Ushering a New Billion into the Global System: The Next Frontier

Ajeet Khurana, Ankur Vaid, Bibin Babu, Bux Khurana, Dayakar Reddy, Harshal Madnani, Itay Azaraty, Jagdeep Sidhu, Javier Arroyo Ferrer, John Shipman, Kapil Dhiman, Punith Belavadi, Ronak Harshad Shah, Sandy Carter. Siddharth Banerjee, Vikram R. Singh, Yash Belavadi

How to Cite This Paper: Ajeet Khurana, Ankur Vaid, Bibin Babu, Bux Khurana, Dayakar Reddy, Harshal Madnani, Itay Azaraty, Jagdeep Sidhu, Javier Arroyo Ferrer, John Shipman, Kapil Dhiman, Punith Belavadi, Ronak Harshad Shah, Sandy Carter. Siddharth Banerjee, Vikram R. Singh, Yash Belavadi. (22 January 2025) Ushering a New Billion into the Global System: The Next Frontier, DavosWeb3, Davos, Switzerland

Abstract: The post-industrial world has been marked by rapid transformations, from shop floor automation to computers capable of replacing humans. Not everyone has been included in this journey. Faster evolution has led to more people being left behind. This underscores the urgency to foster inclusion. Not just as a conceptual framework, but as a roadmap to integrate everyone into global systems. Billions are already left behind. This paper examines the causes of exclusion, analyzes efforts toward redressal, highlights instances of sporadic success, and proposes technological solutions that, if implemented, could integrate the next billion individuals into the formal global systems.

Introduction: What will it take to bring the next billion humans into the global financial system? Why does this mission matter? Inclusion is—and always has been—a cornerstone of human development. By integrating excluded individuals and communities into the formal economy (as well as into other critical systems: social, financial, digital and educational), society as a whole can begin to better tackle poverty, boost economic empowerment, and improve quality of life. Substantial leaps have been made in these directions, in recent years; yet, systemic barriers continue to exclude over a billion adults globally. Addressing these barriers requires a multifaceted approach that recognizes the diverse and interconnected nature of inclusion.

Purpose Statement

- To provide an objective and data-driven overview of global financial inclusion trends
- To contextualize the persistent barriers to financial access
- To encourage critical questions that invite the further exploration of alternative financial models and technology-driven solutions

Definition of Financial Inclusion

The United Nations (UN) lists financial inclusion as an enabler for seven of its 17 Sustainable Development Goals or SDGs. Achieving financial inclusion implies *"that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way*[1]*,"* the World Bank states.

This definition underlines two vital aspects: affordability and utility, thereby emphasizing that financial services must cater to the needs of underserved populations both responsibly and sustainably.

The History of Financial Inclusion

As long as there have been banks and money, there have been tussles over who should have access, and how. Historically, access to capital and credit have been drivers of upward mobility. Such access has defined economic growth at the personal, societal and national levels. Financial inclusion has been, in other words, a critical driver of economic development and poverty alleviation.

The foundation of modern financial inclusion was laid in the late 20th century, as nations began to recognize the power that was unlocked, when banking services became accessible across demographics. In July 1969, India took a step in this direction, nationalizing 14 major banks with deposits exceeding Rs 50 crores. The aim was to better align banking services with national economic objectives. One of these objects: expanding access to underserved rural areas[2].

[1] World Bank, 2021, Overview of Financial Inclusion.
https://www.worldbank.org/en/topic/financialinclusion/overview

[2] Reserve Bank of India, 1968, Chronicle of Events.
https://web.archive.org/web/20230116055529/http://www.rbi.org.in/Scripts/chro_1968.aspx

Another dramatic turning point for financial inclusion in the subcontinent came a few decades later, with the microcredit movement led by the economist Muhammad Yunus in Bangladesh. In 1976, Yunus initiated a research project at the country's University of Chittagong to explore ways by which credit could be provided to impoverished rural populations who lacked collateral. His project eventually paved the way for the establishment of the Grameen Bank in 1983[3].

Founded on the belief that credit is a fundamental human right, Grameen Bank began offering small loans to marginalized communities, laying the groundwork for poverty alleviation through microlending. Its pioneering efforts proved how little it could take to make financial inclusion a reality (Yunus and Grameen Bank would go on to win the Nobel Peace Prize, in 2006).

A Global Focus on Microfinance

The turn of the millennium marked a period of heightened global attention on financial inclusion as a means of alleviating poverty. In 2003, UN Secretary-General Kofi Annan identified the lack of access to financial services as a critical barrier to poverty alleviation, urging governments and organizations to address this disparity[4].

The international spotlight stayed on the issue, as the UN declared 2005 the International Year of Microcredit, a move aimed at promoting this mode of lending as a tool for national and economic development.

These initiatives coincided with the G20's establishment of the Financial Inclusion Experts Group in 2009, and its endorsement of a Financial Inclusion Action Plan in 2010[5].

[3] Nobel Prize Organization, 2006, Muhammad Yunus Biographical
https://www.nobelprize.org/prizes/peace/2006/yunus/biographical/

[4] United Nations, 2003, Programme for International Year of Microcredit
https://press.un.org/en/2003/dev2452.doc.htm

[5] AFI Global, 2020, G20 Mexico Summit
https://www.afi-global.org/events/global-financial-partnership-for-financial-inclusion-g-20-mexico-summit/

Modern Initiatives and Global Commitment

In 2011, the Alliance for Financial Inclusion (AFI), a global network of policymakers and central banks[6], launched the Maya Declaration, marking the first-ever global effort to achieve responsible and sustainable financial inclusion[7]. More than 80 countries endorsed it, acknowledging the vital nature of this effort.

The Sustainable Development Goals (SDGs), established by the United Nations in 2015, meanwhile, outline global objectives to eradicate poverty, promote prosperity, and ensure environmental sustainability by 2030[8]. Financial inclusion directly supports at least seven[9] of these goals, reinforcing its role as a vital enabler of inclusive growth and economic stability.

The World Bank Group also launched the Universal Financial Access 2020 initiative in 2016, with an ambitious goal of enabling an additional 1 billion adults to access a bank account by 2020[10].

Not long after, the World Bank's Global Findex Database 2017 announced that 515 million adults gained access to financial services between 2014 and 2017. This marked a jump of seven percentage points; per this data, 69% of adults worldwide now had a financial account, up from 62% in 2014[1112]. There remains much to be done, but progress has been steady, particularly in and since the pandemic of 2019-23.

---

[6] GPFI, 2012, GPFI Forum Report.
https://www.gpfi.org/sites/gpfi/files/documents/GPFI%20Forum%20Report.pdf

[7] AFI Global, 2011, Maya Declaration.
https://www.afi-global.org/global-voice/maya-declaration/

[8] United Nations, 2015, Sustainable Development Goals.
https://www.un.org/sustainabledevelopment/sustainable-development-goals/

[9] Universal Financial Access, 2017, Universal Financial Access, 2020.
https://ufa.worldbank.org/en/ufa

[10] World Bank, 2017, Global Findex 2017 Report.
https://openknowledge.worldbank.org/bitstream/handle/10986/29510/211259ov.pdf

[11] World Bank, 2021, Global Findex 2021 Interactive Summary.
https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

[12] Global Findex Database, 2021, Interactive Executive Summary Visualization.
https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

State of Financial Inclusion Today

An estimated 1.4 billion adults globally remain unbanked[13], according to data from the Global Findex Database 2021. Over the past decade, global account ownership has shot up, from 51% in 2011 to 76% in 2021, amid efforts to expand access. Account ownership in developing economies has risen to 71% in this period. In regions such as Sub-Saharan Africa, mobile money has played a significant role too, contributing to the growth in account ownership.

The Gender Gap

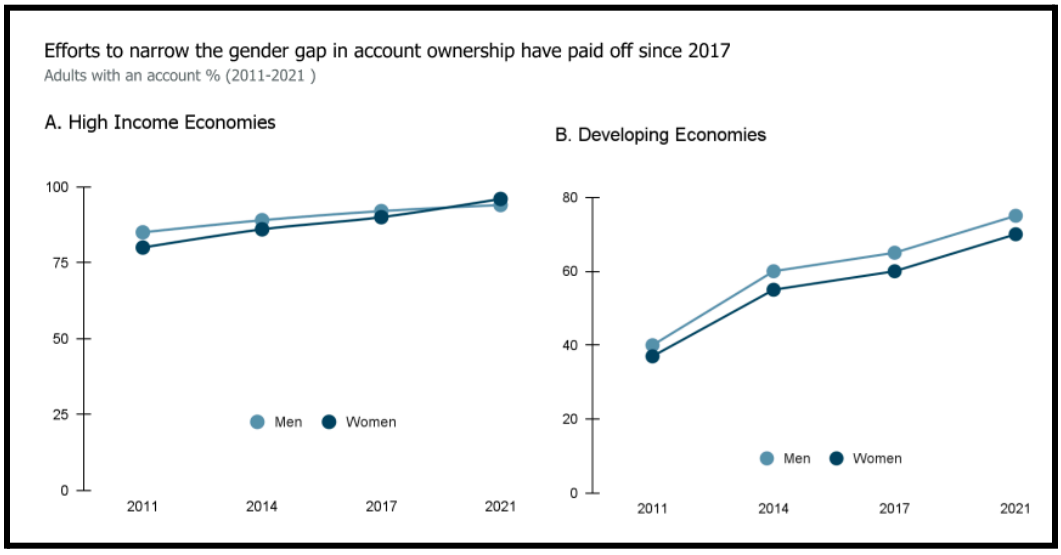


Image Source: Global Findex Database 2021[14]

Despite advancements, a gender gap persists, particularly in developing economies, where there is a seven-percentage-point difference between the share of women likely to own a financial account and the share of men likely to own one. While this gap has narrowed in recent years, women remain disproportionately represented among the population of the unbanked. About 740 million women (13% of all adults globally, and about 53% of the unbanked) do not have an account.

