# The Impact of Financial Technology (Fintech) on Financial Inclusion in Developing Countries: A Critical Literature Analysis

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**ABSTRACT**
*This study examines how fintech is opening up access to financial services for marginalized communities in developing countries. Through a systematic literature review, we analyze how innovations such as digital wallets, peer-to-peer lending, and digital banking are changing the landscape of financial inclusion. Findings suggest that fintech plays a significant role in addressing geographic and cost barriers, but its effectiveness depends on digital infrastructure, supportive regulations, and the digital literacy level of the population. Despite its promise, the digital divide and data security remain major challenges. The results of this study offer valuable insights for policymakers and practitioners in designing strategies that maximize fintech's potential to expand financial access while minimizing its risks.*

**Keywords:   Fintech, Financial Inclusion, Developing Countries**

## INTRODUCTION

In the rapidly evolving digital era, access to financial services has become a fundamental requirement for meaningful economic participation. However, a concerning reality persists in many developing countries, where millions of people live without access to formal financial services. World Bank data reveals that approximately 1.7 billion adults worldwide still lack bank accounts, with the majority residing in developing countries across Asia, Africa, and Latin America. These include small farmers struggling to obtain credit for seeds and fertilizers, informal traders who must store savings under mattresses with the risk of loss, or families paying high fees to send remittances to their hometowns. This phenomenon creates what economists call "premium poverty" where the poor pay more for financial services compared to those with full access to conventional banking systems (Demirgüç-Kunt et al., 2018).

In this challenging landscape, financial technology or "fintech" emerges as a beacon of hope. Driven by widespread smartphone penetration, developing internet infrastructure, and innovation in digital business models, fintech offers alternative pathways to provide financial services to previously unserved and underserved populations. Various solutions such as mobile wallets, peer-to-peer lending platforms, digital microinsurance, and branchless banking services are beginning to open doors to the formal financial system for those who have been marginalized. The presence of fintech not only promises reduced transaction costs and expanded geographical reach, but also democratization of access to financial products previously available only to middle-to-upper income segments (Ozili, 2021).

Despite its promising potential, the relationship between financial technology and financial inclusion is neither simple nor linear. Various complex factors such as digital infrastructure, regulatory frameworks, financial and digital literacy, and socio-cultural

dynamics play crucial roles in determining the extent to which fintech innovations can effectively drive meaningful financial inclusion. Some technologies successful in one developing country context may fail in another due to differences in supporting ecosystems. This creates an urgency to understand more deeply the mechanisms, impacts, and critical factors affecting fintech effectiveness in expanding financial access across various developing country contexts.

This research aims to bridge this understanding gap through a systematic literature review that critically analyzes how financial technology affects financial inclusion in developing countries. Specifically, this study seeks to: (1) identify various mechanisms through which fintech facilitates access, usage, and quality of financial services; (2) evaluate empirical evidence on the actual impact of fintech on various dimensions of financial inclusion; and (3) uncover contextual factors that influence the success or failure of fintech initiatives in promoting financial inclusion.

The significance of this research lies in its multidimensional contribution. For policymakers, research findings can serve as a foundation for designing regulatory frameworks that encourage fintech innovation while protecting consumers and financial system stability. For traditional financial institutions, study results can provide insights into collaboration models with fintech companies to reach new market segments. For fintech industry players themselves, this research can help identify critical success factors and adaptation strategies for various developing country contexts. Ultimately, the greatest benefit is aimed at communities who have been marginalized from the formal financial system, where better understanding of fintech's potential and limitations can pave the way for more inclusive and sustainable solutions.

To achieve these objectives, this research attempts to answer three key questions. First, how does financial technology affect various dimensions of financial inclusion in developing countries? These dimensions include access to financial services, frequency and usage patterns, service quality, and welfare impacts. Second, what factors influence fintech effectiveness in promoting financial inclusion in different contexts? This includes technological, regulatory, market, socio-cultural, and demographic factors. Third, what are the main challenges and constraints in implementing fintech solutions for financial inclusion in developing countries, and how can these challenges be addressed?

It is important to note that this research has certain limitations in its scope. The literature review focuses on studies published between 2015 and 2025, considering the rapidly evolving nature of fintech and the relevance of current findings. Additionally, while financial inclusion is a global challenge, this research specifically focuses on developing country contexts, where financial access gaps are most significant and fintech's transformative potential is most promising. As revealed by Suri and Jack (2016) in their longitudinal study of M-Pesa in Kenya, fintech's transformative impact may require time to fully materialize and vary based on users' socio-economic characteristics, making temporal perspective important to consider in analysis.

