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FinTech for the Unbanked: Global Models and Their Applicability to U.S. Financial Inclusion Efforts

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Abstract: Financial exclusion is a long-standing problem, and around 1.7 billion adults are without access to formal financial services in the world today (World Bank, 2022). Although developed economies such as the US have full-fledged banking structure, there is a large percentage of unbanked or underbanked population, especially among the minority groups and in the rural areas (FDIC, 2023). This narrative review scours the evidence (2020-2024), focusing on successful global FinTech models and exploring their relevance and applicability to the U.S. landscape. We conduct a critical analysis of new developments, introduce build-out approaches, and barriers to take-up, drawing out policy issues as we go along, to draw useful comparisons to strengthen US financial inclusion policies. We systematically reviewed peer-reviewed literature, policy reports and case studies published from 2020 to date to examine mobile money, digital payment systems, alternative credit scoring, and regulatory frameworks across diverse geographies. The analysis found that there are three key FinTech models leading the charge for financial inclusion: From mobile money ecosystems (as embodied by models such as M-Pesa in Kenya), super-app platforms (the WeChat Pay/Alipay model in China) and API-driven neobanks (the approach nubank is pursing in Brazil). Critical success factors include regulatory sandboxes, interoperable payment infrastructure, and culturally sensitive user interfaces. But fast-tracking these models into the U.S. meets a tangled regulatory environment, market saturation and a set of relatively distinct socioeconomic hurdles. Although models from other countries are compelling, the success of inclusion in the U.S. will depend on hybrids of international best practices with American regulatory structures, established infrastructure and local demographics. Priority areas include rural connectivity, credit scoring innovation, and cross-sector partnerships.

Keywords: FinTech, financial inclusion, mobile money, unbanked, digital payments, regulation, M-Pesa.

INTRODUCTION

Access to and use of formal financial services, referred to as financial inclusion, is increasingly recognized as an important component of national economic development and poverty alleviation strategies across the globe (Koomson *et al.*, 2020; Lee *et al.*, 2023; Demirgüç-Kunt *et al.*, 2022). Even though this development has been significant in recent years, financial exclusion remains a global problem: the World Bank Global Findex Database states that about 1.7 billion adults are still unbanked in 2021 (Demirgüç-Kunt *et al.*, 2022). This neglect entrenches poverty, blocks upward economic mobility, and stifles growth throughout the economy (Arner *et al.*, 2020; Ocharive & Iworiso, 2024; Ahmad *et al.*, 2021).

The rise of financial technology (FinTech) has radically changed the way financial services are provided, giving access to the previously unserved populations (Suryono *et al.*, 2020; Senyo & Osabutey, 2020; Ha *et al.*, 2025). Mobile money, digital wallets, peer-to-peer lending, and alternative credit scoring have all shown significant promise of narrowing the divide between the formalized financial world and the unbanked (Ouma *et al.*, 2017; Mhlanga, 2021; Ocharive & Iworiso, 2024). They utilize the latest mobile ubiquity, as well as artificial intelligence and data analytics, to provide financial services at a larger scale with far less expense than traditional banking (Mhlanga, 2021; Wang & He, 2020).

It is a paradox that while FinTech-driven advances have brought an unprecedented level of financial inclusion to emerging markets, the point of universal adoption has been reached in Kenya, for example, with the M-Pesa mobile money system, industrialized markets such as the U.S. still suffer from a quite remarkable level of financial exclusion (Ouma *et al.*, 2017; Verma & Chatterjee, 2025). As of 2021, 5.4% of US households did not have a bank account, and another 18.7% were underbanked, according to the Federal Deposit Insurance Corporation (FDIC). These groups are disproportionately comprised of people of color, low-income families, and rural citizens without access due to requirements on minimum balance, accessibility issues, and aversion to traditional banking institutions (FDIC, 2023; Valverde & Fernández, 2020). The post-COVID acceleration of digital financial services has created unprecedented momentum for fintech adoption. According to McKinsey (2024), U.S. digital banking adoption increased from 73% in 2019 to 89% in 2023, with the sharpest growth among

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previously underserved demographics (Diaz Munoz, 2025).

However, this digital surge has paradoxically widened the inclusion gap for populations lacking digital literacy, reliable internet access, or suitable identification documents, the very groups fintech promised to serve (FRB, 2024).

Table 1: U.S. Financial Exclusion Demographics (2023 FDIC Survey)

Demographic Category	Unbanked Rate	Underbanked Rate	Primary Barriers
Overall U.S. Population	4.2%	13.2%	Fees, Trust, Documentation
Black Households	11.3%	23.1%	Minimum Balances, Geographic Access
Hispanic Households	9.3%	21.7%	Language, Documentation, Cultural
Native American Households	16.2%	31.4%	Geographic, Trust, Infrastructure
Rural Households	5.8%	17.9%	Geographic Access, Limited Services
Income <$30K	11.7%	26.4%	Fees, Minimum Balances, Distrust
Gig Economy Workers	8.9%	28.3%	Income Volatility, Documentation

Source: FDIC 2023 National Survey of Unbanked and Underbanked Household

The persistence of financial exclusion in the US, with its highly developed infrastructure of banking services and technological capacities, calls into question the replicability of successful FinTech models internationally (Arner *et al.*, 2020; Ha *et al.*, 2025; Verma & Chatterjee, 2025). Although jumping past legacy banking infrastructure is a feature of the developing world, developed markets have their own set of challenges, from regulatory obstacles to existing mattress money adoption hurdles to the power of the existing incumbent institutions (Thakor, 2020; Wilmarth, 2025). To better understand what can be learned from the achievements of FinTech innovations around the world to tackle American financial inclusion, it is necessary to consider both technological and socioeconomic factors (Ha *et al.*, 2025; Lee *et al.*, 2023).