[13] Third Gambia Economic Update, 2021, World Bank Report. https://documents1.worldbank.org/curated/en/099060523101038604/pdf/P179266010f0e40b409f360f3e480c8f877.pdf

[14] Global Findex Database, 2021, Gender Gaps in Financial Inclusion. https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

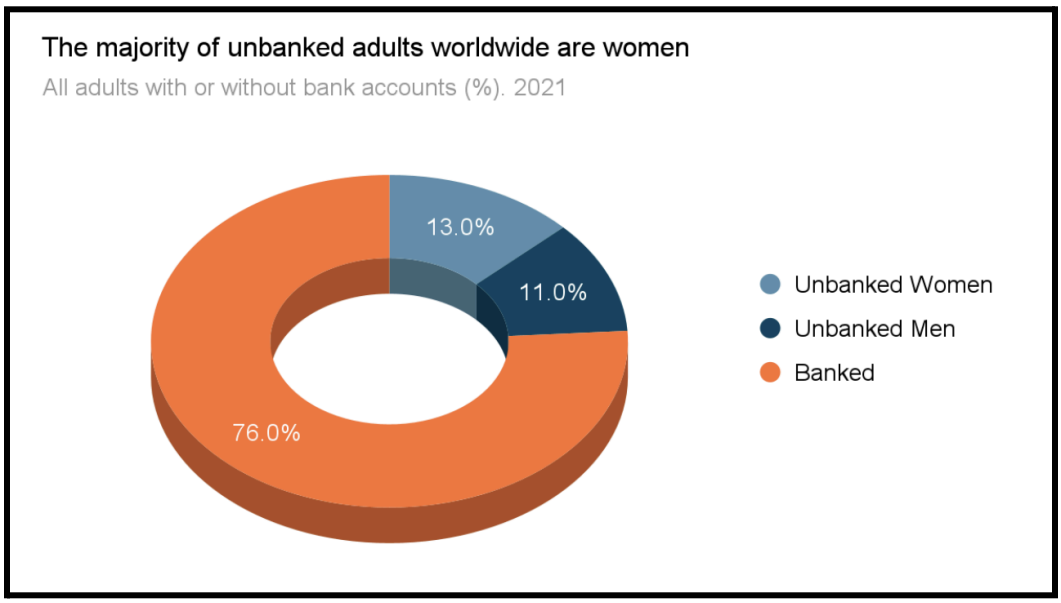


Image Source: Global Findex Database 2021[15]

Income and Age Disparities

Account ownership varies across income levels and age groups, particularly in developing economies. In the richest 60% of households, 79% of adults hold accounts, compared to 72% in the poorest 40%. Additionally, 72% of adults aged 25 and older have accounts, compared to 66% of young adults (aged 15-24).

Regional Concentrations

More than half the world's unbanked population resides in just seven economies: Bangladesh, China, Egypt, India, Indonesia, Nigeria and Pakistan. These collectively account for 54% of all unbanked adults globally, with India alone home to 17% of the unbanked. In The Gambia, about 69% of adults (defined, for the purposes of financial inclusion, as those aged 15 years and older) don't have access to a transaction account. Among youth (aged 15-35), 77% don't have transaction accounts, while the same is true for 75% of people living in rural areas[16][17].

[15] Global Findex Database, 2021, Gender Gaps in Financial Inclusion.
https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

[16] FDIC, 2019, Household Survey Report.
https://www.fdic.gov/analysis/household-survey/2019report.pdf

[17] Third Gambia Economic Update
https://documents1.worldbank.org/curated/en/099060523101038604/pdf/P179266010f0e40b409f360f3e480c8f877.pdf

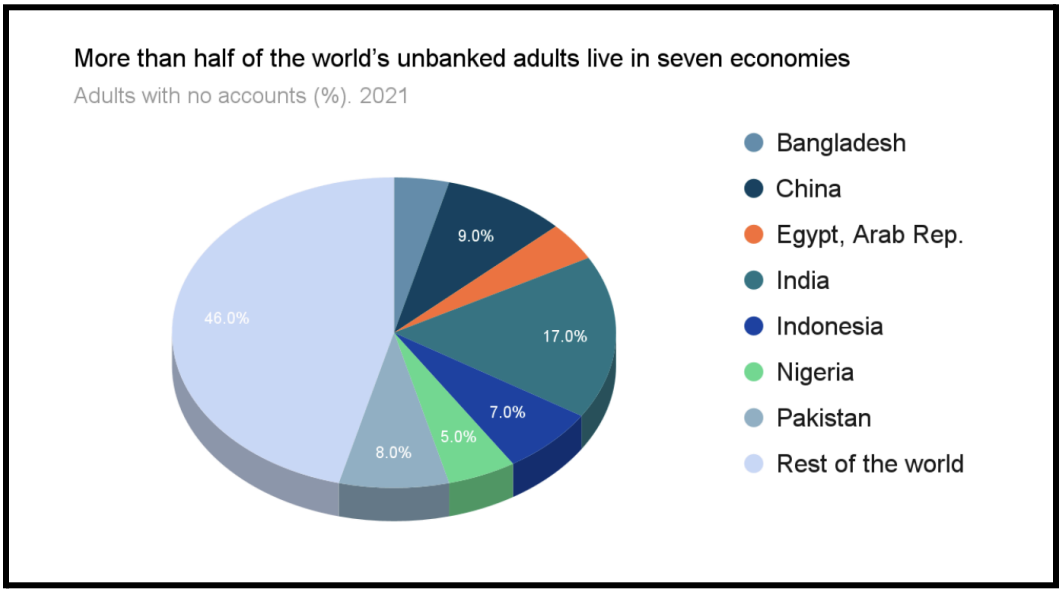


Image Source: Global Findex Database 2021[18][19]

Educational Disparities

Education levels further distinguish the unbanked, with global data indicating that 64% of unbanked adults have only a primary education or less.

In parts of Sub-Saharan Africa, this figure goes as high as 74%. In countries such as Mozambique, 90% of unbanked individuals have minimal schooling. This indicates the diverse and interconnected nature of inclusion, as those at the margins find they have a more-restricted capacity to engage with and benefit from financial services[20]

Challenging Myths

The narrative around financial exclusion is often shaped by misconceptions that oversimplify the realities faced by unbanked and underbanked populations. Insights from the 2019 survey by FDIC (the US Federal Deposit Insurance Corporation) challenge these myths and provide a more nuanced understanding of the issue.

[18] GSMA, 2022, State of Mobile Internet Connectivity Report.
https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf

[19] The Global Findex Database 2021
https://www.worldbank.org/en/publication/globalfindex/Report

[20] ITU, 2022, Measuring Digital Development Facts and Figures 2022.
https://www.itu.int/hub/publication/d-ind-ict_mdd-2022/

Myth 1: The Unbanked Are Largely Young and Low-Income

It is a common misconception that financial exclusion primarily affects younger and lower-income individuals. The data tells a more complex story. In the US, 57% of unbanked individuals are between 25 and 54 years old—firmly within the working age group. Among underbanked households, 45% earn more than $50,000 annually, which is by no measure a low income. While financial exclusion disproportionately affects lower-income individuals (35% of underbanked households earn less than $30,000 annually), a significant portion of the unbanked population is made up of higher-income, working-age individuals[21].

Myth 2: Lack of Trust is the Primary Hurdle

Distrust in banking institutions is often cited as the leading cause of financial exclusion. While trust is a factor, the data shows a more pressing issue.

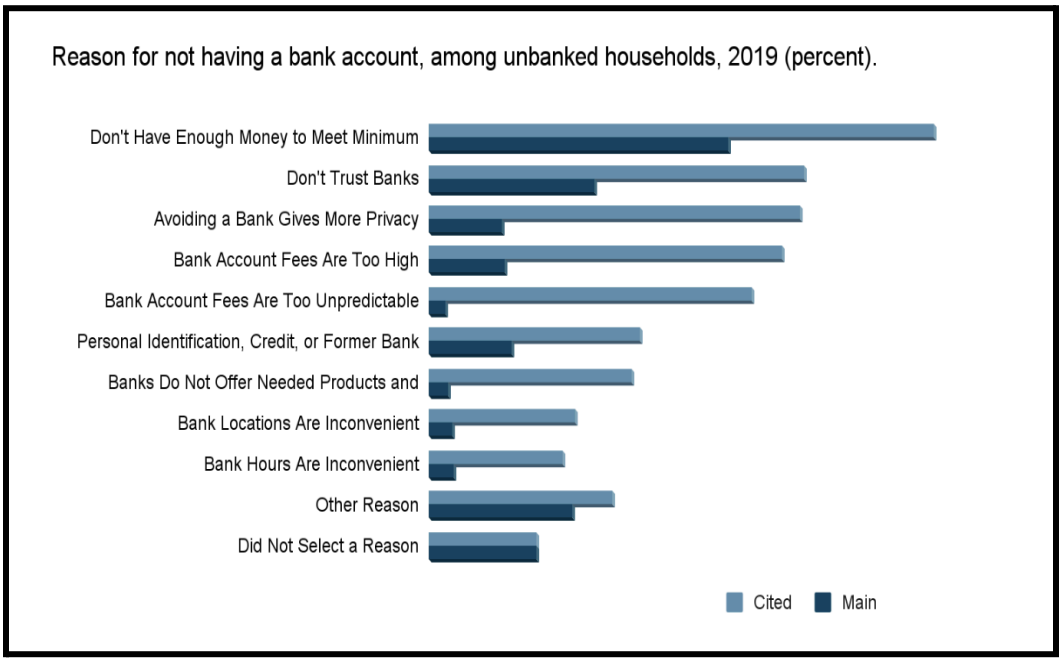


Image Source: FDIC, 2019[22]

Only 16% of unbanked households cited distrust of banks as their primary reason, in the 2019 survey. 29% reported insufficient funds as the main barrier. Other

[21] FDIC, 2019, Challenges in Financial Inclusion. https://www.fdic.gov/analysis/household-survey/2019report.pdf

[22] FDIC, 2019, Challenges in Financial Inclusion. https://www.fdic.gov/analysis/household-survey/2019report.pdf

reasons included high fees, unpredictable charges, and inconvenient branch hours and locations[23].

Myth 3: Digital Banking Alone Can Solve Financial Exclusion

Digital banking is often promoted as the ultimate solution to financial exclusion. However, systemic barriers to digital access make this an overly simplistic assumption. An estimated 15% of unbanked households lack a smartphone. Meanwhile, only 60% of unbanked households have access to the internet, compared to 95% of fully banked households. Digital literacy remains a challenge, further complicating access. While digital banking is a powerful tool, it cannot address the structural and financial barriers underlying exclusion.

Myth 4: Financial Exclusion is a Developing Country Problem

The perception that financial exclusion is largely limited to developing nations overlooks significant challenges in high-income countries such as the United States. Despite being a developed economy, 5.4% of U.S. households (approximately 7.1 million) are unbanked, and an additional 17.4% are underbanked, relying on alternative financial services such as payday loans. Marginalized communities bear the brunt: 13.8% of Black households and 12.2% of Hispanic households are unbanked, compared to only 2.5% of White households.

Myth 5: Most Unbanked Individuals Lack Financial Literacy

There is a pervasive belief that financial exclusion stems from a lack of financial literacy. However, the data indicates that many unbanked individuals have prior experience with the formal banking system and demonstrate an understanding of financial products. Approximately 50% of unbanked households had held a bank account in the past, and 10% had held one within the previous 12 months, the US FDC survey showed. More than 59% of underbanked households had at least some college education, undermining the stereotype that financial exclusion was linked to poor education.

While literacy and awareness remain barriers for some, systemic issues such as high fees and inconvenient branch hours and locations are primary factors.

[23] FDIC, 2019, Challenges in Financial Inclusion.
https://www.fdic.gov/analysis/household-survey/2019report.pdf

So, What Are the Barriers?