As suggested by Zetzsche et al. (2020), the fintech revolution has the potential to change the financial paradigm from expensive branch-based models to inclusive data-based models. However, this transformation requires deeper understanding of the dynamics and nuances of fintech implementation across various developing country contexts. Through comprehensive and critical literature analysis, this research seeks to enrich our understanding of how financial

technology can become an effective catalyst for meaningful, sustainable, and positively impactful financial inclusion for those who have been beyond the reach of conventional financial systems.

## LITERATURE REVIEW

Financial inclusion has become a global focus as an important component of sustainable economic development. This concept refers to the availability and accessibility of affordable, timely, and adequate formal financial services for all segments of society. The World Bank defines it as a condition where individuals and businesses have access to useful and affordable financial products and services that meet their needs for transactions, payments, savings, credit, and insurance delivered in a responsible and sustainable manner. The evolution of financial technology illustrates a transformative journey from simple innovations like ATMs in the 1960s to today's complex digital ecosystems. Arner and colleagues mapped this development in three phases: fintech 1.0 (1866-1967) characterized by analog infrastructure and telegraph, fintech 2.0 (1967-2008) with digitalization of traditional financial institutions, and fintech 3.0 (2008-present) marked by the emergence of disruptive startups and innovative business models after the global financial crisis.

The contemporary fintech landscape encompasses various categories, each addressing different aspects of the financial ecosystem. Mobile payment and e-wallets like M-Pesa in Kenya and GoPay in Indonesia have revolutionized how people conduct transactions without requiring traditional bank accounts. Peer-to-peer lending platforms like Kiva and Funding Societies connect underserved borrowers directly with funders, bypassing conventional financial intermediaries. Meanwhile, insurtech simplifies insurance claims and enables microinsurance for low-income segments, crowdfunding facilitates financing for SMEs, and digital banking eliminates the need for expensive physical branches.

## METHODS

This research adopts a systematic literature review approach to understand deeply how financial technology affects financial inclusion in developing countries. Unlike traditional narrative reviews, this systematic method enables us to identify, evaluate, and interpret relevant research in a structured and comprehensive manner, following principles developed by Kitchenham and Charters. To ensure analytical precision, we established strict inclusion and exclusion criteria. Studies published between 2015 and 2025 became the main focus, reflecting rapid fintech developments over the past decade. We only included peer-reviewed articles in English and Indonesian that explicitly discuss interactions between fintech and financial inclusion dimensions in developing country contexts. Conceptual, empirical, and case studies were all considered, but opinion articles, news reports, and grey literature were excluded to maintain evidence quality. A comprehensive search strategy was conducted through leading academic databases such as Scopus, Web of Science, JSTOR, and Google Scholar. Boolean operator keyword combinations were used to capture the relevant literature spectrum, covering terms like "fintech" OR "financial technology" AND "financial inclusion" AND "developing countries" OR "emerging markets." Additional searches were conducted in World Bank, IMF, and development institution repositories to complement academic literature.

## RESULTS AND DISCUSSION
### General Characteristics of Analyzed Literature

This systematic review analyzed 83 articles meeting inclusion criteria from a total of 487 articles identified in initial searches. Temporal distribution shows significant increasing trends in publications related to fintech and financial inclusion, with sharp increases since 2018, indicating growing academic attention to this theme. Methodologically, 42% of studies used quantitative approaches, 35% qualitative, and 23% mixed methods. Geographic distribution of studies shows concentration in Sub-Saharan Africa (31%), Southeast and South Asia (28%), Latin America (16%), and the remainder scattered across various other developing regions.

Literature analysis reveals diversity in fintech types studied, with mobile payment and e-wallets being the main focus (38% of studies), followed by peer-to-peer lending platforms (22%), digital banking (17%), insurtech (12%), and crowdfunding (11%). The most frequently studied financial inclusion dimension was access aspects (43%), followed by usage (31%), service quality (15%), and welfare impacts (11%). These findings indicate that while access remains a dominant concern, there is a gradual shift toward more comprehensive understanding of financial inclusion beyond mere service availability.