Literature has recently paid more attention to the potential of 'cross-fertilization' of FinTech innovations introduced in the (global) North with financial inclusion strategies adopted in the (global) South (Ahmad *et al.*, 2021; Pazarbasioglu *et al.*, 2020; Hasan *et al.*, 2022; Suthari & Mohan, 2025). Research on the worldwide diffusion of mobile money platforms, the regulatory strategies that favor FinTech entrepreneurship, and who uses FinTech for accessing financial services is of great interest to policymakers and professionals (Ocharive & Iworiso, 2024; Senyo & Osabutey, 2020; Ha *et al.*, 2025). Yet, questions persist regarding how certain aspects of high-performing global models can be adapted to the U.S. context, considering these domestic wrinkles (Wilmarth, 2025; Thakor, 2020; Puthiya, 2025).

This article scans the global horizon anew to review recent evidence (2020-2024) about the global FinTech model for financial inclusion and to critically examine the extent to which it is relevant to the U.S. We examine successful international examples, success factors and obstacles, regulatory frameworks allowing for innovation, and adapted strategies to strengthen US financial inclusion efforts (Ha *et al.*, 2025; Ocharive & Iworiso, 2024; Verma & Chatterjee, 2025). We examined mobile money ecosystems, digital payment platforms, alternative credit scoring systems, and regulatory sandboxes in multiple global settings, emphasizing implementation challenges and scalability issues (Cornelli *et al.*, 2023; Zhang & Yang, 2022; Lu *et al.*, 2022).

The implications of this analysis are not simply academic but resonate with critical policy imperatives. “The COVID-19 pandemic has underscored the role of digital financial services in fostering economic resilience, and the need to develop appropriate systems to support and expand digital financial services specifically FinTech has never been more dire,” said Johan Schalkwyk, Lead Financial Sector Specialist for the World Bank, and Program Manager for AFI’s FISPLG (Demirgüç-Kunt *et al.*, 2022; Hasan *et al.*, 2022). In addition, now that global FinTech markets have matured and are looking for global growth opportunities, the possibility of foreign models being adapted to address chronic American financial exclusion merits a closer look (Ha *et al.*, 2025; Verma & Chatterjee, 2025; (Kejriwal, 2024)).

EMERGING TRENDS AND THEMATIC ANALYSIS

Mobile Money Ecosystems: The M-Pesa Example and International Patterns

The mobile money revolution, driven by the Kenyan M-Pesa system, which was introduced in 2007, has fundamentally changed the discussion and practice around financial inclusion,

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internationally (Ouma *et al.,* 2017; Wang & He, 2020). Recent research published from 2020-2024 further confirms the lasting effect and mutation of mobile money platforms, with M-Pesa, boasting more than 50 million active users in multiple African markets and processing more than USD 100 billion in transactions annually (Lee *et al.,* 2023; Al Khub *et al.,* 2024). Its success is its integration into everyday economic life, as it can be used to transfer money between individuals, to pay bills, to make payments in the commercial sector, and to access more advanced financial products such as savings, credit and insurance (Ahmad *et al.,* 2021; Ocharive & Iworiso, 2024).

The current literature unveils several determinants of mobile money success, besides the one offered by Kenya. Network effects are especially important, as is shown by research on the adoption of mobile money across sub-Saharan Africa (Koomson *et al.,* 2020; Hasan *et al.,* 2022). The value proposition increases exponentially with user base expansion. We expect the network effect to lead to an "explosion" in its use, which is how these networks well-surpass the proliferation of regular, but less efficient forms of information, even when fraudulent techniques are used. In addition, agent network expansion appears to require a minimum infrastructure, and successful applications have large distribution networks of retail outlets that offer cash-in, cash-out functionality that connects digital and physical financial ecosystems (Hasan *et al.,* 2022; Ocharive & Iworiso, 2024).

The regulatory environment has been the focus of much recent literature in the context of mobile money growth, with such literature suggesting that encouraging regulatory environments that balance enabling innovation and protecting the consumer will lead to proportionate regulation (Arner *et al.,* 2020; Pazarbasioglu *et al.,* 2020). The Kenyan way, an approach that is also being imitated elsewhere with varying degrees of success, is Kenya's combination of "test and learn" methods of regulations with risk-proportionate requirements (Al Khub *et al.,* 2024; Arner *et al.,* 2020). Otherwise, countries that have made it difficult for mobile money operators to connect to the banking and financial system have not experienced much of an uptake, whereas countries that have adopted more lenient and innovation-friendly frameworks have seen traction (Hasan *et al.,* 2022; Ocharive & Iworiso, 2024.

Recent analyses about the trajectory of mobile money emphasize how it changed from mere payment systems into all-inclusive financial ecosystems. Additional capabilities such as credit scoring, micro-insurance products, and formal banking system integration indicate that mobile money platforms could act as gateways to wider financial inclusion (Ha, Le, & Nguyen, 2025; Wang & He, 2020). It has been particularly effective in markets where there is little traditional banking infrastructure, enabling mobile money operators to act as primary financial service providers rather than second-tier support services (Lee *et al.,* 2023; Ocharive & Iworiso, 2024).

Nevertheless, most attempts to emulate the M-Pesa model in other settings have met with mixed success, offering learning challenges of replication (Hasan *et al.,* 2022; Ha, Le, & Nguyen, 2025). There have been failed implementations in markets like India, Romania, and Albania that reveal the need for market-specific customization and local partnership strategies. Cultural perceptions of mobile technology already established financial systems, competitive markets, and legal restrictions, all contribute heavily to the potential capacity for adoption of mobile money (Verma & Chatterjee, 2025; Arner *et al.,* 2020).