The key barriers blocking access to traditional banking manifest across geographic, economic, regulatory and psychological dimensions, impacting different demographics in distinct ways.[24]

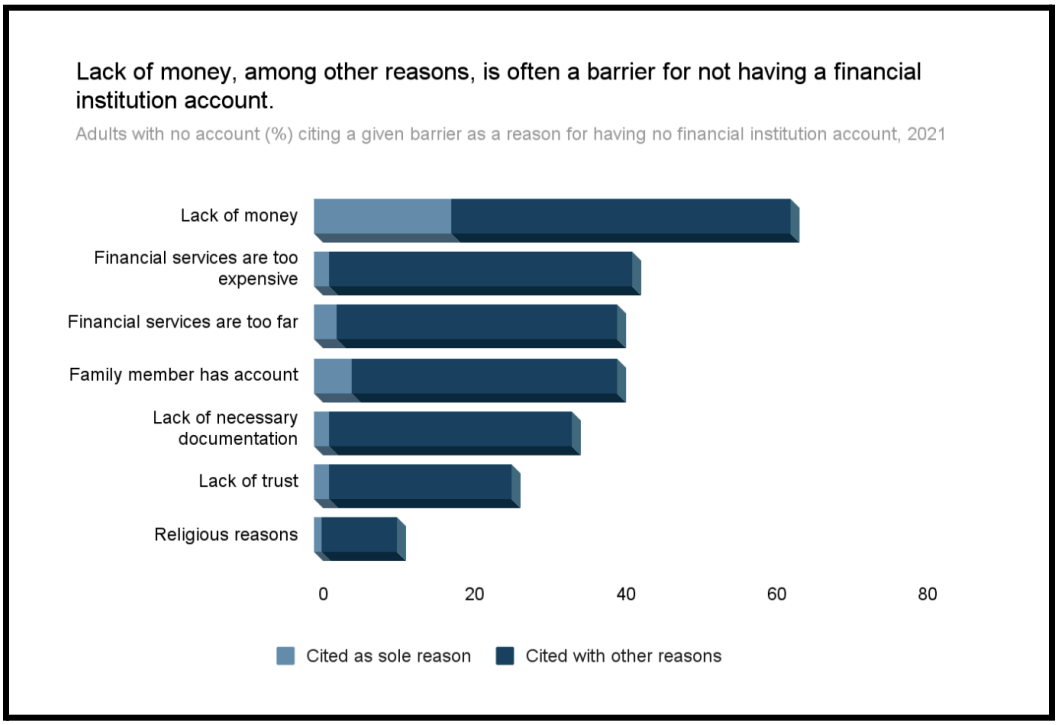


Image Source: Global Findex Database 2021[25]

1. Geographic Barriers

Access to financial services is often limited in underserved areas, where physical distance and infrastructure deficits prevent the convenient use of banking. About 31% of unbanked adults worldwide cite distance from the nearest branch as a primary barrier, with countries such as Liberia (53%), Bolivia (47%), Laos (45%), India (43%) and Uganda (41%) reporting high rates of geographic exclusion[26].

[24] Global Findex Database, 2021, Interactive Executive Summary Visualization. https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

[25] Global Findex Database, 2021, Interactive Executive Summary Visualization. https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

[26] FDIC, 2019, Challenges in Financial Inclusion. https://www.fdic.gov/analysis/household-survey/2019report.pdf

Banking Deserts in Rural Neighbourhoods

The lack of local banking infrastructure poses a significant challenge, particularly in rural neighbourhoods[27]. In the U.S, approximately 20% of recent bank branch closures have occurred in regions with no other nearby branches, effectively creating "banking deserts" that leave communities without access to essential financial services[28].

Efforts to narrow the gender gap in account ownership have paid off since 2017

Category	Total Census Tracts	Deserts 2019	Deserts 2023	2019-2023 Percent Change	Population of 2023 Deserts	Percent of Population Living in 2023 Deserts
Total	83,848	3,401	3,618	6.40%	12,283,793	3.80%
By tract metro status						
Rural	13,668	463	491	6.00%	1,174,327	2.60%
Suburban	41,186	2,254	2,395	6.30%	8,081,960	4.70%
Urban	28,994	684	732	7.00%	3,027,506	2.80%
By tract median family income						
LMI (<80% area median)	24,524	850	901	6.00%	2,946,219	3.20%
MUI	57,608	2,439	2,600	6.60%	9,180,658	4.00%
By tract majority race/ethnicity						
American Indian/Alaska Native	195	96	94	-2.10%	283,252	46.40%
Asian	873	4	4	0.00%	17,534	0.50%
Black	6,566	159	175	10.10%	599,777	2.80%
Hispanic	8,275	262	259	-1.10%	995,987	2.80%
White	56,280	2,622	2,808	7.10%	9,421,809	4.30%
Diverse (no predominant race)	11,659	258	278	7.80%	965,434	2.00%
By other categories						
Low device access	20,837	1,196	1,258	5.20%	3,785,518	5.40%
Low broadband access	20,837	1,347	1,417	5.20%	4,269,626	6.10%
High share of older residents	20,897	1,135	1,205	6.20%	3,387,870	4.80%
High share of disabled residents	20,862	1,240	1,331	7.30%	4,021,986	5.80%

Image Source: Philadelphia Fed, 2024, Banking Deserts Report[29]

Between 2008 and 2016, in the wake of the economic downturn, the U.S. saw a major reduction in the number of bank branches, with 6,008 of the country's 95,018 branches closing—a decrease of over 6%. Closures disproportionately impacted urban ZIP codes, but rural areas were particularly vulnerable to the

[27] Measuring Financial Access around the World
https://www.cgap.org/research/publication/measuring-financial-access-around-world

[28] U.S. Bank Branch Closures and Banking Deserts
https://www.philadelphiafed.org/-/media/frbp/assets/community-development/reports/banking-deserts-report-feb-2024.pdf

[29] Philadelphia Fed, 2024, Banking Deserts Report
https://www.philadelphiafed.org/-/media/frbp/assets/community-development/reports/banking-deserts-report-feb-2024.pdf

formation of new banking deserts. During this period, 86 new banking deserts appeared in rural areas[30].

Recent data highlights the impact. The number of individuals living in a banking desert has risen from 11.5 million (3.5% of the U.S. population) in 2019 to 12.3 million (3.8%) in 2023.

Digital Infrastructure Constraints

Digital banking would appear to be an obvious answer to the issue of banking deserts, and to geographic barriers overall. But inconsistent access to the internet, and interruptions in power supply, limit access to digital banking services in many underserved areas.

Reports indicate that areas with steady internet connectivity experience rates of digital banking use that are up to 40% higher than areas with unreliable infrastructure.

The banking industry has historically been constrained by a lack of incentive to serve low-income individuals, leaving a significant segment of the population underserved. However, advancements in technology are poised to revolutionize this dynamic by making banking more accessible and inclusive.

Ronak Harshad Shah, founder of *DroomDroom*[31], highlights that digital banking significantly reduces costs, enabling banks to offer low-fee accounts and services tailored to low-income groups. He writes, "AI-powered tools can assess creditworthiness using unconventional data sources like utility payments, opening doors to loans for those previously excluded from formal credit systems. Moreover, decentralized finance (DeFi) eliminates intermediaries, thereby lowering transaction fees and enabling small, affordable loans. Mobile payment systems have further simplified access to financial tools, while AI-driven agents are emerging as personalized advisors, empowering individuals to manage their finances effectively. Together, these innovations form a comprehensive ecosystem designed to make banking practical and inclusive for all."

[30] NCRC Memo
https://ncrc.org/wp-content/uploads/2017/05/NCRC_Branch_Deserts_Research_Memo_050517_2.pdf

[31] DroomDroom: Learn Everything Web3 & Crypto
https://droomdroom.com/

Adding more depth to that, *Itay Azaraty*, founder of *EcoTrader*[32], adds that while technology might not directly motivate traditional banks to serve low-income individuals, it creates alternatives that challenge the status quo. He says, "These technological solutions are often more accessible, cost-effective, and unbiased. Over time, as these alternatives attract a significant customer base, traditional banks may recognize the economic opportunity in catering to underserved populations, thus shifting their approach."

Bibin Babu, founder of *Paycio*[33], emphasizes the transformative role of blockchain in bridging the financial gap for low-income individuals. Referring to his own work he says that "Blockchain-based platforms like Paycio streamline digital payments, reducing fees and enabling accessibility through mobile-based transactions and offline capabilities. By removing intermediaries, blockchain ensures inclusivity and provides secure, transparent financial services, empowering underserved communities with seamless access to banking."

Harshal Madnani, founder of *Xade Finance*[34], underscores the potential of decentralized platforms to revolutionize financial services for low-income groups. He explains the motivation for his new project, "By leveraging blockchain technology, platforms like Xade Finance provide transparency, trust, and cost efficiency. Smart contracts further reduce operational expenses, enabling seamless access to loans, payments, and savings without intermediaries. Through DeFi solutions, the financial inclusion gap is bridged, unlocking opportunities for previously neglected populations and fostering an equitable banking ecosystem."

2. Operating Hours and Documentation

Banking hours are often misaligned with the schedules of low-income and hourly-wage earners. Many traditional banks mandate specific official documents for Know Your Customer (KYC) compliance, thus excluding people who do not have, for instance, a birth certificate.

Approximately 27% of unbanked adults cite the absence of necessary documentation as a deterrent. This barrier is highly pronounced in countries such

[32] Ecotrader: Revolutionizing Renewable Energy Investments
https://www.ecotrader.io/

[33] Paycio: Best Crypto Payment Gateway for Businesses
https://www.paycio.com/

[34] Xade Finance: The Ultimate Trading Experience
https://www.xade.finance/

as Tanzania and Uganda, where about half the unbanked population lacks the documentation required to open an account[35].

Black and Hispanic households, despite making up only 32% of the U.S. population, represent 64% of the unbanked and 47% of underbanked households[36]. These communities often rely on alternative financial services (AFS), such as check cashers and payday lenders, due to their accessibility and convenience.

3. Cost of Digital Infrastructure

The ability to afford both an internet-enabled device and the internet itself can define how rural and underserved populations access financial services, or become / remain excluded.

Device Affordability and Cost of Access

The GSMA State of Mobile Internet Connectivity Report identifies device affordability as a predominant barrier to mobile-internet adoption, especially for rural populations and women in low- and middle-income countries[37]. In these regions, an entry-level internet-enabled device costs 18% of the average monthly income, with this figure rising to 51% for the poorest 20% of the population. In Sub-Saharan Africa, the affordability challenge is even more pronounced. Here, an entry-level device can cost up to 99% of the average monthly income for the region's poorest 20%[38].

Mobile broadband costs in low-income countries were equivalent to 9.3% of gross national income (GNI) per capita in 2022, significantly above the affordability target of 2%. Fixed broadband costs are even higher, reaching 32.6% of GNI per capita[39].

[35] FDIC, 2019, Challenges in Financial Inclusion
https://www.fdic.gov/analysis/household-survey/2019report.pdf

[36] BCG, 2021, Barriers to Banking Services
https://www.bcg.com/en-us/financial-inclusion-banking-reforms

[37] GSMA, 2022, State of Mobile Internet Connectivity Report
https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf

[38] GSMA, 2022, State of Mobile Internet Connectivity Report
https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf

[39] ITU, 2022, Measuring Digital Development Facts and Figures 2022
https://www.itu.int/hub/publication/d-ind-ict_mdd-2022/

The Digital Divide

Although mobile broadband networks now cover about 95% of the global population, only 55% of people actively use mobile internet services. This gap reflects the non-technical barriers, including economic limitations and a lack of digital skills, that prevent individuals from accessing available digital services[40].