**Table 1: Main Characteristics of Analyzed Studies (n=83)**

| Characteristic | Category | Number | Percentage |
|---|---|---|---|
| **Publication Year** | 2015-2017 | 12 | 14.5% |
| | 2018-2020 | 31 | 37.3% |
| | 2021-2025 | 40 | 48.2% |
| **Methodology** | Quantitative | 35 | 42.2% |
| | Qualitative | 29 | 34.9% |
| | Mixed Methods | 19 | 22.9% |
| **Geographic Region** | Sub-Saharan Africa | 26 | 31.3% |
| | Southeast & South Asia | 23 | 27.7% |
| | Latin America | 13 | 15.7% |
| | Middle East & North Africa | 8 | 9.6% |
| | Multi-regional | 13 | 15.7% |
| **Fintech Type** | Mobile Payment & E-wallet | 32 | 38.6% |
| | Peer-to-Peer Lending | 18 | 21.7% |
| | Digital Banking | 14 | 16.9% |
| | Insurtech | 10 | 12.0% |
| | Crowdfunding | 9 | 10.8% |
| **Financial Inclusion Dimension** | Access | 36 | 43.4% |
| | Usage | 26 | 31.3% |
| | Service Quality | 12 | 14.5% |
| | Welfare Impact | 9 | 10.8% |

## Findings Categorization by Theme
### Fintech and Financial Service Access Expansion

Literature analysis shows that financial technology successfully overcomes geographical barriers that have been major challenges in financial service expansion. A longitudinal study by Suri and Jack in Kenya found that M-Pesa penetration increased formal financial service access by 56% over six years, with the most significant impact seen in rural communities that previously had to travel long distances to access bank branches. Similar phenomena appeared in Bangladesh, where bKash reached over 30 million users quickly by utilizing agent networks spread to remote villages.

Gender dimensions in access expansion show diverse findings. In some contexts like India and Pakistan, fintech successfully reduced gender gaps in account ownership, as shown by Barboni's study finding 22% increase in women's financial inclusion through digital wallets. However, research by Chamboko in Zimbabwe warns that without specific interventions addressing structural barriers (such as phone ownership and digital literacy), fintech could actually widen existing gender gaps. Agent models become crucial components in access expansion strategies. Agency systems utilizing local traders, pulsa kiosks, or convenience stores as financial service points have exponentially expanded reach at much lower costs compared to opening conventional bank branches. Research by Hernandez in Colombia found that one financial agent could serve up to 800 users with minimal infrastructure investment, making it a highly scalable model for reaching dispersed populations.

### Fintech Impact on Financial Service Costs

Cost efficiency becomes one of fintech's main value propositions in promoting financial inclusion. Comparative analysis by Masila in six East African countries shows that remittance costs through fintech platforms averaged 2-3% of transaction value, far below traditional money transfer service rates reaching 8-10%. Similarly, Frost's study in Latin America found that digital banks could offer accounts without monthly administrative fees thanks to operational cost structures 60-70% lower than conventional banks. In the microcredit sector, peer-to-peer lending platforms like Konfio (Mexico) and KoinWorks (Indonesia) could offer interest rates 15-20% lower than traditional microfinance institutions thanks to alternative credit assessment algorithms and overhead cost elimination. However, some research like that conducted by Gabor and Brooks warns that behind lower rates, there are hidden cost risks through user data monetization that could raise long-term privacy implications.

Another important aspect is pricing structures enabling microtransactions. The "sachet banking" model inspired by consumer product marketing strategies in small packages enables financial service access in very small denominations. The Wave case study in Senegal shows how this platform enables money transfers as small as 50 cents with minimal costs, opening access for population segments previously marginalized due to inability to meet minimum balances or relatively high transaction fees at conventional banks.

### Fintech and Financial Literacy Improvement

The relationship between fintech and financial literacy is bidirectional. On one hand, low financial literacy levels can hinder fintech solution adoption. But on the other hand,

intuitive interface design and educational features in fintech applications potentially improve users' financial understanding. Lyons' study in the Philippines shows that active users of digital financial applications experienced 12% increase in financial literacy scores after six months of use, especially in budgeting and savings product understanding aspects.

Several fintech platforms integrate educational components directly into their applications. Juntos Finanzas in Peru combines digital wallet services with micro-learning content and positive financial behavior notifications, while Absa Bank in South Africa launched AI-based chatbots providing personal financial education based on user transaction patterns. Impact evaluation by FSD Africa shows that this contextual and just-in-time educational approach is far more effective than conventional classroom-style financial literacy programs.