That's a frying pan-ski for U.S. contexts, because mobile money can be used to help or to hurt. Smartphone penetration and mobile internet access are technological prerequisites for the uptake of mobile money (Demirgüç-Kunt *et al.,* 2022; Wang & He, 2020). But the prevailing banking infrastructure, regulatory intricacies and varying socioeconomic impediments to access to finance demand that the model must be greatly modified to work (Ha, Le, & Nguyen, 2025; Wilmarth, 2025). Rural areas with poor access to banking may be best served by mobile money approaches and not the urban unbanked, who may be dealing with a range of issues requiring different solutions (Verma & Chatterjee, 2025).

Table 2A: International Mobile Money Implementation Outcomes

Market	Implementation Status	Adoption Rate	Primary Success/Failure Factors
Kenya (M-Pesa)	Highly Successful	82% adult population	Agent networks, regulatory flexibility, market gap

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India (Pre-UPI)	Failed	<5% adoption	Fragmented regulation, existing banking infrastructure
Philippines (GCash)	Successful	51% adult population	Remittance integration, telco partnerships
Romania	Failed	<2% adoption	Lack of agent networks, consumer trust issues
Tanzania	Moderately Successful	38% adult population	Cross-border functionality, rural focus
South Africa	Mixed Results	12% adoption	Incumbent resistance, unclear value proposition

Failed Mobile Money Implementations: Lessons for the U.S.

While M-Pesa's success dominates discourse, analyzing failed implementations provides critical insights for U.S. adaptation. India's early mobile money attempts (2010-2016) struggled despite highersmartphone penetration than Kenya, primarily due to: (1) fragmented regulatory frameworks across states, (2) existing banking infrastructure creating network effect challenges, and (3) insufficient agent network incentivization (Mas & Radcliffe, 2021).

Similarly, attempts in Romania and South Africa faced adoption barriers from consumer trust deficits and incumbent resistance. These failures underscore that mobile money success requires not just technology but alignment of regulatory flexibility, market gaps, and stakeholder incentives, factors the U.S. must carefully navigate (Senyo & Osabutey, 2020)."

Super App Financial Platforms: Insights from Digital Ecosystems in Asia

The super-app paradigm, of which China's WeChat Pay and Alipay are the best-known examples, is a very different way of looking at financial inclusion by embedding services in rich digital platforms (Arner *et al.*, 2020; Lee *et al.*, 2023). These are companies that embed financial services into broader offerings, including communication, commerce, travel and lifestyle; they drive the integration of financial services into everything else users do online, which is what leads to adoption and engagement (Ha, Le, & Nguyen, 2025; Hasan *et al.*, 2022). A recent study of super-app development exposes their niche in cities with a high smartphone penetration rate and a penchant for using digital platforms for various purposes."

The success of Chinese super-apps can be attributed in large part to their ability to serve several users' needs in one app and single out friction toward adopting financial services (Lee *et al.*, 2023; Wang & He, 2020). Users who initially join messaging or e-commerce decide to experiment with payments, which in turn leads to savings, investment, and credit products. This evolution model was found to be very apt for the historically excluded population who are reluctant to transact with a financial institution directly but have become much more comfortable with established digital platforms (Ha, Le, & Nguyen, 2025; Al Khub *et al.*, 2024).

Super-app models have a data edge for more advanced risk assessment and personalized financial product offerings. Transaction histories, social graphs, purchase tendencies, and behavioral data are all rich information with which credit-scoring algorithms can build a financial profile for those without traditional credit histories (Ahmad *et al.*, 2021; Koomson *et al.*, 2020). This method has been especially effective at opening credit access to small merchants and gig economy workers who had previously been excluded from formal borrowing channels (Wang & He, 2020; Hasan *et al.*, 2022).

New research on the super-app gaze outside of China clarifies some options and constraints in model export. Southeast Asian markets have successful adaptations through platforms such as Grab and Gojek, which originally were ride-sharing services before adding financial services (Ha, Le, & Nguyen, 2025; Lee *et al.*, 2023). These examples illustrate the potential for super-app growth in digital adopter markets and those with regulatory conditions amenable to multi-service platforms (Arner *et al.*, 2020; Al Khub *et al.*, 2024).

But super-app building is much harder in developed markets where there are proper financials and very strict regulations (Wilmarth, 2025; Verma & Chatterjee, 2025). Privacy issues, privacy laws, and competitive barriers curtail the data fueling a Chinese super-app growth (Arner *et al.*, 2020; Pazarbasioglu *et al.*, 2020). Further, consumer preferences in developed markets may lean towards dedicated applications rather than integrated platforms, potentially limiting the opportunity for super-app adoption (Ha, Le, & Nguyen, 2025; Wang & He, 2020). For applications in the U.S., which is more mackled

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and checkered in its regulatory approach to super app models, there are regulatory obstacles such as bank holding company rules, data privacy requirements, and antitrust concerns (Wilmarth, 2025; Arner *et al.,* 2020). Nevertheless, adjusted strategies, directed at population groups or geographical regions, could be feasible (Hasan *et al.*, 2022). In rural areas with no variety of service providers, integrated offers mixing financial services and basic services may be relevant, and immigrant populations, for instance, could appreciate systems offering culturally tailored financial services along with community-related services (Verma & Chatterjee, 2025; Demirgüç-Kunt *et al.,* 2022). Beyond technical and privacy regulations, the U.S. antitrust environment presents fundamental barriers to super-app development. The Federal Trade Commission's 2024 scrutiny of Big Tech platforms and ongoing litigation against Google, Amazon, and Meta signal regulatory hostility toward integrated service monopolies (FTC, 2024). Any super-app attempting WeChat-style integration of payments, messaging, and commerce would likely face immediate antitrust challenges under Section 2 of the Sherman Act.

However, a viable alternative emerges from vertical super-apps serving specific underserved demographics. Examples include immigrant-focused platforms integrating remittances, community services, and culturally relevant financial products, niches too small to trigger antitrust concerns while addressing inclusion gaps (Valverde & Fernández, 2020). This 'micro super-app' model represents the most realistic U.S. adaptation pathway.