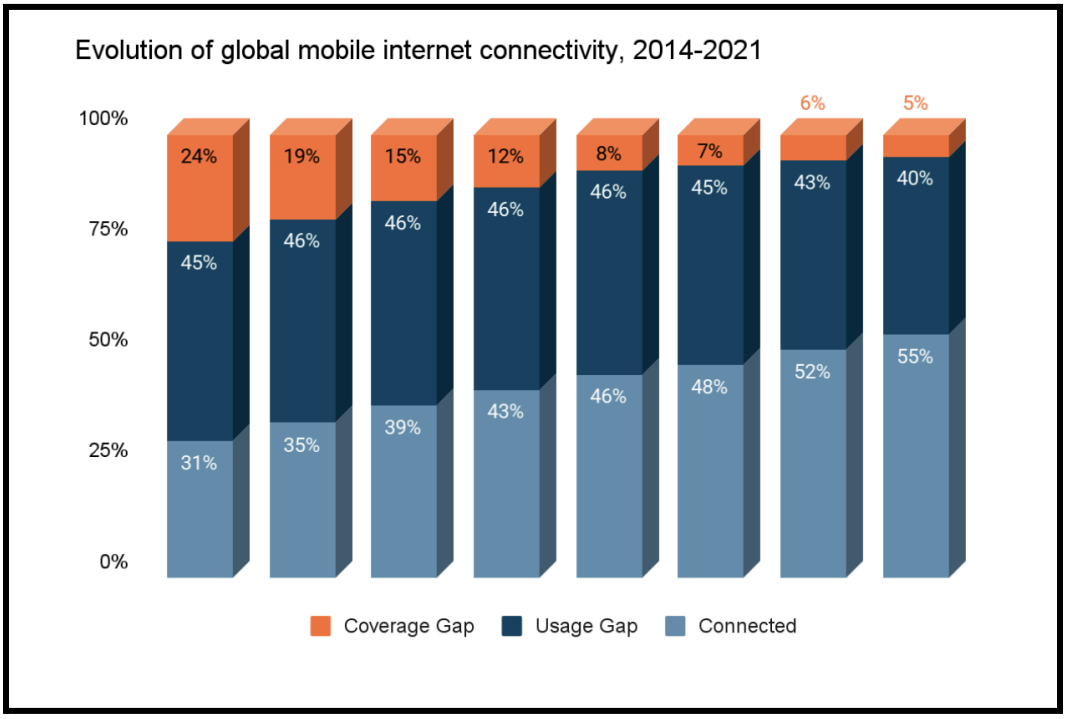


Image Source: State of Mobile Internet Connectivity 2022[41]

The GSMA report highlights a pronounced urban-rural divide in internet access. In 2022, 82% of urban residents used the internet, compared to only 46% in rural areas, with the gap being particularly wide in Africa and the Asia-Pacific region[42].

The Skills Gap

Lack of digital skills represents a major barrier to connectivity. Low levels of information / data literacy indicate that simply providing access to digital tools is

[40] GSMA, 2022, State of Mobile Internet Connectivity Report
https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf

[41] GSMA, 2022, State of Mobile Internet Connectivity Report
https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf

[42] ITU, 2022, Measuring Digital Development Facts and Figures 2022
https://www.itu.int/hub/publication/d-ind-ict_mdd-2022/

not enough to support financial inclusion. In Sub-Saharan Africa, for instance, about 30% of mobile money account holders need help using their accounts[43].

4. High Fees and Minimum Balances

Maintenance fees and minimum balance requirements discourage low-income individuals from opening accounts.

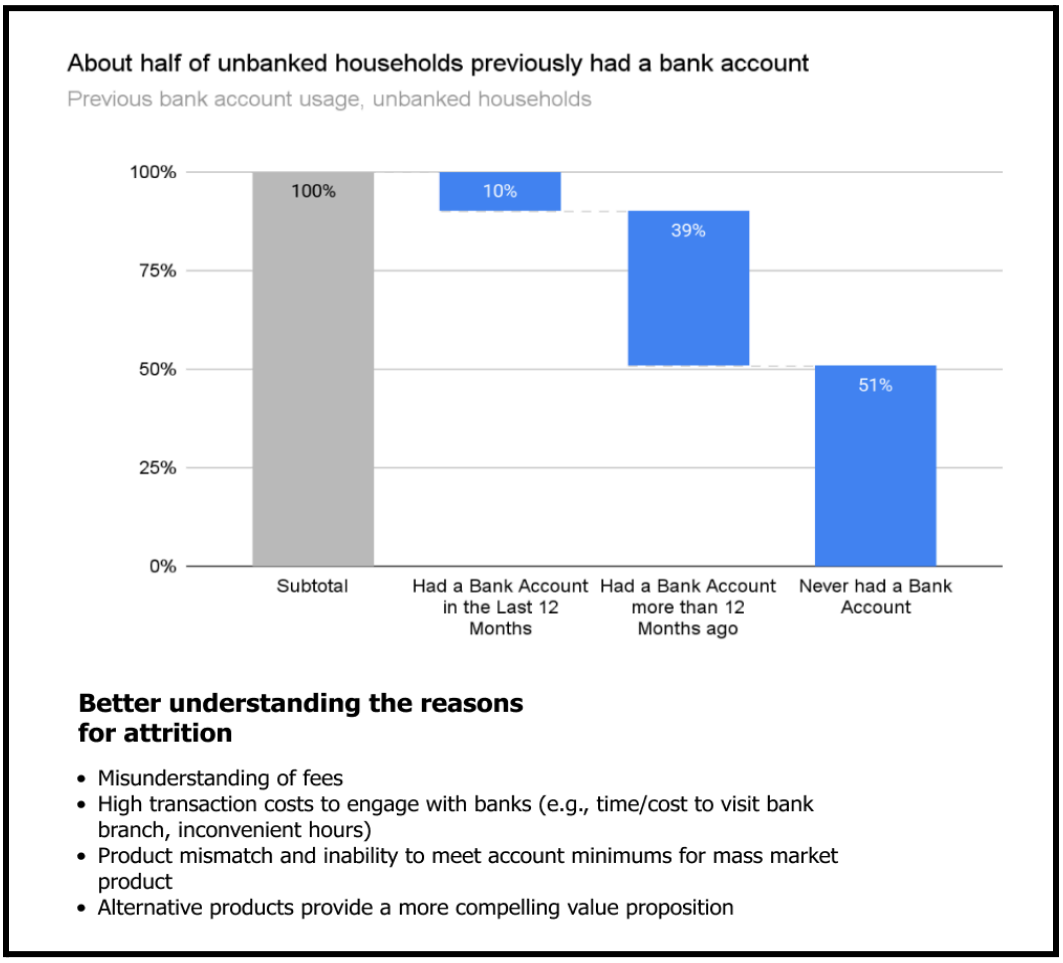


Image Source: BCG, 2021[44]

As the chart above illustrates, about half of all unbanked households in the U.S. had previously held bank accounts, with many opting out due to misunderstandings about fees, high transaction costs, and inconvenient banking

[43] Global Findex Database, 2021, Interactive Executive Summary Visualization
https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

[44] BCG, 2021, Barriers to Banking Services
https://www.bcg.com/en-us/financial-inclusion-banking-reforms

hours. This highlights a gap between what traditional banks offer and what underbanked communities need.

Cost of Banking Services

The FDIC National Survey of Unbanked and Underbanked Households (2019) reports that nearly half of all unbanked households (48.9%) cite insufficient funds to meet minimum balance requirements as a primary reason for not having a bank account. Additionally, high fees or unpredictable costs were noted by 34.2% of respondents as deterrents to using traditional banking services[45].

Worldwide, 36% of unbanked adults said that financial services were too expensive. This share was almost twice as high (60%) in Latin America and the Caribbean. In Brazil, Colombia, Honduras, Nicaragua, Panama, Paraguay and Peru, more than 60% of unbanked adults cited cost as a barrier[46].

Worldwide, 29% of unbanked households cited not having enough money to meet minimum balance requirements as the main barrier to opening an account[47]. Additionally, high fees and privacy concerns were cited as deterrents.

Decentralized frameworks, such as blockchain-based solutions, hold immense potential for balancing accessibility and user privacy, thereby advancing financial inclusion.

Ajeet Khurana, founder of the Flex *Ecosystem*[48], emphasizes that achieving this balance requires juggling trade-offs between privacy, security, speed, autonomy, decentralization, democratization, and cost. He explained the multi-variate problem, "enhancing one aspect may compromise another. Blockchain technology offers a near-optimal solution by addressing these factors holistically. Innovations such as zero-knowledge proofs enable frameworks that prioritize user privacy without sacrificing accessibility or security. As a result, blockchain emerges as a cornerstone for a decentralized, privacy-focused, and AI-compatible future."

[45] FDIC, 2019, Challenges in Financial Inclusion
https://www.fdic.gov/analysis/household-survey/2019report.pdf

[46] Global Findex Database, 2021, Interactive Executive Summary Visualization
https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

[47] BCG, 2021, Barriers to Banking Services
https://www.bcg.com/en-us/financial-inclusion-banking-reforms

[48] Flex: Dapps that Democratize
https://www.flexecosystem.com/

Javier Arroyo Ferrer, Leader of *ICP.HUB Canada & US*[49] and CEO of *Quantum Leap Labs*[50], highlights the role of the Internet Computer Protocol (ICP)[51] in creating scalable, transparent, and secure systems. "ICP empowers financial inclusion through cost-effective decentralized applications (dApps) that eliminate intermediaries, reducing barriers for underserved populations. Its cryptographic mechanisms ensure data privacy while maintaining transparency in transactions, fostering trust in decentralized ecosystems. By supporting decentralized identity systems and smart contracts, ICP enables users to control their data seamlessly, creating equitable opportunities for global economic participation while safeguarding individual privacy."

Similarly, *Jagdeep Sidhu*, lead core developer and co-founder of *Syscoin*[52], and *Patrick Breaux*, Marketing and PR Manager for *SYS Labs*[53], emphasize the focus on how cryptographic methods such as zero-knowledge proofs facilitate trustless transactions while protecting sensitive data. "By removing intermediaries and reducing costs, these technologies empower underserved populations and enhance transparency. Frameworks like Syscoin's modular blockchain combine scalable solutions with privacy-preserving technologies, creating inclusive financial ecosystems that prioritize user control and security. This approach drives meaningful progress toward global financial inclusion."

