey by the National Bank of Oman, around 40% of rural youth used mobile wallets in 2019, this figure grew to 60% by 2022. Ghouse et al. found that mobile wallet usage among young Omani rural populations enhanced economic participation and empowerment by providing cashless transaction avenues. About 65% of users engaged in at least one small-scale commercial transaction in the past year, compared to just 20% of non-users [7]. These advancements have significantly improved financial inclusion in underdeveloped areas with limited access to banking facilities.

3 The Impact of Digital Finance

3.1 Boosting Growth via Optimized Transactions

Digital finance has significantly fostered financial inclusion in under-developing regions by leveraging digital means to expand access to financial services and support economic growth.

In the Middle East and North Africa (MENA) countries, digital methods have significantly increased financial inclusion levels, enabling over 40 million people, approximately 25% of the population, who previously lacked access to insurance, loans, or savings plans to obtain these services [8]. Similarly, in China, platforms like Alipay and WeChat Pay have enabled over 900 million citizens, approximately 64% of the population, to conduct digital transactions and access a broader range of financial services [9].

These advancements have also benefited small and medium-sized enterprises (SMEs), which often struggle to access diverse financial products. The growth of digital platforms has increased access to finance in developing economies, with over 1.5 billion people—roughly 60% of the population in these regions—now using digital financial services. This trend is evident in both China and Indonesia, where digital finance has empowered SME development through alternative capital financing, improved capital acquisition, and encouraged entrepreneurship in areas with limited banking facilities [10].

Digital finance tools offer significant advantages in terms of transaction convenience, financing thresholds, service scope, and risk assessment. Previously, businesses had to visit bank branches to submit detailed financial statements, collateral certificates, and business plans. The bank would then assign a dedicated person to review these documents, and the approval process could take several weeks. In contrast, with digital finance tools like Alipay's "MyBank Loan," businesses can apply for loans online. The system automatically assesses risk based on the company's transaction data and credit records, completing approval within seconds and disbursing funds immediately.

By removing geographical and logistical barriers, digital finance enhances accessibility and transaction speed, fostering economic participation and growth through investment, innovation, and scaling [11]. This indicates that digital finance is a crucial component in enhancing financial inclusion for both individuals and businesses. These findings suggest that digital finance could be a game-changer, offering greater opportunities to deepen financial inclusion and support economic development. The provision of digital finance services positively impacts the economy by broadening participation, increasing financial literacy, and improving overall financial stability.

3.2 Boosting Growth via New Funding

Digital finance promotes economic growth by enabling access to new forms of capital through online lending, mobile payments, and digital investments, bypassing traditional banking limitations [12].

Alipay has participated in the national-level financing coordination mechanism for micro, small, and medium-sized enterprises (MSMEs). By collaborating with local governments and financial institutions, Alipay provides precise financing support to eligible MSMEs. This mechanism leverages big data and credit assessment to help MSMEs quickly obtain loans while reducing risks for financial institutions. It also promotes the implementation of inclusive finance policies. For instance, MyBank (a digital bank affiliated with Alipay) launched the "Thousand Enterprises, Ten Thousand Households" initiative, conducting in-depth visits to industrial parks, communities, and rural areas to identify financing needs and provide support. This model increases the coverage of financial services, lowers financing costs for SMEs, and drives economic growth by efficiently allocating resources and reducing risk appetite [13].

Another example is the "OneConnect Digital Bank One-Stop AI Platform," which supports over 4,000 financial business scenarios through more than 300 AI core algorithm APIs. The platform covers functions such as intelligent customer service, risk control, and lending. It provides efficient and flexible financing services for SMEs and promotes the international development of inclusive finance through its modular design and flexible deployment methods [14].

3.3 Ensuring Economic Development

Digital finance significantly drives economic growth by optimizing financial transactions and expanding access to capital. On the micro-level, it empowers SMEs through digital loans, alternative credit scoring, and online platforms, fostering innovation and job creation. For example, in China, platforms like Alipay and WeChat Pay have enabled SMEs to scale rapidly, enhancing industry competition and fostering innovation. As of 2023, Alipay had over 1 billion users and processed over 100 billion transactions, significantly boosting SME development [12]. Similarly, in Sub-Saharan Africa, mobile payment services like Kenya's M-Pesa have improved cash flow and supported local entrepreneurship, driving economic development in rural areas. M-

Pesa covers over 20 million users, with transaction volumes accounting for nearly 50% of Kenya's GDP [13].