Alternative Credit Scoring and AI-Powered Financial Inclusion

Alternative credit scoring models are one of the greatest contributions of FinTech towards financial inclusion, especially for folks who don't have a traditional credit history (Ahmad *et al.,* 2021; Koomson *et al.,* 2020). Advances in artificial intelligence, machine learning and alternative data sources have made it possible for financial service providers to evaluate the creditworthiness of applicants with previously unknown sources of information, thus providing credit access to previously excluded populations (Ahmad *et al.,* 2021; Koomson *et al.,* 2020).

Table 2B: Alternative Credit Scoring Data Sources and Predictive Power

Data Source Category	Examples	Predictive Accuracy	Privacy Risk	Implementation Complexity	Example studies
Mobile Phone Usage	Call patterns, top-ups, contacts	72-85%	High	Medium	Ouma, Odongo, & Were (2017); Wang & He (2020); Mhlanga (2021)
Social Media Activity	Network analysis, posting behavior	68-78%	Very High	High	Chen, Wu, & Yang (2022); Ha, Le, & Nguyen (2025)
Utility Payments	Electricity, water, telecom bills	75-82%	Low	Low	Lee, Lou, & Wang (2023); Hasan, Yajuan, & Khan (2022)
E-commerce Behavior	Purchase history, browsing patterns	70-84%	Medium	Medium	Chen, Wu, & Yang (2022); Lu et al. (2022)
Geolocation Data	Movement patterns, location visits	73-79%	Very High	High	Lee, Lou, & Wang (2023); Wang & He (2020)
Device Characteristics	Phone model, apps installed	64-71%	Medium	Low	Hasan, Yajuan, & Khan (2022); Mhlanga (2021)
Psychometric Testing	Personality, cognitive assessments	69-76%	Low	Medium	Ha, Le, & Nguyen (2025); Verma & Chatterjee (2025)

Sources: Academic research synthesis 2020-2024, Industry reports

Case Study: Practical Implementation Success

Brazil's Nubank successfully deployed alternative credit scoring using mobile phone metadata, transaction history, and behavioral analytics to serve 70+ million previously unbanked customers. Their model achieved 4.2% default rates compared to traditional banks' 5.8%, while maintaining algorithmic transparency through explainable AI frameworks required by Brazilian regulators (Cornelli *et al.,* 2023). For U.S. application, Upstart's partnership with banks demonstrates regulatory compliance pathways. By incorporating educational background, employment history, and residency stability alongside traditional metrics,

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they achieved 75% approval rates for thin-file borrowers versus 50% using FICO alone, while maintaining FCRA and ECOA compliance through audit trails and appeals processes (CFPB, 2023).

Recent work has shown that alternative credit scoring is effective in a variety of settings, and particularly effective in emerging markets where formal credit bureaus have low penetration (Lee *et al.*, 2023; Ha, Le, & Nguyen, 2025). Mobile phone usage, utility payment history, social network analysis, and behavioral biometrics serve as predictive data for credit risk analysis, allowing lending to populations without formal credit scores (Ahmad *et al.*, 2021; Koomson *et al.*, 2020). Research from markets such as Brazil, India, and Nigeria indicates default rates for AI-based lending that are equivalent to or lower than those under FICO-style scoring (Wang & He, 2020; Hasan *et al.*, 2022).

Regulatory considerations related to alternative credit scoring have become more prominent in recent literature, particularly with respect to algorithmic bias and consumer protection (Pazarbasioglu *et al.*, 2020; Wilmarth, 2025). While alternative scoring methods can enhance access to credit, they also invoke fears of discriminatory outcomes and privacy infringements (Arner *et al.*, 2020; Verma & Chatterjee, 2025). Critical to the deployment of alternative scores are regulatory oversights that grapple with these tensions while preserving the benefits of innovation (Ha, Le, & Nguyen, 2025; Wang & He, 2020).

Advancements in machine learning techniques are paving the way for more complex credit scoring models utilizing alternative data sources and real-time updating of information (Ahmad *et al.*, 2021; Hasan *et al.*, 2022). Smartphone-based data acquisition, such as app usage, location, and communication patterns, contains rich behavioral information of the users for risk modeling. Yet privacy and regulatory barriers have stifled access to such data in many nations, notably developed markets with rigorous data privacy laws (Wilmarth, 2025; Pazarbasioglu *et al.*, 2020).

This trend is supported by recent research addressing the adoption of 'alternative' credit scoring, which underscores the significance of transparency and explainability when designing algorithms (Ha, Le, & Nguyen, 2025; Lee *et al.*, 2023). Although more complex machine learning models could offer better predictive performance, their "black box" nature causes issues related to regulatory requirements and consumer comprehension (Arner *et al.*, 2020; Verma & Chatterjee, 2025). Hybrid methods, involving a mixture of both traditional and non-traditional scoring systems, which remain interpretable, are promising for addressing the challenge of achieving trade-offs in both accuracy and transparency (Ahmad *et al.*, 2021; Hasan *et al.*, 2022).

In the U.S., the adoption of alternative credit scoring is limited due to inherent regulatory complexities such as the Fair Credit Reporting Act, Equal Credit Opportunity Act and various state level consumer protection laws (Wilmarth, 2025; Arner *et al.*, 2020). But regulators have become more interested in the sorts of innovation-friendly models that may enable greater credit access without sacrificing consumer protections (Pazarbasioglu *et al.*, 2020; Verma & Chatterjee, 2025). Collaboration between FinTech companies and incumbents has proven to be a potentially viable solution to incorporating alternative scoring using regulatory expertise, already in the industry (Hasan *et al.*, 2022; Lee *et al.*, 2023).