Sandy Carter, Chief Operating Officer and Head of GTM at *Unstoppable Domains*[54], underscores the transformative power of tokenization, digital identity, and smart contracts in decentralized frameworks. "Tokenization democratizes access to wealth-building opportunities by dividing assets into smaller, tradable units, reducing entry barriers without requiring full identity disclosure. Digital identity solutions give users self-sovereign control over their data, enabling secure and borderless access to financial tools. Meanwhile, smart contracts automate

[49] ICP.HUB North America: Accelerating the Internet Computer Mass Adoption in Canada & US
https://icpnorthamerica.org/

[50] Quantum Leap Labs: Accelerating Successful SNS DAO Launches on the Internet Computer Protocol
https://quantumleaplabs.ca/

[51] Internet Computer Protocol: World Computer
https://internetcomputer.org/

[52] Syscoin: Bitcoin's only Modular Network
https://syscoin.org/

[53] SYS Labs: Venture Building the Fundamental Layers of Web3
https://syslabs.com/

[54] Unstoppable Domains - Onchain Domains for Everyone
https://unstoppabledomains.com/

financial agreements, enhancing transparency and fairness while removing intermediaries. Together, these innovations foster a decentralized, secure approach to economic empowerment, advancing financial inclusion while safeguarding privacy."

Cost per transaction

An IMF working paper examining the costs of basic banking services in 34 countries found that the cost of maintaining a basic checking account can exceed 5% of monthly income, particularly affecting low-income individuals in regions such as the West African Economic and Monetary Union (WAEMU) and the Southern African Development Community (SADC)[55].

In regions such as Guinea-Bissau, Niger and Madagascar, the basic checking account fee was found to be particularly prohibitive.

The average monthly maintenance fee for checking accounts in low-income countries was found to be 1.3% of monthly Gross National Income (GNI) per capita and could go as high as 8.3% of GNI per capita, a prohibitive figure for many[56].

In addition to checking-account maintenance, the study highlighted ATM withdrawal fees as another significant barrier. In some countries, these can reach up to 9.1% per transaction for every $100 withdrawn.

These high costs contribute to financial exclusion, as maintaining an account becomes a burden for the economically disadvantaged.

5. Behavioral and Psychological Barriers

The complexity of banking products and services can lead to cognitive overload, discouraging potential users. This is particularly true for populations with limited financial education. Alternative financial services with more straightforward processes then become the preferred alternative, even though they come at a higher cost. Fundamental lack of trust can be a key barrier too.

[55] IMF, 2024, Financial Access Chapter
https://www.elibrary.imf.org/display/book/9798400223525/CH007.xm

[56] IMF, 2024, Financial Access Chapter
https://www.elibrary.imf.org/display/book/9798400223525/CH007.xm

Social Influence and Trust

The preference for informal financial practices within certain communities may stem from a historical mistrust of formal institutions. This mistrust, rooted in past exploitation or exclusion, discourages individuals from engaging with banks, reinforcing reliance on community-based, informal savings and lending groups.

Trust is described as a dynamic and multifaceted concept in retail and banking literature. Trust in banks is critical, especially in turbulent times—and is vital for financial access, inclusion and stability. Low trust has the propensity to limit financial access, inclusion and stability for consumers, as well as damage the financial services industry. Individuals with lower levels of trust are less likely to have a savings account and have stronger liquidity preferences than people with higher levels of trust.

One study revealed that mistrust is prevalent across genders, with 15.0% of females, 18.2% of males, and 29.9% of gender-diverse individuals indicating that they find financial institutions untrustworthy[57]. "Overall, findings indicate that respondents' mistrust of banking can be attributed to a fear of loss," the researchers noted.

Younger respondents, especially those aged 35-44, showed higher levels of distrust, indicating generational differences in perceptions of financial stability and transparency within the banking system. Many respondents described their mistrust as rooted in both systemic and personal historical experiences with financial institutions.

6. Gender gap

The gender gap in financial inclusion remains a significant barrier, particularly in developing countries, where socio-cultural factors restrict women's access to financial services.

Account Ownership Disparities

Globally, there is a 7% gender gap in financial account ownership, with 72% of men having an account at a financial institution or mobile money provider

[57] Fear and trust in financial institutions: A content analysis by Isha Chawlaa, Mia B. Russellb, Kenneth J. White'*, Sharon A. DeVaneyd
https://openjournals.libs.uga.edu/fsr/article/download/3541/3138

compared to only 65% of women[58]. In regions such as the Middle East and North Africa (MENA) and South Asia, this gap is even more pronounced, with disparities of 18.8% and 10.7%, respectively.

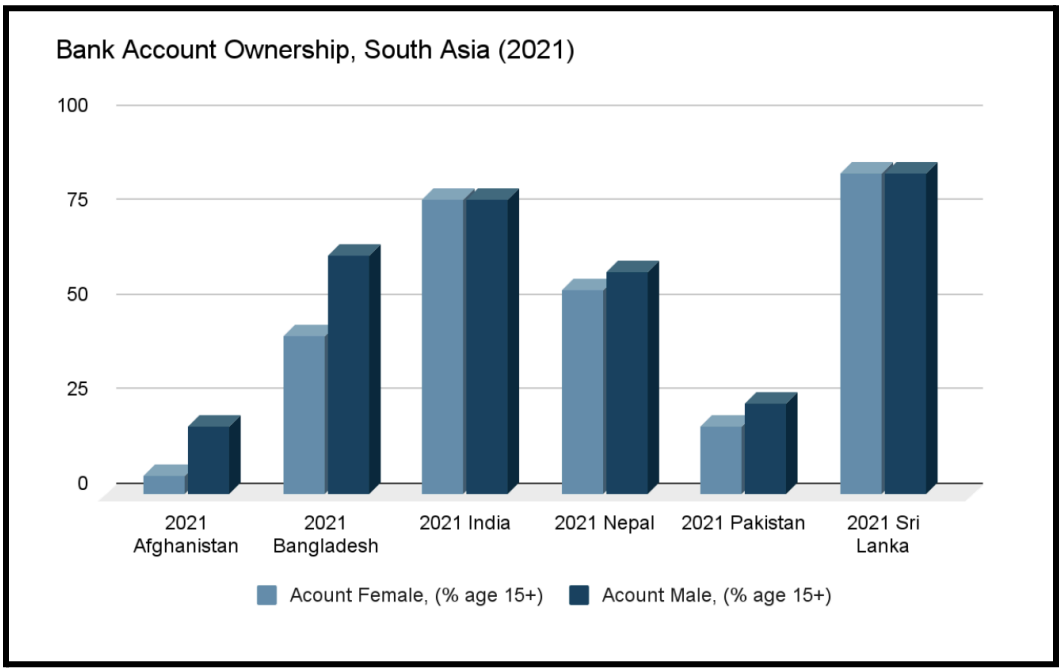


Image Source: ORF, 2024, Financial Inclusion of Women: Evidence from India[59]

Women in developing economies own fewer accounts than men and experience reduced access to credit and formal savings mechanisms. Even where initiatives such as microcredit programs have been introduced, only about 11% of women in certain regions have utilized them[60].

Socio-Cultural Barriers

Research from the University of Arkansas and the European Bank for Reconstruction and Development (EBRD) has explored how societal expectations around women's roles can prevent women from accessing financial services, particularly in patriarchal societies. For example, restrictions on women's

[58] The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19 https://www.worldbank.org/en/publication/globalfindex

[59] ORF, 2024, Financial Inclusion of Women: Evidence from India https://www.orfonline.org/research/financial-inclusion-of-women-current-evidence-from-india

[60] ORF, 2024, Financial Inclusion of Women: Evidence from India https://www.orfonline.org/research/financial-inclusion-of-women-current-evidence-from-india

mobility and the societal expectation that they prioritize household responsibilities limit their engagement with financial institutions[61].

In South Asia, women are reportedly 38% less likely to own a mobile phone than men[62], affecting their ability to engage with mobile money services, which have otherwise significantly boosted financial inclusion[63].

On the Road to Financial Inclusion

As of 2021, there are 1.4 billion unbanked adults globally, a number that would likely have been far higher without the sustained efforts to expand access. These efforts have been defined by technological innovations, mobile banking, and government-led initiatives, all of which have emerged as transformative solutions. This section explores their impacts, limitations, and potential.

Technological Innovation

Technological advancements have played a pivotal role in the mission for financial inclusion, reshaping how individuals access and engage with financial services.

Mobile Banking

Mobile banking and digital financial services have significantly advanced access to financial services, particularly in developing countries with more-limited traditional banking infrastructure. Platforms such as M-Pesa in Kenya and GCash in the Philippines have empowered millions to transact, save and borrow using their mobile phones.

M-Pesa is a particularly striking example. It has revolutionized financial inclusion in Kenya. Since its launch, it has brought more than 83% of Kenyan adults into

[61] EBRD, 2024, Access to Finance: Mind the Gender Gap
https://www.ebrd.com/documents/oce/access-to-finance-mind-the-gender-gap.pdf

[62] GSMA, 2015, State of the Industry 2015
https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/gsma_resources/state-of-the-industry-2015/

[63] CGAP, 2017, Social Norms Change for Women's Financial Inclusion
https://www.cgap.org/sites/default/files/Brief-Social-Norms-Change-for-Womens-Financial-Inclusion-Jul-2017_0.pdf

the financial system[64]. Between its launch and achieving 83% financial inclusion, M-Pesa helped reduce Kenya's unbanked adult population by approximately 13.8 million.

By 2016, nearly 75% of Kenyan adults had access to mobile money services through platforms like M-Pesa, bypassing the need for traditional banking infrastructure. Its transformative impact is evident from its rapid adoption, with 1.1 million users registering within eight months and $87 million transferred during that time[65].

This success is not confined to Kenya. As of 2021, mobile money services were operational in 98 countries, with 1.35 billion accounts registered[66]—a significant increase from 866 million in 2018. Transaction volumes globally surpassed $1 trillion in 2021 (Global Findex Database, 2021)[67].

The geographical reach of M-Pesa has also grown significantly. As of 2021, operations had expanded to seven countries, including Tanzania, Mozambique, the Democratic Republic of Congo, Lesotho, Ghana, and Egypt, with over 50 million monthly active users[68]. Mobile money account ownership in the area serviced by M-Pesa increased from 12% in 2014 to 33% in 2017 and 39% by 2021[69].

This success illustrates the ability of mobile platforms to bypass traditional banking infrastructure while addressing regional disparities[70].

---

[64] WJARR, 2024, Financial Inclusion Through Fintech
https://wjarr.com/sites/default/files/WJARR-2024-2379.pdf

[65] NBER, 2016, Mobile Banking in Kenya
https://www.nber.org/system/files/chapters/c13367/c13367.pdf

[66] GSMA, 2022, The State of Mobile Internet Connectivity
https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf

[67] GSMA, 2019, State of the Industry Report 2019
https://www.gsma.com/r/wp-content/uploads/2019/05/GSMA-State-of-the-Industry-Report-on-Mobile-Money-2018-1.pdf

[68] Vodafone, 2021, M-Pesa Report
https://www.vodafone.com/news/services/m-pesa-celebrates-reaching-50-million-customers

[69] The Global Findex Database 2021
https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

[70] NBER, 2016, Mobile Banking in Kenya
https://www.nber.org/system/files/chapters/c13367/c13367.pdf

Mobile banking's transformative role extends beyond Africa to South Asia, exemplified by India's Unified Payments Interface (UPI). It has transformed digital transactions by integrating banking and non-banking services. This interoperability has made UPI a preferred payment method, driving seamless financial access for millions.