However, critical review by Ozili warns that while fintech can serve as a "gateway" to better financial understanding, these applications cannot fully replace comprehensive basic financial education. A longitudinal study in Ghana shows that without fundamental understanding of interest, savings, and risk concepts, fintech users tend to utilize services limitedly and sometimes in potentially harmful ways, such as repeated borrowing without adequate repayment planning.

## Innovative Fintech Business Models in Developing Countries

Literature analysis reveals various innovative business models developed specifically for developing country contexts. The "freemium" model with free basic services and paid premium services proves effective in attracting new users. MoMo in Vietnam, for example, offers money transfers and utility payments free of charge, while earning revenue from value-added services like investments and microinsurance. Integration with non-financial ecosystems becomes an increasingly dominant trend. Gojek and Grab in Southeast Asia developed super-app models integrating financial services with transportation, food delivery, and other on-demand services, creating comprehensive ecosystems. This approach accelerates adoption by introducing financial services in the context of daily needs relevant to users.

Alternative data-based business models also emerge as innovative solutions for underserved segments. Tala and Branch in Kenya use alternative data from mobile devices to assess creditworthiness, including app usage patterns, social contacts, and pulsa refill consistency. Study by Björkegren and Grissen shows that alternative data-based algorithms achieve credit payment prediction accuracy comparable to traditional assessment methods, while reaching populations without formal credit history.

## Critical Analysis of Supporting Factors
## Digital Infrastructure and Connectivity

Cross-country analysis reveals that smartphone penetration and mobile network coverage become fundamental prerequisites for fintech success. GSMA comparative study in 15 developing countries shows strong correlation ($r=0.78$) between smartphone penetration and digital wallet adoption rates. Urban-rural gaps in digital infrastructure become significant challenges, with internet speeds in rural areas averaging 60% slower than urban areas, as revealed in World Bank study in South Asia.

Innovation in overcoming infrastructure limitations emerges in several contexts. In

Tanzania, Tigo Pesa platform developed technology enabling transactions through USSD (Unstructured Supplementary Service Data) functioning on simple feature phones without internet connection. Meanwhile, in India, several fintechs adopted "offline-to-online" models with temporary transaction storage capability when offline that synchronizes when connection is available. This approach enables fintech services to function in areas with unstable internet connectivity. Mobile data costs also become critical factors. Alliance for Affordable Internet study shows that in countries where 1GB data costs exceed 2% of average monthly income, fintech adoption rates are significantly lower. Some initiatives like Free Basics (formerly Internet.org) partnerships with local fintechs in several African countries enable free access to digital financial applications, though this approach also draws criticism regarding internet neutrality.

**Regulation and Government Policy**

Regulatory frameworks play important roles in shaping fintech landscapes. Thematic analysis identifies three main regulatory approaches: (1) "wait and see" approach (example: Nigeria before 2020), (2) "sandbox regulation" approach allowing innovation in controlled environments (example: Malaysia, Singapore), and (3) "proactive regulation" approach with clear rules from the start (example: Kenya with M-Pesa). Comparative study by Jenik and Lauer from CGAP reveals that countries with sandbox regulation approaches achieve the best balance between innovation and consumer protection, with fintech adoption rates 23% higher than countries with wait-and-see approaches, while minimizing systemic risks. Specific regulations like Digital Identity Policies (example: India Aadhaar, Peru ID) also play important roles in facilitating digital onboarding and reducing documentation barriers that previously hindered formal financial service access.

Policy incentives such as tax reductions for digital payment adoption (Thailand), infrastructure subsidies in remote areas (Malaysia), and national digital literacy campaigns (Rwanda) prove effective in accelerating fintech penetration. However, some research like that conducted by Mader and Sabrow warns that without adequate oversight, pro-fintech policies can raise consumer protection and financial system stability risks, especially if driven more by economic political motives than substantive inclusivity considerations.