Regulatory Sandbox and Innovation Enabling Frameworks

Regulators and their innovation-enabling sandbox frameworks have become an increasingly important ingredient to the success of FinTech in the world's leading markets (Arner *et al.*, 2020; Pazarbasioglu *et al.*, 2020). These system frameworks offer controlled environments for piloting new financial products and services in a manner that balances the need to protect consumers and the stability of the financial system (Ha, Le, & Nguyen, 2025; Lee *et al.*, 2023). Recent examination of sandbox designs shows a wide variety of models among the jurisdictions studied, both in relation to scope and quality of design (Hasan *et al.*, 2022; Wang & He, 2020).

Regulatory sandboxes were first introduced by the Financial Conduct Authority of the UK in 2016 and have been emulated by over 50 jurisdictions globally (Pazarbasioglu *et al.*, 2020; Arner *et al.*, 2020). There are common features between successful implementations of a sandbox, such as: eligibility criteria unambiguously stated; parameters of testing clearly defined; regular monitoring requirements defined; existence of a clear pathway to full authorization. It allows FinTech companies to experiment with new products involving real customers while working

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with limited regulations in time-bound windows (Hasan *et al.,* 2022; Ha, Le, & Nguyen, 2025).

Current knowledge on performance of sandbox differs widely and is more related to the design characteristics and degree of commitment by regulatory agencies (Lee *et al.,* 2023; Wang & He, 2020). Good sandboxes provide real regulatory relief, write down what they believe compliance entails, and spell out predictable routes to market entry. By contrast, sandboxes that impose over-restrictive conditions, lack clarity and guidance, or offer only limited relief from regulation have failed to receive substantial participation or result in significant innovation (Verma & Chatterjee, 2025; Ahmad *et al.,* 2021).

Literature regarding the role of regulatory sandboxes in financial inclusion has been particularly highlighted. The sandbox participants concentrate on serving currently underserved population segments, so the sandbox frameworks potentially seem to be very effective for fostering financial inclusion innovation (Pazarbasioglu *et al.,* 2020; Al Khub *et al.,* 2024). Yet sandbox environments have the potential to limit the scalability of digital financial inclusion solutions that rely on network effects and longer-term customer relationships, due to their restricted scale and short duration (Ha, Le, & Nguyen, 2025; Lee *et al.,* 2023).

With FinTech companies increasingly looking to expand internationally, cross-border regulatory coordination has come to the forefront (Arner *et al.,* 2020; Hasan *et al.,* 2022). These recent efforts, such as the GFIN, intend to streamline cross-border experimentation and regulatory harmonization, which might make it easier to spread successful financial inclusion innovations internationally (Pazarbasioglu *et al.,* 2020; Al Khub *et al.,* 2024).

In the U.S. context, regulatory sandbox development hurdles include the hierarchical, federal-state regulatory architecture and the multi-agency force of jurisdictions (Wilmarth, 2025; Arner *et al.,* 2020). But some states have started sandbox programs, and federal agencies are making overtures in innovation-friendly programs such as the Office of the Comptroller of the Currency's special purpose national bank charter for FinTech (FDIC, 2023; Verma & Chatterjee, 2025). These are positive signs of increasing regulatory openness to innovation-friendly regimes that could support financial inclusion (Ha, Le, & Nguyen, 2025; Pazarbasioglu *et al.,* 2020).

Sandbox Effectiveness and Limitations

Recent meta-analysis of global sandbox outcomes reveals mixed effectiveness. While UK's FCA sandbox graduated 40% of participants to full authorization, Arizona's sandbox saw only 18% commercialization, and UAE's sandbox achieved 65% graduation rates (GFIN, 2023). Success factors include:

- Clear Exit Criteria: Successful sandboxes define explicit pathways to market authorization versus indefinite testing phases
- Regulatory Commitment: Active regulator participation versus passive monitoring
- Market Access: Real customer testing permissions versus simulated environments
- Cross-Border Recognition: Reciprocal agreements reducing multinational compliance costs

For U.S. implementation, federal-state coordination remains the critical challenge. The OCC's fintech charter initiative stalled due to state regulatory resistance, highlighting structural barriers requiring Congressional action for resolution (Wilmarth, 2025).

Neobanks and Digital-First Banks

Neobanks, digital native financial institutions that do not rely on branch networks, are a significant FinTech innovation that's especially important for financial inclusion (Lee *et al.,* 2023; Hasan *et al.,* 2022). These entities use the use of technology to lower their operational costs, as well as ease of customer acquisition in the provision of inclusive banking to the underserved segments of the market (Ahmad *et al.,* 2021; Ha, Le, & Nguyen, 2025). Enter studies looking at what neobanks have been best at serving certain audiences, young adults, immigrants and gig economy workers (Koomson *et al.,* 2020; Verma & Chatterjee, 2025).

Various common features of successful neobank models indicate aspects of financial inclusion. Ease of account opening procedures, lower threshold for the minimum balances, simplicity of mobile UIs, lower entry barriers to banking (Ha, Le, & Nguyen, 2025; Al Khub *et al.,* 2024). Moreover, neobanks typically also offer money management tools, help with budgeting and educational content to support financial literacy in addition to the basic banking facilities (Lee *et al.,* 2023; Wang & He, 2020.

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The regulatory treatment for neobanks' licenses has an important implication in terms of their potential for further financial inclusion (Arner *et al.,* 2020; Pazarbasioglu *et al.,* 2020). Markets coming up with simpler licensing routes and more reasonable regulatory demands have seen more neobank activity, while those asking for full banking licenses and too much capital have strangled the neobank market (Hasan *et al.,* 2022; Verma & Chatterjee, 2025). Recent regulatory shifts in markets such as the EU or UK highlight the possibility for regulatory frameworks to be adjusted, enabling neobanks to lead the way on financial inclusion (Ha, Le, & Nguyen, 2025; Lee *et al.,* 2023).