The Global Findex Database 2021 report indicates that, among adults in developing economies who received government transfers or pension payments, 70% made digital payments from their accounts, while 50% used the accounts for merchant payments, and 40% for bill payments[71].

Reliance on smartphones and internet connectivity limits applicability in regions with digital infrastructure gaps.

Meanwhile, findings indicate that mobile payments significantly enhanced household consumption, particularly in urban and higher-income segments. For instance, in 2020, global mobile payment usage exceeded 1 billion users, with the market size reaching $15 trillion and projections suggesting growth to $30 trillion by 2025. In China, mobile payments have become integral to consumption, with Alipay alone processing 32.1 billion transactions in 2021—averaging 230 per user[72].

Beyond individual convenience, research indicates systemic economic benefits. Research on China's consumer market found that mobile payment adoption not only increased consumer convenience but also promoted economic growth, particularly benefiting small and micro-enterprises[73].

Agent Banking

Agent banking bridges the gap for rural and remote populations by using human agents equipped with digital tools to facilitate financial transactions.

One illustrative example is bKash in Bangladesh, which employs agents in rural areas to enable cash-in and cash-out services, facilitating savings and payments

[71] The Global Findex Database 2021.
https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

[72] Mobile payment, digital inclusive finance, and residents' consumption behavior research, 2024.
https://pmc.ncbi.nlm.nih.gov/articles/PMC11262667/

[73] Mobile payment, digital inclusive finance, and residents' consumption behavior research, 2024.
https://pmc.ncbi.nlm.nih.gov/articles/PMC11262667/

for more than 50 million users. This model illustrates how technology and the human touch can work in tandem to extend financial services to the underserved[74]

Agent banking has significantly expanded financial inclusion in areas with minimal banking infrastructure, allowing millions to engage with the formal economy.

Blockchain and Decentralized Finance

Blockchain technology represents a transformative tool for financial inclusion, with its secure, low-cost, decentralized solutions.

Platforms such as Stellar and Ripple have reduced cross-border transaction costs by more than 50%, enabling low-income households to retain more of their earnings[75].

In addition to cost reductions, Decentralized Finance (DeFi) expands financial access by offering microloans to underserved entrepreneurs. For example, DeFi platforms have provided microloans to entrepreneurs in Sub-Saharan Africa, ensuring fair repayment terms and transparency[76].

Beyond finance, blockchain technology has the potential to address logistical and credit-invisibility issues for the 1.4 billion unbanked adults globally. For example, rural producers in India benefit from blockchain-enabled supply chain transparency, which ensures fair compensation[77].

Blockchain and DeFi hold the potential to overcome inherent inequalities in regions with low digital literacy by prioritizing accessibility, scalability, and inclusivity while addressing socio-economic divides. *Dayakar Reddy*, founder of *OmniFlix*[78], emphasizes the role of community-driven DeFi cooperatives. “By employing simplified user interfaces and localized guidance, these cooperatives

[74] The Global Findex Database 2021
https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

[75] IMF, 2024, Article on Access to Finance.
https://www.elibrary.imf.org/view/journals/001/2024/150/article-A001-en.xml#A001ref08

[76] Harvard University Press, 2022, Blockchain for Financial Inclusion
https://www.hup.harvard.edu/catalog/blockchain-financial-inclusion

[77] Block chain technology for digital financial inclusion in the industry 4.0, towards sustainable development?
https://www.frontiersin.org/journals/blockchain/articles/10.3389/fbloc.2023.1035405/full

[78] Omniflix Network
https://omniflix.network

can foster trust and engagement, making advanced technology approachable. This approach ensures scalability while bridging socio-economic gaps effectively."

Bux Khurana emphasizes that real progress in digital finance comes from collective efforts toward fairness and accessibility. "Blockchain and DeFi strip away the complexities of traditional finance, creating a more transparent and inclusive system. Community-driven DeFi cooperatives, with simplified interfaces and localized support, can bridge socio-economic gaps, making financial empowerment a reality for everyone, regardless of their background."

Ankur Vaid, who leads ecosystem growth at *Reflexical*[79], highlights the importance of simple and intuitive interfaces, complemented by visual or voice-based guidance. "By collaborating with local organizations to provide education in regional languages, DeFi systems can enhance understanding and trust, encouraging adoption even in communities with limited digital literacy. These initiatives ensure that technology becomes a tool of empowerment rather than exclusion."

Yash Belavadi, founder and CEO of *Surge*[80], along with *Punith Belavadi*, founder and CTO, underline the significance of accessibility and education as cornerstones for reducing inequalities in such regions. "Mobile-friendly platforms tailored to local languages make financial services more approachable, while partnerships with community organizations provide practical financial literacy programs to build trust. Offline-to-online solutions, such as cash-to-crypto services, can extend financial inclusion to unbanked populations. Gamified learning tools further engage users by making education interactive and enjoyable. They have stressed the importance of public-private partnerships in developing infrastructure and ensuring affordable internet access. By promoting transparency and decentralized governance, blockchain and DeFi can empower marginalized groups, creating inclusive financial ecosystems that address socio-economic divides comprehensively."

Similarly, the Mediterranean Hospital in Cyprus, in collaboration with VeChain, has implemented the "E-NewHealthLife" system, featuring the blockchain-based E-HCert Application. This solution securely stores COVID-19 test results on the VeChain Thor blockchain and assigns patients digital NFC-enabled health

[79] Reflexical
https://reflexical.com

[80] Surge: Bitcoin's Ultimate Scaling Metalayer
https://surge.build

passports, enabling efficient medical record management and automated patient identification[81].

Decentralized finance platforms have demonstrated potential to provide financial services directly to users, bypassing intermediaries.

Financial Education

Financial literacy and education are pivotal in promoting inclusive finance, particularly for underserved populations in low- and middle-income countries. With financial literacy recognized as essential for making sound financial decisions, multiple initiatives and strategies have emerged globally and regionally to address literacy gaps.

India, for example, has implemented a range of programs under initiatives such as the Pradhan Mantri Jan-Dhan Yojana (PMJDY), which have been instrumental in bringing unbanked populations into the formal financial system. Since its inception in 2014, PMJDY has facilitated over 531.3 million accounts (as of August 2024)[82].

In South Africa, Old Mutual's financial literacy program has provided targeted training to low-income women, focusing on essential skills such as budgeting and debt management. Through a rigorous one-day training course, the program improved participants' budgeting knowledge by 6.1 percentage points, increasing awareness from 47.1% in the control group to 53.2% among participants. Additionally, the program resulted in a 12.9 percentage point increase in self-reported savings, with the proportion of participants saving in any form rising from a base of 73.3%[83].

In Pakistan, financial literacy initiatives such as the Benazir Income Support Programme (BISP) and Citizen Damage Compensation Program (CDCP) have focused on educating ultra-poor families[84]. These programs provide financial

[81] VeChain Foundation, 2020, Blockchain Medical Data Platform.
https://medium.com/vechain-foundation/vechain-and-i-dante-partnered-to-create-blockchain-enabled-medical-data-management-platform-for-17465639e8c7
[82] PMJDY
https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1952793

[83] Poverty Action Lab, 2024, Evaluating the Effectiveness of Financial Literacy Programs in South Africa.
https://www.povertyactionlab.org/evaluation/evaluating-effectiveness-financial-literacy-program-south-africa

[84] Pakistan's Citizens Damage Compensation Program (CDCP): Case Study (English)
https://documents.worldbank.org/en/publication/documents-reports/documentdetail/153031468139211888/pakistans-citizens-damage-compensation-program-cdcp-case-study

literacy in simplified formats, ensuring that even participants with very little education can benefit.

However, gender disparities in financial inclusion remain a persistent challenge. A global mapping exercise indicated that 65% of women remain unbanked, compared to 72% of men[85] Financial literacy will be crucial when it comes to equipping women with the skills required to engage in digital finance securely.

The Critical Role of Small and Micro Credit

Microfinance Institutions (MFIs) and Non-Bank Financial Institutions (NBFIs) have long played a transformative role in advancing financial inclusion, particularly among low-income and underserved populations. These institutions provide essential financial services, particularly in emerging economies.

Microfinance Institutions (MFIs)

MFIs primarily target populations excluded from traditional financial systems, including rural households, women, and small-business owners. Their focus on small-scale, accessible financial services has made them key drivers of financial inclusion globally.

According to the IMF's 2023 Financial Access Survey, microfinance institutions maintained resilience in financial access during the COVID-19 pandemic. While traditional commercial banks saw a decline in SME lending (indicating reduced access to formal credit), MFIs stepped in to meet urgent liquidity needs among SMEs and low-income clients. This gap-filling role has been crucial as commercial lending decreased from 59% to 55% of GDP in regions such as the Middle East and Central Asia between 2021 and 2022[86].

The microfinance sector has contributed significantly to advancing financial inclusion in the West African Economic and Monetary Union (WAEMU) too, by offering underserved populations access to financial services. In 2017,

[85] The Global Findex 2017
https://documents1.worldbank.org/curated/en/332881525873182837/pdf/126033-PUB-PUBLIC-pubdate-4-19-2018.pdf

[86] Financial Access Survey, 2023, Microfinance Trends
https://www.imf.org/en/Publications/fandd/issues/2022/12/the-digital-gender-gap-khera-ogawa-sahay-vasishth

microfinance institutions served 13.6 million customers, up from 12.7 million in 2016[87].

Non-Bank Financial Institutions (NBFIs)

SMEs are often constrained by limited access to credit, a gap that NBFIs partially address by offering flexible loan products tailored to small businesses. However, despite the significant contributions of NBFIs, the IMF Financial Access Survey, 2023, found a decrease in outstanding loans to SMEs as a share of GDP, from 2021 to 2022. Such a drop was reported in 75% of reporting economies. This decline, attributed partly to the rollback of COVID-19 policy measures, indicates a need for sustained support from NBFIs, to stabilize SME financing under more stringent economic conditions.

Working together

Government-led initiatives and international programs have been instrumental in driving financial inclusion globally. By combining policy reforms, digital infrastructure and community-based approaches, these efforts address systemic barriers such as gender disparities, regional inequalities and digital divides.

The Pradhan Mantri Jan-Dhan Yojana (PMJDY), launched in 2014, has been a cornerstone of India's efforts at financial inclusion[88]. By August 2024, the program had facilitated the opening of more than 531 million bank accounts, providing essential services such as RuPay debit cards, accident insurance and overdraft facilities to marginalized populations[89]. A key marker of the success of the initiative has been its ability to increase account ownership, particularly among rural and low-income groups.

The initiative has also expanded account ownership among women. Approximately 56% of PMJDY accounts are held by women[90].