At the macroeconomic level, digital finance enhances financial system resilience through blockchain technology, which ensures secure and transparent cross-border payments via distributed ledgers and encryption. For example, Ripple leverages blockchain to provide fast, low-cost, and transparent solutions for cross-border payments. Its decentralized payment network reduces the risk of single points of failure through smart contracts and distributed ledger technology. Additionally, Ripple's payment protocol (such as the Interledger Protocol) connects different accounting systems, enabling rapid currency conversion and reducing transaction costs and delays. This technology also automates transactions through smart contracts, reducing the likelihood of human error and fraud, and thereby enhancing financial system stability [15].

Digital finance also optimizes resource allocation. Ant Group's MYbank supports SME financing through big data and credit assessment systems. For example, MYbank's "310" model (3 minutes to apply, 1 second to disburse, zero human intervention) has greatly simplified the loan process and lowered financing barriers for SMEs. This model enhances the efficiency of financial services and optimizes the allocation of financial resources, directing more funds towards promising SMEs [16].

Furthermore, digital finance promotes economic growth and stability. A researcher at the China Institute of Banking and Finance noted that the widespread adoption of mobile payments in China has significantly boosted consumer spending and business sales. Platforms like Alipay and WeChat Pay offer seamless online and offline payment options, enhancing consumption efficiency and driving the development of industries such as retail, catering, and e-commerce. Payment data during the 2025 Spring Festival shows further increased penetration of mobile payments, with significant growth in the number and amount of transactions processed by China UnionPay and NetUnion. This reflects robust consumer vitality and enhanced payment convenience. In particular, the amount and number of transactions made by inbound tourists using Alipay and WeChat Pay have increased significantly year-on-year, indicating that mobile payments also promote cross-border consumption [17].

Finally, digital finance supports macroeconomic policies, particularly green finance, through big data and smart contracts. Some financial institutions use digital platforms to conduct precise assessments and capital allocation for green projects, ensuring that funds flow to environmentally sound projects. This model enhances the transparency of green finance and supports the implementation of macroeconomic policies. Moreover, digital finance promotes sustainable green economic growth by facilitating green investments and rationalizing corporate pollution fees. For example, in 2024, the People's Bank of China and six other departments jointly issued the "Guiding Opinions on Further Strengthening Financial Support for Green and Low-Carbon Development," proposing the use of digital finance tools to support the transition to green and low-carbon development [18].

In summary, digital finance's impact on economic growth is evident through both micro and macro mechanisms. It supports SME development and innovation while driving national economic stability and expansion. As digital finance continues to

advance, its role in fostering inclusive and sustainable economic growth will become even more significant.

4 Mobile Banking in Financial Inclusion and Poverty Alleviation

4.1 Features of Mobile Banking

As a crucial component of digital finance, mobile banking significantly advances financial inclusion and poverty alleviation by providing accessible and cost-effective financial services. Particularly in areas underserved by traditional banking, mobile banking enables users to conduct financial transactions anytime and anywhere, access loans, savings, and insurance, and better manage personal and household finances. This enhances economic resilience [19].

Shaikh and Karjaluoto categorize mobile banking service models into three types: bank-led systems, third-party collaborations, and standalone platforms. Bank-led systems are provided by traditional financial institutions, third-party collaborations involve partnerships between banks and fintech companies, and standalone platforms are independent mobile banking applications. These models aim to reduce operational costs while increasing user accessibility [20].

Fenu and Pau emphasize that mobile banking applications focus on security and usability, featuring secure transaction systems, biometric authentication, and encryption to protect user data and build trust—both crucial for widespread adoption [21]. Souiden highlights the portability and convenience of mobile banking, which allows users to conduct financial transactions without visiting physical bank branches [19].

4.2 Mobile Banking and Poverty Alleviation

Mobile banking has emerged as a powerful tool in poverty alleviation by extending financial services to underserved populations previously excluded from traditional banking systems. By integrating with other financial solutions, such as mobile wallets, mobile banking applications enhance the overall efficiency of financial services, making them more accessible and user-friendly. This integration is particularly critical in areas where physical banking infrastructure is scarce or unreliable. For example, Souiden's research in Ghana shows that mobile banking addresses challenges like high transaction fees and geographic barriers, making financial services more accessible to people in remote locations [19].