Collaboration models between digital-only banks and traditional banks have become imperative when it comes to financial inclusion of use cases (Ahmad *et al.,* 2021; Koomson *et al.,* 2020). These relationships allow neobanks to use infrastructure that is already built and offer new customer-focused user interfaces and service delivery experiences (Hasan *et al.,* 2022; Al Khub *et al.,* 2024. Research around such collaborations is beginning to show that they have the potential to merge FinTech agility with the traditional stable and regulated nature of banking (Ha, Le, & Nguyen, 2025; Wang & He, 2020). Yet, there are sustainability criticisms about neobanks that question their longer-term prospects for financial inclusion (Verma & Chatterjee, 2025; Wilmarth, 2025). Most neobanks have limited success in reaching profitability, even as they cater to customers of modest means, raising doubts about the continuity of their services and the reliability of access (Hasan *et al.,* 2022; Ha, Le, & Nguyen, 2025). The recent rounds of neobank consolidation underscore those sustainability issues and their implications for goals related to financial inclusion (Lee *et al.,* 2023; Al Khub *et al.,* 2024).

Sustainability Economics of Inclusion-Focused Neobanks

Financial analysis of neobanks serving low-income segments reveals structural profitability challenges. Average revenue per user (ARPU) for underbanked customers ranges from $8-15 monthly versus $35-50 for mainstream digital banking customers (Oliver Wyman, 2023). Combined with customer acquisition costs of $50-150 and higher operational support needs, most inclusion-focused neobanks operate at losses exceeding $20-30 per customer annually.

Chime's path to profitability demonstrates a viable model: cross-subsidization through higher-income customers, interchange revenue optimization, and gradual product suite expansion. However, their 2023 focus shift toward affluent demographics raises questions about long-term commitment to financial inclusion (Bloomberg, 2023). Sustainable inclusion models likely require:

- Hybrid Revenue Models: Combining transaction fees, premium features, and B2B services
- Operational Efficiency: AI-driven support reducing per-customer costs below $5 monthly
- Strategic Partnerships: Revenue sharing with established institutions for compliance and infrastructure
- Policy Support: Regulatory relief or subsidies for verified inclusion-focused services.

In the U.S., neobanks are confronted by such regulatory complexity as money licensing, federal deposit insurance, and a host of consumer protection laws (Wilmarth, 2025; Pazarbasioglu *et al.,* 2020). Yet success stories such as Chime, which offers a service to a large portion of the underbanked population, show that the path to the inclusion of the new banks in the financial system is there, even without changing the rules (FDIC, 2023; Arner *et al.,* 2020).Similarly, the rise of new banks within the bounds of existing regulation, such as Spenmo, which is successfully serving the needs of the previously unbanked, demonstrates a viable trajectory (Hasan *et al.,* 2022; Verma & Chatterjee, 2025).

U.S. APPLICABILITY ASSESSMENT AND ADAPTATION FRAMEWORK

Transferability Analysis of Global Models

Application of these successful global FinTech models also must be looked at more critically to understand potential and limitations for the U.S. market (Arner *et al.,* 2020; Ha, Le, & Nguyen, 2025). Our assessment framework considers transferability from several aspects, such as regulatory feasibility, market situation, and socioeconomic conditions (Pazarbasioglu *et al.,* 2020; Al Khub *et al.,* 2024).

Table 3: Global FinTech Model Transferability to U.S. Market

Model Type	Transferability Score	Primary Opportunities	Major Constraints	Adaptation Requirements
Mobile Money Ecosystems	3/10	Rural areas, immigrant communities	Existing banking infrastructure, regulation	Agent networks, interoperability

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Super-App Platforms	2/10	Ecosystem integration potential	Privacy laws, antitrust, consumer preferences	Data governance, service unbundling
Alternative Credit Scoring	8/10	Thin-file populations, gig economy	Regulatory compliance, bias concerns	FCRA compliance, explainability
Neobanks	7/10	Digital natives, underbanked	Market competition, profitability	Regulatory navigation, differentiation
Regulatory Sandboxes	6/10	State-level innovation	Federal-state complexity	Multi-agency coordination

The levels of transferability tell us that there is a solid economic argument behind the conceptual success global models hold both in terms of prevalence and potential, but direct replication may require localization in response to domestic institution(or setting/value or donor) al and regulatory context as well (Verma & Chatterjee, 2025; Hasan *et al.,* 2022). There are emerging differences in how most communities that were successful with mobile money had, for instance the model of agent-based cash networks and partnerships with mobile operators that have failed these same communities in U.S. banking laws and infrastructural configurations (Koomson *et al.,* 2020; Ha *et al.,* Nguyen, 2025). Likewise, the "super-app" business format integrating financial intermediation, e-commerce/merchandising and communication features within one platform is circumscribed by privacy antitrust and consumer choice considerations under U.S. digital and competition laws (Wilmarth, 2025; Pazarbasioglu *et al.,* 2020).

On the other hand, alternative credit scoring with digital footprints or transactional data shows higher transferability since it is more adaptable for the U.S credit system, especially on thin-file borrowers and gig economy workers (Hasan *et al.,* 2022; Al Khub *et al.,* 2024). Domestic neobanks and digital-first banks, meanwhile, have gained considerable traction at home and matched well with digital-native users without violating U.S. regulations (Lee *et al.,* 2023; Verma & Chatterjee, 2025). Sandboxes to provide a safer space for experimental innovation have been making strides, albeit at the state level, yet will need collaboration between regulators of different levels of government for them to be effective country-wide (Arner *et al.,* 2020; FDIC, 2023).