[87] Microfinance Barometer 2019
https://www.convergences.org/wp-content/uploads/2019/09/Microfinance-Barometer-2019_web-1.pdf
[88] ORF, 2024, Financial Inclusion of Women: Evidence from India
https://www.orfonline.org/research/financial-inclusion-of-women-current-evidence-from-india

[89] PIB, 2024, PMKDY10th Anniversary Press Release
https://pib.gov.in/PressReleasePage.aspx?PRID=2049231

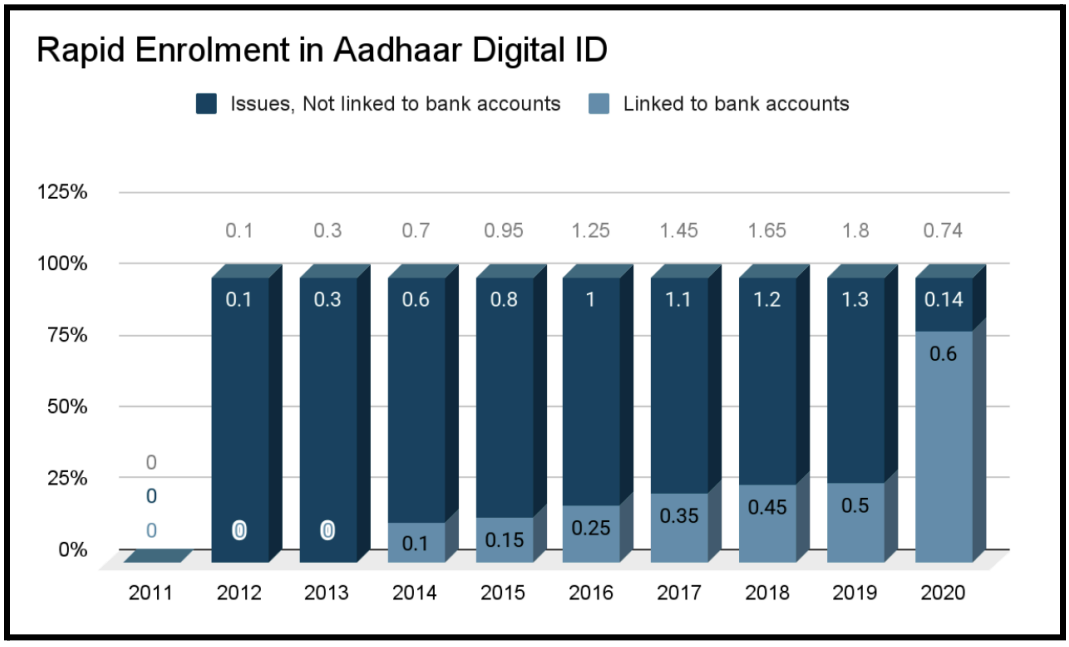
[90] Ministry of Finance Decade of Change: How PMJDY Empowered Women Financially
https://pib.gov.in/PressNoteDetails.aspx?NoteId=152060&ModuleId=3&reg=3&lang=1

Furthermore, the scheme has been instrumental in integrating account holders into welfare schemes such as the Pradhan Mantri Suraksha Bima Yojana (accident insurance) and Atal Pension Yojana, which provide financial safety nets to vulnerable populations[91].

Challenges, of course, remain. Despite the impressive scale of account ownership, a significant proportion of these accounts are inactive. Dormancy indicates that many beneficiaries primarily use their accounts to receive government benefits, with limited engagement in savings or other financial activity.

Meanwhile, however, Aadhaar, India's digital identity framework, has drastically reduced the time and cost involved in customer-identification processes (e-KYC), previously a major barrier for low-income individuals. By 2017, over 90% of the population was registered with Aadhaar, and half had linked their accounts to their Aadhaar numbers[92].

This integration of Aadhaar with PMJDY has contributed to a rise in financial account ownership from 53% in 2014 to 80% in 2017, formally integrating over 300 million people into the financial sector.



[91] PMJDY Scheme
https://pmjdy.gov.in/scheme
[92] IMF, 2024, Financial Access Chapter
https://www.elibrary.imf.org/display/book/9798400223525/CH007.xml

Image Source: IMF, 2024, Chapter on Financial Inclusion[93]

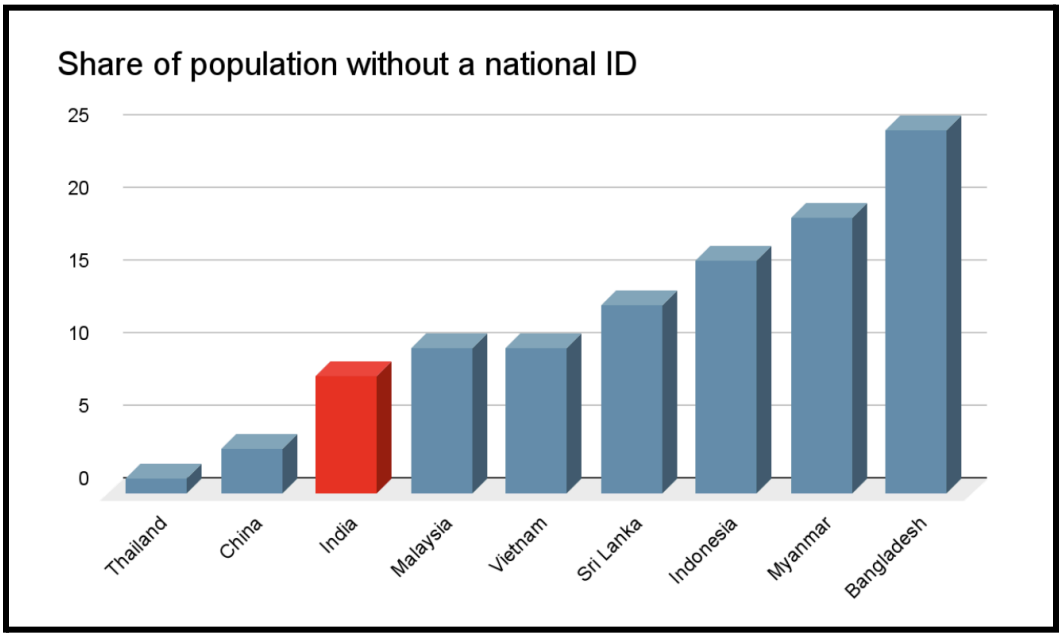


Image Source: IMF, 2024, Chapter on Financial Inclusion[94]

As identification becomes more widespread, financial inclusion rises correspondingly.

Similarly, MyInfo in Singapore simplifies account opening while ensuring user data privacy through consent-based systems. Launched in 2017, MyInfo eliminates repetitive form filling across more than 17 e-government services[80].

Digital ID-enabled processes have the potential to reduce customer onboarding costs by up to 90%. The COVID-19 pandemic created an urgent need for innovative approaches to financial inclusion, especially for populations without formal identification. In response, several jurisdictions adopted temporary measures to expand financial access through digital identity mechanisms. For example, in government-to-person payment schemes, non-official IDs were

[93] IMF, 2024, Financial Access Chapter
https://www.elibrary.imf.org/display/book/9798400223525/CH007.xml
[94] IMF, 2024, Financial Access Chapter
https://www.elibrary.imf.org/display/book/9798400223525/CH007.xml

permitted for the purposes of account opening, to ensure that beneficiaries could receive subsidies and financial aid[95].

Blockchain technology offers transformative potential for digital identity systems, particularly in addressing financial inclusion challenges in emerging economies. These systems ensure data privacy, interoperability, and trust, creating opportunities for underserved populations who are often excluded from traditional financial ecosystems.

Vikram R. Singh, founder and CEO of *Antier*[96], emphasizes that identity has always been humanity's foundational social technology. He says, “Blockchain revolutionizes this concept by turning identity from an institutional privilege into a digital right, a change that holds particular significance for the 1.4 billion unbanked adults in emerging economies. By employing zero-knowledge proofs, individuals can demonstrate creditworthiness without revealing sensitive financial histories or verify their age without sharing specific birthdates. Blockchain expands the definition of identity from merely 'proof of self' to 'proof of contribution,' enabling individuals to access global opportunities based on their contributions rather than traditional credentials. Standards such as W3C Verifiable Credentials and cross-chain protocols ensure seamless identity verification across networks, replacing opaque intermediaries with cryptographic transparency.” As Singh notes, “Web3 not only transcends the limitations of Web2 but directly addresses its flaws, paving the way to onboard the next billion users into a decentralized, user-empowered digital ecosystem.”|

Siddharth Banerjee, founder and CEO of *Kandola Network*[97], highlights the role of blockchain in addressing the exclusion of underserved populations from formal credit systems. “Retail lending, which accounted for 27-30% of total bank credit in 2023, often bypasses these populations due to their lack of credit history. This exclusion pushes them toward unregulated lenders or biased micro-lending practices. Blockchain technology provides a solution by enabling the creation of transparent, verifiable credit histories and decentralized lending marketplaces. Blockchain-ledger-managed lending pools allow for fair access to credit, ensuring

[95] FIGI, 2021, Digital Identity for Financial Inclusion
https://documents1.worldbank.org/curated/en/099650005162214653/pdf/P16477001277440f10b8080dc6f51daf2dc.pdf

[96] Antier Solutions
https://www.antiersolutions.com

[97] Data3 AI: Kandola Network
https://kandola.network

trust and data privacy. This approach fosters financial inclusion by empowering underserved populations and enabling them to build robust financial identities."

Kapil Dhiman, founder and CEO of *Quranium*[98], underscores the impact of blockchain-based digital identity systems in creating secure, self-sovereign identities for underserved populations. "These systems safeguard data privacy through encryption and user-controlled access, ensuring individuals maintain control over their information. The interoperability of blockchain networks allows seamless integration across platforms, facilitating broader participation in financial ecosystems. Trust is bolstered by blockchain's inherent transparency and immutability, reducing dependency on intermediaries. With over a billion people globally lacking formal identification, such systems address critical barriers to accessing banking, credit, and other financial services, thereby empowering individuals to engage in the digital economy."

John Shipman, founder and CEO of *Xai Games*[99], further elaborates on how blockchain-based digital identity systems empower underserved populations. "These systems provide secure, verifiable identities that enable access to essential financial services. They ensure data privacy through encryption and self-sovereign control while leveraging interoperability standards to integrate across platforms seamlessly. Decentralized verification mechanisms foster trust by reducing reliance on intermediaries and mitigating fraud. Collectively, these features enhance financial inclusion, allowing individuals to participate in global economic ecosystems with security and dignity."

In the Philippines, the National Strategy for Financial Inclusion (NSFI), launched in 2015 and updated in 2022, focuses on expanding digital financial services and financial literacy programs, to improve banking penetration among underserved populations[100]. Central to the strategy is a regulation mandating that banks offer Basic Deposit Accounts (BDAs) with no minimum balance requirements and simplified KYC processes. These reforms have significantly increased financial access for women and low-income groups.

The NSFI promotes financial literacy through school-based programs and community workshops too. These initiatives aim to instill sound financial

[98] Quranium
https://www.quranium.org

[99] Xai: Arbitrum Layer 3 Blockchain
https://xai.games

[100] BSP, 2022, National Strategy for Financial Inclusion 2022–2028.
https://www.bsp.gov.ph/Pages/InclusiveFinance/NSFI-2022-2028.pdf

behaviors at an early age, and empower communities with the tools needed for effective financial management.