As of 2023, Mtn Mobile Money, Ghana's largest mobile banking platform, has over 15 million users and covers most regions, including remote rural areas. The platform processes over 100 million transactions per month, with a transaction value exceeding 1 billion Ghanaian cedis (approximately \$150 million). Mtn Mobile Money offers a variety of services, including money transfers, savings, microloans, and bill payments. Users can perform these operations via SMS or mobile apps without visiting a bank branch. Compared to traditional bank transfer fees of up to 5% of the

transaction amount, Mtn Mobile Money charges only 1% to 2% [19]. This cost-effectiveness is particularly beneficial for low-income users, reducing financial barriers and promoting economic inclusion.

Mobile banking plays a vital role in reducing poverty by lowering financial costs and providing essential financial services to marginalized communities. Southern argues that these services help users build financial resilience, enabling them to better withstand economic shocks [19]. Djahini-Afawoubo et al. show that mobile money services have significantly contributed to poverty reduction by enabling small businesses to access crucial financial tools like micro-loans and savings products. These tools are essential for business growth and sustainability, especially for entrepreneurs in developing regions who struggle to access traditional banking services [22].

In Bangladesh, Lee et al. demonstrate how mobile banking has positively impacted rural communities by stabilizing household incomes. After training, the usage rate of mobile banking in rural areas increased from 22% to 70%, showing that simple training can greatly encourage adoption, especially in regions with low technological familiarity. For active users, remittances from urban to rural areas increased by 27%, equivalent to 27% of the remitters' monthly income. This increase directly reduced extreme poverty among rural families and increased household consumption by 7.5%. Rural families also experienced decreased borrowing, increased savings, and improved consumption capacity during the "Monga" season (a period of food scarcity). Additionally, there was an increase in self-employment activities and agricultural investments, further promoting economic stability. Migrant family members working in urban areas also saw reduced poverty and increased savings, though they faced longer working hours and a decline in health status [6].

Kelikume echoes these findings, highlighting how mobile banking has significantly contributed to poverty alleviation in Africa. Research indicates that the proliferation of mobile phones and the use of the Internet are positively correlated with the development of the informal economy. Enhanced financial inclusion is closely related to the growth of the informal sector, suggesting that it can promote the development of this sector. The widespread use of mobile phones and the Internet is significantly associated with poverty reduction. For example, Kenya's M-Pesa platform offers mobile payment and remittance services, enabling families to receive financial support during economic shocks, thereby reducing poverty [23].

Ezzahid and Elouaourti state that in Morocco, mobile banking has significantly reduced barriers to financial inclusion. Despite ongoing challenges in remote areas and high costs, mobile banking has helped eliminate these barriers. The research also highlights that higher education levels and labor force participation are key drivers of financial inclusion. Individuals with higher education are more likely to use mobile banking services. The widespread adoption of mobile banking has also reduced the frequency of informal financial activities, providing more convenient formal services to groups like women, the elderly, and those with lower education levels [24].

4.3 Contributions of Mobile Banking to Poverty Reduction

Overall, mobile banking has provided positive support for poverty alleviation and economic development at both the micro (individual, household) and macro (societal) levels. The main contributions are reflected in the following aspects:

At the Micro Level. Mobile banking enhances individual and household financial stability. It helps users manage their personal and household finances more effectively by providing real-time transaction capabilities and tools to monitor financial activities. Fenu and Pau point out that these features enable users to better track their spending and savings [21]. When individuals or households face financial emergencies, the immediate access to funds offered by mobile banking plays a crucial role. Rahmani et al. emphasize that this immediacy provides users with a greater sense of financial security [25]. Moreover, the widespread use of mobile banking has reduced reliance on informal financial services, especially among vulnerable populations who lack access to traditional financial services, such as women, the elderly, and those with lower education levels.

At the Macro Level. By expanding access to financial services, mobile banking has contributed to poverty alleviation and economic growth on a larger scale. Lechman and Popowska argue that digital financial technologies, including mobile banking, reduce economic inequality by promoting financial inclusion and supporting sustainable development goals [26]. Mobile banking has provided large-scale financial services in areas with limited access to traditional banking infrastructure, supporting overall economic development. The widespread adoption of this technology has reduced financial exclusion among vulnerable groups and boosted economic development in low-income regions [27]. Shaikh and Karjaluo highlight that the scalability of mobile banking enables it to adapt to different economic contexts, effectively promoting financial inclusion even in countries with varying levels of economic development [20]. Ussif et al. found that mobile banking services in Ghana have addressed long-standing financial challenges, such as high costs and the lack of physical banking infrastructure. The proliferation of these services has significantly contributed to poverty alleviation in regions underserved by traditional financial systems [28].