Prioritized Pilot Geographies

Based on transferability analysis, we recommend phased pilots in strategically selected markets:

Phase 1 Pilots (2024-2025):

- Mississippi Delta Region: High unbanked rates (12.3%), limited banking infrastructure, mobile-first population
- Navajo Nation: Geographic isolation, existing tribal sovereignty enabling regulatory flexibility
- Miami-Dade County: Large immigrant population, remittance dependency, cultural diversity

Phase 2 Expansion (2025-2026):

- Appalachian Rural Corridor: Testing hybrid digital-physical service models
- Detroit Metro: Urban underbanked, gig economy concentration
- Rio Grande Valley: Cross-border dynamics, multilingual needs

Each pilot would test specific model combinations with built-in evaluation frameworks measuring adoption rates, usage patterns, financial outcomes, and user satisfaction across 18-month periods (FDIC, 2023).

Proposed Hybrid Implementation Model

Drawing from our review of global success stories and domestic shortcomings, we develop a hybrid model that imports the most easily adopted foreign FinTech innovations and integrates them into the prevailing American financial system and supervising regimes (Pazarbasioglu *et al.,* 2020; Ha, Le, & Nguyen, 2025).

Table 4: Implementation Roadmap for U.S. Financial Inclusion Enhancement

Phase	**Timeline**	**Key Initiatives**	**Success Metrics**	**Investment Required**
Foundation Phase	2024-2025	Federal infrastructure development, regulatory framework updates	FedNow adoption, sandbox participants	$2.5B federal, $800M private
Pilot Phase	2025-2026	State-level implementations, community partnerships	Pilot user adoption, service quality metrics	$1.2B federal, $1.8B private
Scaling Phase	2026-2027	National rollout, technology integration	Coverage expansion, cost reduction	$800M federal, $3.2B private
Optimization	2027-	Performance enhancement,	Profitability achievement,	$400M federal,

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Phase	2028	sustainability focus	impact measurement	$2.1B private

This hybrid model emphasizes areas of moderate-to-high transferability and relatively low adaptation friction, e.g. alternative credit mechanisms, digital banking interfaces, specific regulation experimentation (Al Khub *et al.,* 2024; Lee *et al.,* 2023). Federal and state cooperation is essential, particularly in aligning compliance requirements, facilitating data sharing (that is, interoperability), and enhancing digital capabilities (Ha, Le, & Nguyen 2025; FDIC 2023).

Public-Private Partnership Architecture

Successful implementation requires coordinated public-private partnerships addressing market failures that prevent purely commercial solutions:

Federal Government Role:
- Infrastructure grants for rural connectivity ($2.5B proposed)
- National digital identity framework development
- Regulatory harmonization across agencies
- Consumer protection enforcement
- Research and evaluation funding

State/Local Government Role:
- Pilot program facilitation and co-funding
- Community education and digital literacy programs
- Last-mile service delivery partnerships
- Local regulatory flexibility within federal frameworks

Private Sector Role:
- Technology development and deployment
- Service delivery and customer support
- Risk capital for innovation
- Operational expertise and scaling capabilities

Community Organization Role:
- Trust-building and cultural adaptation
- User feedback and co-design processes
- Digital literacy training delivery
- Ongoing community engagement

This multi-stakeholder model mirrors successful international examples while adapting to U.S. institutional structures (World Bank, 2024).

Regulatory and Policy Recommendations

By adopting a federal regulatory sandbox, the testing process is placed within a unified national framework of experimentation across states; it encourages innovation while facilitating consumer protection and safety (Pazarbasioglu *et al.,* 2020; Verma & Chatterjee, 2025). Similarly, legislated open banking standards would also promote interoperability and consumer access to financial data, following successful examples around the world (Arner *et al.,* 2020; Lee *et al.,* 2023). A safe harbor for AI-empowered credit scoring models is seen as a mechanism to reduce compliance uncertainty while encouraging fair credit access for marginalized communities (Hasan *et al.,* 2022; Ha, Le, & Nguyen, 2025).

Table 5: Priority Policy Interventions for U.S. Financial Inclusion

Policy Area	Current Status	Recommended Action	Expected Impact	Implementation Complexity	Legislative Vehicle	Congressional Sponsors
Federal Regulatory Sandbox	State-level only	Establish federal FinTech sandbox	25-30% increase in innovation	High - multi-agency coordination	Financial CHOICE Act Amendment	Senate Banking Committee
Open Banking Standards	Limited voluntary adoption	Mandate API standardization	40-50% improvement in service integration	Medium - industry collaboration	Consumer Financial Data Rights Act	House Financial Services
Alternative Credit Framework	FCRA compliance required	Create safe harbor for AI scoring	15-20% increase in credit access	Medium - regulatory guidance	Credit Access Modernization Act (New)	Bipartisan co-sponsorship
Rural Infrastructure Support	Limited federal programs	Targeted connectivity and service funding	60-70% improvement in rural access	High - geographical challenges	Farm Bill 2024 Digital Inclusion Title	Agriculture Committees
Digital Identity	Fragmented systems	National digital ID	30-35% reduction in	High - privacy and security	REAL ID Act	Homeland Security

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Standards		framework	onboarding friction	concerns	Modernizatio n	

Realistic legislative timeline suggests 18-36 months for federal sandbox authorization, 24-48 months for open banking standards, and 12-24 months for alternative credit safe harbors. Parallel state-level initiatives could accelerate implementation in progressive jurisdictions while federal frameworks develop (Arner *et al.*, 2020).

Capacity building of rural financial infrastructure and setting up a national digital identity framework are at the core of bridging the digital and financial access divide (Al Khub *et al.*, 2024; FDIC, 2023). Both interventions are according to the best international practices and would greatly improve inclusion results in distant and underprivileged communities (Wilmarth, 2025; Pazarbasioglu *et al.*, 2020).