**DISCUSSION**
**Collaboration between Fintech and Traditional Financial Institutions**

Collaboration models between fintech and traditional financial institutions evolved from competition toward mutually beneficial collaboration. Taxonomy by Komarova Loureiro identifies four partnership patterns: (1) API integration enabling access to bank infrastructure, (2) white-label models where banks offer fintech products under their own brands, (3) fintech investment and incubation by banks, and (4) full acquisition. Strategic partnerships such as between BCA (Indonesia) with several digital wallets show how banks can expand reach without new infrastructure investment, while fintechs gain access to customer bases and bank credibility. Case study by Bourreau and Valletti in Colombia reveals that bank-as-a-service (BaaS) models providing regulatory and banking infrastructure for fintechs can accelerate time-to-market by up to 60% while ensuring regulatory compliance.
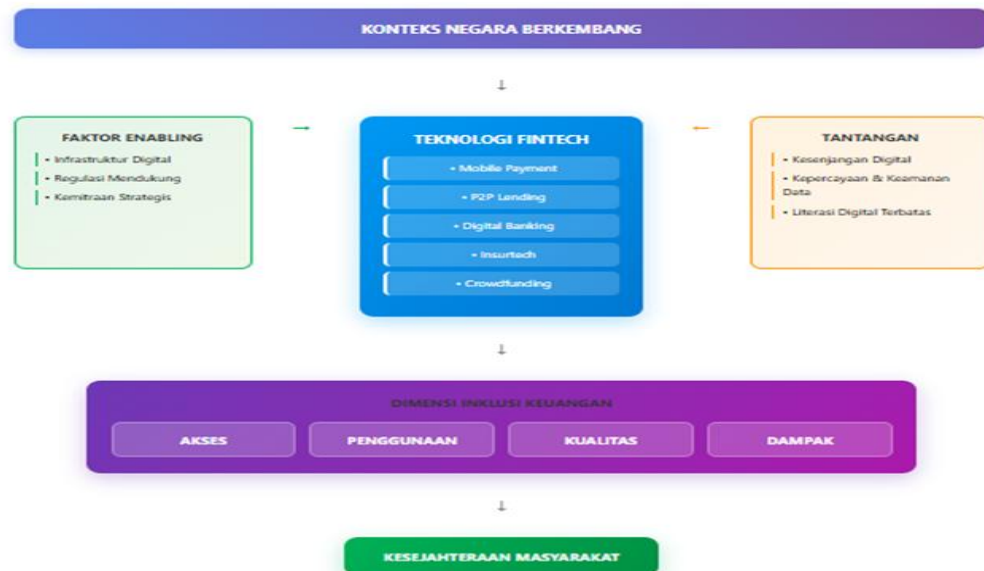
**Figure 1. Conceptual Model of Fintech and Financial Inclusion Relationship in Developing Countries**

## Challenges and Constraints
### Digital Divide

Despite fintech offering significant inclusion potential, digital divides remain fundamental challenges. ITU data shows that approximately 3.7 billion people worldwide remain unconnected to the internet, with the largest proportion in developing countries. This divide has multiple dimensions: geographical (urban-rural), socio-economic (rich-poor), gender, and generational. Study by Research ICT Africa in 10 African countries reveals that in rural areas, women are 45% less likely to access internet compared to men, creating a "double digital divide." Ethnographic study by Donner in India and South Africa reveals that fintech is often designed with assumptions of stable connectivity and adequate devices, ignoring the reality of "intermittent internet" experienced by many users in developing countries. Some innovative adoptions such as agent models equipped with special devices (Kenya) and applications with very low data consumption (Bangladesh) show efforts to overcome these constraints, but implementation remains limited and has not become mainstream in fintech ecosystems.

### Consumer Trust and Data Security

Trust factor becomes crucial variable in fintech adoption, especially in communities with limited experience with digital financial systems. Risk perception study by Morawczynski in Kenya found that fears of digital fraud, money loss due to technical errors, or personal data breaches become significant barriers, especially for novice and elderly users. Data security incidents exposed by media, though isolated, tend to have multiplier effects in reducing trust in entire ecosystems. User data monetization practices by some fintechs also raise ethical concerns. Aitken's research reveals how some lending platforms in India and Mexico collect

extensive data from borrower devices (including contact lists, messages, and location) without adequate transparency about data usage. Power and information imbalances between fintech providers and users, especially from low-income segments with limited digital understanding, create significant exploitation risks.