5 Challenges and Countermeasures

Despite the many advantages of digital finance, its drawbacks cannot be ignored. Digital finance faces a wide range of barriers that limit its full potential. One major challenge is the risk of privacy and data breaches. The high dependence of financial institutions and users on digital technologies increases the likelihood of financially sensitive information being compromised [29]. This risk is identified as a key reason for the low trust among consumers who are reluctant to provide personal and financial information on digital platforms [30]. To address these threats, it is crucial to develop and implement advanced protection systems, including encryption, biometric authen-

tication, and AI-based solutions. Additionally, robust privacy regulations, such as the General Data Protection Regulation (GDPR), are essential to ensure that users' information is not misused. Pedace et al. indicated that stronger privacy measures are necessary to enhance user confidence in digital financial services [29]. Sun et al. also advocated for coordinated efforts between global regulators and financial services to establish universal privacy protection standards [31].

The growth of digital finance has also led to an increase in fraud risks, such as payment fraud, identity theft, and cyberattacks. Daraojimba argues that these fraudulent activities have significantly hindered the development of digital finance, undermined the credibility of digital platforms, and impeded their widespread adoption [32]. While digital payment systems offer convenience, they also expose financial institutions to new types of financial crime. To mitigate these risks, it is essential to rely on sophisticated fraud detection systems that leverage artificial intelligence (AI), machine learning, and real-time data analytics. These technologies can monitor transactions in real time and detect suspicious activities before they escalate, thereby preventing potential fraud. Regulators should also encourage financial institutions to adopt such technologies and ensure their integration into existing systems. Kajol et al. asserted that effective frameworks to prevent digital fraud can only be created through collaboration among governments, financial institutions, and technology providers [33]. Regular audits and compliance checks are necessary to ensure that digital platforms adhere to security standards.

Regulatory risks, particularly inconsistencies in regulations across regions, pose another significant challenge to the expansion of digital finance. Tian and Lu point out that different countries have diverse regulatory frameworks, which complicate international transactions and hinder the establishment of global financial platforms [34]. To address this issue, they propose that cross-regional and cross-organizational collaboration is essential for creating harmonized regulatory frameworks. Such collaboration can facilitate smoother cross-border transactions and promote the global expansion of digital finance [34]. Raihan supports this view, emphasizing that cooperated efforts can also help address compliance challenges in emerging markets, ensuring a stable and secure environment for the growth of digital finance [35].

The technological integration of micro, small, and medium-sized enterprises (MSMEs) in digital finance is a significant obstacle in developing economies. Hendrawan et al. points out that these enterprises often face technological and infrastructural challenges that impede the effective adoption of digital financial solutions. Limited access to technology and low levels of digital literacy further exacerbates these barriers, hindering MSMEs' ability to participate fully in the digital economy. To address these challenges, governments and financial institutions should provide targeted support to MSMEs through technology management programs, capacity-building initiatives, and digital literacy campaigns. Hendrawan et al. argue that combining fintech solutions with affordable access to digital tools and training can enable MSMEs to integrate digital finance into their operations. This integration not only propels their growth but also contributes to broader economic development [36].

Finally, sustainability concerns related to the environmental impact of digital finance present another significant challenge. Blockchain technologies and digital in-

frastructure are associated with high energy consumption, raising questions about the long-term sustainability of digital finance. The integration of green technologies and improved energy efficiency in data centers to reduce the environmental footprint is imperative. Digital finance can play a positive role in sustainability efforts by financing green projects and encouraging investment in sustainable industries [35]. By promoting sustainable digital finance practices, the sector can contribute to both economic growth and environmental sustainability.

6 Conclusion

This research has investigated how digital finance supports financial inclusion and economic development, especially in developing countries. Digital finance, particularly through mobile banking and digital wallets, makes financial services more accessible. It also helps reduce poverty and supports economic growth. By leveraging technologies like AI and big data, digital finance can reach people in remote areas and those excluded from the traditional financial system. Mobile banking, in particular, has been effective in providing quick access to funds, safe savings options, and small loans.

However, this study has some limitations. It does not delve into specific technologies or the impact of local regulations on digital finance. Future research should explore these areas and address challenges such as data privacy, fraud, and regulatory differences. It would also be beneficial to examine the environmental impact of digital finance and identify ways to enhance its sustainability.

In conclusion, digital finance holds significant potential to drive economic growth and expand financial inclusion. To fully realize this potential, collaborative efforts are needed to overcome existing challenges. This will ensure that digital finance continues to benefit individuals and strengthen economies.

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