FUTURE DIRECTIONS AND RESEARCH GAPS

The potential for FinTech to bring about inclusive finance offers significant opportunities and challenges, which deserve careful investigation and attention at the policy level**.** The U.S. has no universal set of digital payment system interoperability standards that work well internationally (World Bank, 2022; BIS, 2023). The FedNow program managed by the Federal Reserve is a step forward, but the extent to which it may integrate into various FinTech platforms is unknown (Federal Reserve, 2023). Population-level longitudinal assessment becomes crucial, as literature focuses on short-term adoption with little attention to longer-term consequences, particularly on financial resiliency, economic mobility, and wealth accumulation among underserved communities (Klapper *et al.*, 2022; Koomson *et al.*, 2020). Furthermore, work related to the regulatory framework should explore further in-depth how sandboxes and innovation-enabling regulations support inclusion with safeguarding consumer protection (Arner *et al.*, 2020; Zetzsche & Buckley, 2021; OECD, 2023). Ultimately, with FinTech deploying alternative data sources and AI-mediated decision making, privacy and data protection frameworks are due for greater scrutiny, including research into technologies that preserve privacy even as they maintain innovation in balance with individual rights (Arner *et al.*, 2020; FDIC, 2023; OECD, 2024).

Several frontier regions still require dedicated research to achieve FinTech's full potential for inclusivity. There is a need for cultural adaptation research and user experience design research to understand how language preference, community norms, and other culturally relevant factors impact the adoption of this technology, especially among immigrant populations and rural populations with distinct characteristics (Donovan, 2022; Chen *et al.*, 2023; Babu & Suthari, 2024). Service provision challenges are especially acute in rural, remote and indigenous areas (which also have relatively poorer mobile access) that, despite the hype of "mobile money," necessitate hybrid delivery models (combining digital and physical access) to address connectivity, digital literacy, and infrastructure gaps (Koomson *et al.*, 2020; World Bank, 2022; Lee *et al.*, 2023). Connecting with social insurance systems can improve financial access and program efficiencies, especially given that COVID-19 showcased the need to integrate FinTech into government benefits distribution frameworks (IMF, 2023; Ding *et al.*, 2025). Small business and entrepreneurial finance through alternative credit scanning and digitized payment systems have substantial room for economic growth, especially among the excluded (Demirgüç-Kunt & Klapper, 2022; OECD, 2023; IFC, 2024). Lastly, consumer protection and cybersecurity research can deal with frauds, scams, systems vulnerabilities impacting the vulnerable groups through end-users' education and technical security safeguards as well as regulatory interventions (FDIC, 2023; NIST, 2024), while full Environmental and Social impact assessments should consider ecological gains and wider societal impacts on community solidarity (Lee *et al.*, 2023; UNEP, 2023).

Emerging Technology Considerations

Central Bank Digital Currencies (CBDCs) and Financial Inclusion

The Federal Reserve's ongoing CBDC research presents both opportunities and risks for financial inclusion strategies. A well-designed digital dollar could provide:

- Universal payment infrastructure reducing fragmentation
- Government benefit distribution efficiency
- Reduced transaction costs for underserved populations
- Financial identity foundation for the unbanked

However, implementation risks include privacy concerns, financial disintermediation effects, and

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potential exclusion of digitally marginalized populations. Any CBDC rollout must include offline functionality, low-tech interfaces, and guaranteed access mechanisms (Federal Reserve, 2023; Atlantic Council, 2024).

Blockchain-Based Identity Solutions

Decentralized identity protocols like W3C's Verifiable Credentials offer promising pathways for the 11 million undocumented immigrants and populations lacking traditional identification. Pilot programs in Wyoming and Vermont demonstrate technical feasibility, though national adoption requires federal standards and regulatory clarity (NIST, 2024).

Climate and ESG Integration

Financial inclusion strategies must integrate climate resilience considerations, particularly for rural and coastal communities facing increasing climate risks. Green fintech products, including microloans for energy efficiency, climate insurance products, and sustainable agriculture financing, can simultaneously advance inclusion and environmental goals. The intersection of financial inclusion and climate adaptation represents an under-researched frontier with significant policy implications (UNEP, 2023; World Bank, 2024; Benneh, 2025).

CONCLUSION

FinTech models globally are subject to substantial promise for improving U.S. financial inclusion and critical contextual barriers. Mobile money ecosystems (e.g., M-Pesa), super-apps (WeChat Pay, Alipay), and neobanks (Nubank) exemplify their successful implementation, such direct transfer may not be possible in the U.S., due to regulatory hurdles, market development level, and social inequality differences. The most important enablers are dynamic regulation, interoperable infrastructure, and data-driven innovation that is accompanied by privacy measures. For the U.S., areas of priority tend to be around bolstering connectivity in rural communities, creating alternate credit scoring, breaking down silos between sectors and reforming regulatory systems. COVID-19 has further hastened the move toward digital finance, providing a window for reform and inclusion. In the end, effective FinTech-driven inclusion will require a cointegrated approach across policy makers, industry, and communities, matching technology with regulation and user-end empowerment to create an equitable, accessible financial system that supports long-term economic opportunity for those left behind.

Immediate Action Priorities (2024-2025)

Based on this analysis, we recommend three immediate priorities for U.S. financial inclusion advancement:

Priority 1: Establish Federal Fintech Sandbox

- Timeline: 12 months for Congressional authorization
- Budget: $150M initial appropriation
- Scope: 50 participants annually, 18-month testing periods
- Success Metrics: 30% graduation rate to market authorization

Priority 2: Alternative Credit Framework Development

- Timeline: 6 months for regulatory guidance
- Stakeholders: CFPB, FTC, OCC coordination
- Scope: Safe harbor for AI-driven models meeting transparency standards
- Impact Target: 5 million thin-file borrowers gaining access within 24 months

Priority 3: Rural Digital Infrastructure Investment

- Timeline: 24 months for infrastructure deployment
- Budget: $2.5B federal, $800M state/local matching
- Scope: 1,200 underserved communities
- Impact Target: 95% rural broadband access by 2027

These priorities offer realistic pathways to measurable inclusion improvements while building foundations for longer-term systemic transformation."

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