## Digital Literacy Limitations

Low digital literacy hinders fintech adoption even when infrastructure access and devices are available. Experimental study by Medhi in India reveals that users with limited digital literacy spend 3-4 times longer completing basic transactions on fintech applications, with significantly higher error rates. This often causes frustration and technology rejection, despite their principled awareness of potential benefits. Various approaches have been developed to address these challenges, from icon and audio-based interface design for populations with low literacy (example: EKO India), peer mentoring programs (example: Grameen Telecentres), to gradual user experiences that introduce complex features progressively as user comfort increases. Impact evaluation by CGAP shows that combinations of inclusive interfaces with community mentoring programs can increase fintech adoption by up to 38% in populations with limited literacy.

## Success Case Studies from Various Developing Countries

Case study analysis reveals several fintech models proven successful in promoting financial inclusion in various contexts. M-Pesa in Kenya becomes a classic example with models utilizing extensive agent networks and simple USSD interfaces, successfully reaching 96% of Kenyan households and reducing extreme poverty by 2%. Success keys lie in supportive regulation, partnerships with Safaricom having dominant telecommunications market share, and focus on money transfer needs highly relevant to local contexts. In India, integration of Aadhaar digital identity system with UPI payment platforms created digital public infrastructure enabling various fintechs to build solutions on top. This "India Stack" approach successfully reduced customer acquisition costs by up to 90% and accelerated onboarding from several days to several minutes. The impact: bank account numbers in India increased from 53% to 80% of adult population within four years.

In Latin America, neobank models like Nubank in Brazil show how digital-only approaches focusing on user experience and cost transparency can attract segments previously neglected by traditional banks. With 40 million customers, mostly from middle-low segments, Nubank successfully offered credit cards without annual fees and accounts with competitive returns, challenging conventional banking models that previously tended to favor middle-upper segments. Comparative analysis of these success cases reveals several key factors: (1) solutions designed based on deep understanding of local needs and contexts, (2) business models addressing specific cost barriers, (3) inclusive interfaces supporting various literacy levels, (4) distribution strategies utilizing existing networks, and (5) gradual approaches building trust before introducing more complex services.

## CONCLUSION

This systematic literature review reveals a complex picture of how financial technology

affects financial inclusion in developing countries. Main findings show that fintech can overcome structural barriers that have limited public access to formal financial services, especially through cost reduction, geographical reach expansion, and process simplification. The most significant impact appears in access expansion, with substantial increases in formal account ownership across various contexts, from Kenya to India. However, analysis also reveals that meaningful financial inclusion involves dimensions beyond mere access, including active usage, service quality, and welfare impacts that still require deeper attention.

Empirical evidence shows that fintech effectiveness in promoting financial inclusion heavily depends on supporting ecosystems including adequate digital infrastructure, balanced regulatory frameworks, and community digital literacy levels. "One-size-fits-all" approaches prove ineffective, considering socio-economic, cultural, and infrastructural context diversity across various developing countries. The most successful innovations are those designed with deep understanding of local needs and constraints, as exemplified by M-Pesa success in Kenya and UPI in India.

This research's theoretical contribution lies in developing conceptual models integrating technological, institutional, and socio-economic perspectives in understanding fintech-financial inclusion relationships. This model expands traditional financial inclusion frameworks by including digital dimensions as moderating variables between interventions and impacts. Practically, research findings offer guidance for policymakers in designing regulations that encourage innovation while protecting consumers, for financial institutions in developing collaboration strategies with fintechs, and for fintech industry players in designing more inclusive and sustainable solutions.

This research is not without limitations. Despite using systematic methodology, our review is limited by availability of long-term empirical studies, given the relatively recent nature of fintech phenomena in many developing countries. Methodology and context heterogeneity in analyzed literature also limits ability to make strong generalizations. Additionally, many existing studies tend to focus on established fintechs like mobile payments, while newer innovations such as AI-based financial applications or blockchain remain underrepresented.

For future research, several promising directions include: (1) longitudinal studies to understand long-term fintech impacts on household welfare and economic mobility; (2) in-depth comparative analysis of how institutional contexts affect similar fintech model success across different countries; (3) research on privacy and data protection implications in fintech ecosystems, especially for users with limited digital literacy; and (4) exploration of hybrid approaches integrating digital technology with human interaction to address persistent digital divides. In conclusion, while fintech offers transformative opportunities for financial inclusion in developing countries, realizing its potential requires holistic approaches addressing not only technological aspects but also broader structural, regulatory, and socio-cultural barriers. Only by considering this complexity can fintech become a true catalyst for more inclusive and equitable financial systems.

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