However, challenges persist, particularly in remote areas where digital infrastructure is limited. Ensuring that financial literacy programs translate into long-term behavioral change remains a critical issue too, requiring further investment and innovation.

On the global front, the Shaping Inclusive Finance Transformations (SHIFT) program, led by the United Nations Capital Development Fund (UNCDF), operates across the ASEAN and SAARC regions, to enhance financial inclusion among vulnerable populations[101]. This program focuses on least developed countries (LDCs) such as Laos and Myanmar, where financial exclusion remains a significant barrier to poverty alleviation and gender equity.

SHIFT has achieved notable success in empowering women by providing access to formal financial services, enabling investments in education and health, particularly for their children. By promoting savings accounts, credit and insurance products, the program has reduced reliance on informal moneylenders, fostering greater financial stability for underserved populations. Initially focused on ASEAN, SHIFT has expanded to SAARC regions, with Bangladesh serving as a pilot country, followed by Nepal and Bhutan.

Similarly, the United Nations High Commissioner for Refugees (UNHCR) has leveraged blockchain to enhance aid delivery efficiency and protect sensitive identity-linked information. By employing zero-knowledge proof, blockchain facilitates secure digital wallets for refugees, ensuring immediate and cost-effective aid distribution, including during the Ukraine conflict[102].

Despite these achievements, challenges persist. Over 60% of the ASEAN population still relies on informal financial mechanisms, limiting their access to the protections and opportunities offered by formal systems.

[101] UNCDF, 2024, SHIFT Initiative.
https://www.uncdf.org/shift/homepage

[102] ZK-Proof Update, 2024, Blockchain for Refugee Aid UNHCR.
https://www.biometricupdate.com/202401/unhcr-embraces-blockchain-zero-knowledge-proofs-to-improve-aid-systems

Conclusion

Financial inclusion, as explored in this research paper, remains an essential yet complex global challenge. While technological innovations, government initiatives and the rise of decentralized financial systems have significantly expanded access, over a billion adults worldwide still lack integration into the formal financial system. The data and analysis presented reveal systemic barriers—geographic, digital, regulatory, and behavioral—that require multifaceted solutions.

A recurring theme across the paper is the transformative potential of technology. Mobile-banking platforms, blockchain-enabled systems and decentralized finance (DeFi) have demonstrated scalable models for inclusion. However, the implementation of these reveals areas that require further attention, including varying levels of digital readiness and differing access to resources, which influence the pace of adoption and impact across communities.

Programs such as India's PMJDY, South Africa's financial literacy initiatives, and UNHCR's blockchain-aided systems underscore the role of policy and collaboration in addressing these barriers.

Meanwhile, despite advancements, critical questions remain. How can financial systems balance scalability and equity without exacerbating existing divides? What role can emerging technologies play in addressing deeply rooted socio-cultural barriers to inclusion? Can decentralized frameworks truly democratize finance while minimising new risks and complexities?

These questions invite further exploration, emphasizing the need for ongoing research and dialogue among policymakers, technologists and financial institutions, to ensure that the global financial system serves as a bridge rather than a barrier for the millions still excluded.

After all, the path to financial inclusion is not just about creating access points but about fostering empowerment, equity and resilience within communities. In this way, by focusing on sustainable and human-centric models, the next era of global financial services can be both inclusive and transformative.

References

1. AFI Global. (2011). Maya Declaration. Retrieved from https://www.afi-global.org/global-voice/maya-declaration/
2. AFI Global. (2020). G20 Mexico Summit. Retrieved from https://www.afi-global.org/events/global-financial-partnership-for-financial-inclusion-g-20-mexico-summit/
3. Bank for International Settlements. (2019). The design of digital financial infrastructure: Lessons from India (BIS Papers No. 106). Retrieved from https://www.bis.org/publ/bppdf/bispap106.pdf
4. BCG. (2021). Report on financial inclusion. Retrieved from https://www.bcg.com/publications/2021/unbanked-and-underbanked-households-breaking-down-the-myths-towards-racial-equity-in-banking
5. Banking Deserts Report. (2024). Banking Deserts Report. Retrieved from https://www.philadelphiafed.org/-/media/frbp/assets/community-development/reports/banking-deserts-report-feb-2024.pdf
6. BSP. (2022). National Strategy for Financial Inclusion 2022–2028. Retrieved from https://www.bsp.gov.ph/Pages/InclusiveFinance/NSFI-2022-2028.pdf
7. CGAP. (2017). Social norms change for women's financial inclusion. Retrieved from https://www.cgap.org/sites/default/files/Brief-Social-Norms-Change-for-Womens-Financial-Inclusion-Jul-2017_0.pdf
8. CGAP. (2010). Measuring financial access around the world. Retrieved from https://www.cgap.org/research/publication/measuring-financial-access-around-world
9. Financial Inclusion Global Initiative (FIGI). (2021). Digital ID to enhance financial inclusion. World Bank Group. Retrieved from https://documents1.worldbank.org/curated/en/099650005162214653/pdf/P16477001277440f10b8080dc6f51daf2dc.pdf
10. FDIC. (2019). Household survey report. Retrieved from https://www.fdic.gov/analysis/household-survey/2019report.pdf
11. Global Findex Database. (2017). The Global Findex Database 2017. Retrieved from https://openknowledge.worldbank.org/bitstream/handle/10986/29510/211259ov.pdf
12. Global Findex Database. (2021). Interactive executive summary visualization. Retrieved from https://www.worldbank.org/en/publication/globalfindex/interactive-executive-summary-visualization

13. Global Partnership for Financial Inclusion (GPFI). (2012). The First G20 Global Partnership for Financial Inclusion (GPFI) Forum Report. Retrieved from https://www.gpfi.org/sites/gpfi/files/documents/GPFI%20Forum%20Report.pdf
14. Global Partnership for Financial Inclusion (GPFI). (2018). G20 digital identity onboarding. Retrieved from https://documents1.worldbank.org/curated/en/362991536649062411/pdf/129861WP-10-9-2018-17-26-21-GDigitalIdentityOnboardingReportlowres.pdf
15. GSMA. (2015). 2015 state of the industry report on mobile money. Retrieved from https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/gsma_resources/state-of-the-industry-2015/
16. GSMA. (2019). The state of mobile internet connectivity report. Retrieved from https://www.gsma.com/r/wp-content/uploads/2019/05/GSMA-State-of-the-Industry-Report-on-Mobile-Money-2018-1.pdf
17. GSMA. (2022). The state of mobile internet connectivity report. Retrieved from https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf
18. Hu, N., & Hou, G. (2024). Mobile payment, digital inclusive finance, and residents' consumption behavior research. Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC11262667/
19. International Telecommunication Union (ITU). (2022). Measuring digital development: Facts and figures 2022. Retrieved from https://www.itu.int/hub/publication/d-ind-ict_mdd-2022/
20. IMF. (2022). The digital gender gap. Retrieved from https://www.imf.org/en/Publications/fandd/issues/2022/12/the-digital-gender-gap-khera-ogawa-sahay-vasishth
21. IMF. (2023). Financial Access Survey. Retrieved from https://www.imf.org/en/News/Articles/2023/10/03/pr23332-imf-releases-the-2023-financial-access-survey-results
22. IMF. (2024). Article on Access to Finance. Retrieved from https://www.elibrary.imf.org/view/journals/001/2024/150/article-A001-en.xml#A001ref08
23. IMF. (2024). Chapter on Financial Inclusion. Retrieved from https://www.elibrary.imf.org/display/book/9798400223525/CH007.xml
24. J-PAL. (2024). Evaluating the effectiveness of a financial literacy program in South Africa. Retrieved from

https://www.povertyactionlab.org/evaluation/evaluating-effectiveness-financial-literacy-program-south-africa
25. Nobel Prize Organization. (2006). Biographical: Muhammad Yunus. Retrieved from https://www.nobelprize.org/prizes/peace/2006/yunus/biographical/
26. National Bureau of Economic Research. (2016). Mobile banking: The impact of M-Pesa in Kenya. Retrieved from https://www.nber.org/system/files/chapters/c13367/c13367.pdf
27. Observer Research Foundation. (2024). Financial inclusion of women: Current evidence from India. Retrieved from https://www.orfonline.org/research/financial-inclusion-of-women-current-evidence-from-india
28. Press Information Bureau. (2024, August 28). Pradhan Mantri Jan-Dhan Yojana (PMJDY)—National Mission for Financial Inclusion—completes a decade of successful implementation. Government of India. Retrieved from https://pib.gov.in/PressReleasePage.aspx?PRID=2049231
29. RBI. (1968). Chronicle of events. Retrieved from https://web.archive.org/web/20230116055529/http://www.rbi.org.in/Scripts/chro_1968.aspx
30. Salesforce. (2020). IBM and Salesforce join forces to help organizations and individuals verify vaccine and health status. Retrieved from https://www.salesforce.com/news/press-releases/2020/12/18/ibm-and-salesforce-digital-health-pass/
31. Third Gambia Economic Update. (2021). Economic insights on youth and rural access. Retrieved from https://documents1.worldbank.org/curated/en/099060523101038604/pdf/P179266010f0e40b409f360f3e480c8f877.pdf
32. The importance of financial education for the effective use of formal financial services. (2024). World Bank. Retrieved from https://documents1.worldbank.org/curated/en/099346003072335535/pdf/IDU06db1d7f504f4e04bdc086250f256d40d4253.pdf
33. United Nations. (2003). Programme for International Year of Microcredit. Retrieved from https://press.un.org/en/2003/dev2452.doc.htm
34. United Nations. (2015). Sustainable Development Goals. Retrieved from https://www.un.org/sustainabledevelopment/sustainable-development-goals/
35. Universal Financial Access. (2017). Tracking progress in enabling access to a transaction account. World Bank Group. Retrieved from https://ufa.worldbank.org/en/ufa
36. UNCDF. (2024). SHIFT Initiative. Retrieved from https://www.uncdf.org/shift/homepage

37. VeChain Foundation. (2020). VeChain and I-Dante partnered to create blockchain-enabled medical data management platform for healthcare provider in Cyprus. Retrieved from https://medium.com/vechain-foundation/vechain-and-i-dante-partnered-to-create-blockchain-enabled-medical-data-management-platform-for-17465639e8c7
38. Vodafone. (2021, September 7). M-Pesa celebrates reaching 50 million customers. Retrieved from https://www.vodafone.com/news/services/m-pesa-celebrates-reaching-50-million-customers
39. World Journal of Advanced Research and Reviews. (2024). Advancing financial inclusion through fintech. Retrieved from https://wjarr.com/sites/default/files/WJARR-2024-2379.pdf
40. World Bank. (2021). Overview of financial inclusion. Retrieved from https://www.worldbank.org/en/topic/financialinclusion/overview
41. uOttawa. (2023). The impact of microfinance on financial inclusion in the WAEMU's countries and its implications. University of Ottawa. Retrieved from https://ruor.uottawa.ca/server/api/core/bitstreams/30195ce7-f217-40a0-bae5-5ec26cf58630/content