Digital financial inclusion research and developments around the world

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Abstract

This study presents an overview of digital financial inclusion research and developments around the world. The literature has paid little attention to the uneven digital financial inclusion developments in different regions of the world. There is a need for an overview of the existing digital financial inclusion research and developments around the world to gain insight into digital financial inclusion trends and to chart some directions for future research. It was shown that digital financial inclusion has a beneficial positive effect on wellbeing and society. There are uneven positive developments in digital financial inclusion across regions. The determinants of digital financial inclusion are varied according to regions. Every region is faced with a unique set of challenges that limit progress in digital financial inclusion.

Keywords: financial inclusion, digital financial inclusion, digital technology, fintech, Africa, Europe, Asia, Australia, America.

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1. Introduction

This article presents an overview of the existing digital financial inclusion research and developments around the world. It provides insight into the regional developments in digital financial inclusion and presents some important areas for future research in digital financial inclusion.

Digital financial inclusion is a topic of significant interest in the literature because digital financial inclusion has the potential to stimulate the digital economy and offer positive welfare benefits to individuals, households, firms and government (Ahmad et al, 2021; Shen et al, 2021). The recent debate about digital financial inclusion is centered on the determinants of digital financial inclusion and its effect on society and the economy (Shen et al, 2021; Chipunza and Fanta, 2022; Ali and Ghildiyal, 2023). But the literature has paid little attention to the uneven digital financial inclusion developments in different regions of the world. This calls for an overview of the existing digital financial inclusion research and developments around the world to gain insight into digital financial inclusion trends and to chart some directions for future research.

The quest for digital financial inclusion began as a response to the World Bank's 2017 report which stated that nearly two billion adults globally do not have access to a bank account (Demirgüç-Kunt et al, 2020). This led to calls for a strategy that would bring the two billion adults into the formal financial system. As a result, the World Bank together with national policy makers, other multilateral banks, nongovernmental organisations and private financial institutions reached a consensus that digital technology should be used to advance financial inclusion globally (Demirgüç-Kunt et al, 2020). This led to the term 'digital financial inclusion' which refers to the use of digital technologies to extend affordable formal financial services to everyone to increase the level of financial inclusion. Despite the growing interest in digital financial inclusion in the literature, existing studies rarely provide a comparative overview of the trends in digital financial inclusion across regions. This article extends the literature by presenting a concise overview of the existing digital financial inclusion research and developments around the world.

The article contributes to the literature in the following ways. First, the study contributes to the digital financial inclusion literature. Studies in this literature include Shen et al (2021),

Chipunza and Fanta (2022), Ali and Ghildiyal (2023), Demirgüç-Kunt et al (2020) and Ahmad et al (2021). This study contributes to the digital financial inclusion literature by providing a much-needed overview of the state of digital financial inclusion research and developments. Second, the study contributes to the literature that examine the determinants and effect of digital financial inclusion. This study contributes to this literature by exploring the effect of digital financial inclusion on the economy and society. Third, the study also makes a theoretical contribution to the literature. It contributes to the technology acceptance theory which predicts that the acceptance of technology by individuals is influenced by their perception of the usefulness of technology and the perceived ease of use of the technology (Taherdoost, 2018).

The rest of the article is organized as follows. Section 2 presents an overview of digital financial inclusion research and developments around the world. Section 3 presents some determinants and other effect of digital financial inclusion. Section 4 suggests some areas for future research. Section 5 presents the conclusion of the study.

2. Overview of digital financial inclusion research and developments around the world

2.1. Africa region

Existing research shows that digital financial inclusion is a more effective strategy to increase the level of financial inclusion in African countries (Ozili, 2018; Kelikume, 2021). Digital technologies such as mobile phones and mobile money wallets are being used to increase the level of financial inclusion in sub-Saharan African countries through greater access to, and use of, digital financial services (Evans, 2018; Fernandes, Borges and Caiado, 2021; Kouladoum, Wirajing and Nchofoung, 2022; Ashenafi and Dong, 2022). Digital financial inclusion offers many benefits for African countries. For example, digital financial inclusion facilitates greater access and use of digital financial services during a health crisis or during economic downturns (Machasio, 2020), it broadens access and use of digital financial services, it stimulates the digital economy in African countries (Mpofu and Mhlanga, 2022), it increases economic growth in the presence of strong institutions (Chinoda and Kapingura, 2023a; Ugwuanyi et al.,

2022), it improves bank stability (Chinoda and Kapingura, 2023b), and it reduces the size of the informal economy (Kelikume, 2021). Despite the numerous benefits of digital financial inclusion in African counties, the African digital financial inclusion literature identified several challenges that hinders progress in digital financial inclusion in African countries. These challenges include digital illiteracy, digital exclusion, digital finance illiteracy, redundancy barriers, lack of internet/broadband connectivity, high cost of internet broadband, poor education, gender inequality in the digital environment and digital taxes (Ozili, 2018; Ojo, 2022; Mpofu, 2023; Chipunza and Fanta, 2022).

Despite these challenges, the African region has witnessed significant developments in digital financial inclusion in Africa. For instance, South Africa, Nigeria, and Kenya are ranked among the top countries that are advancing digital financial inclusion in the African continent, while countries like Egypt, Mauritius and Ghana are witnessing mild growth in digital financial inclusion. The most common channels used to advance digital financial inclusion in most African countries are mobile phones, mobile money services, point-of-sale (POS) terminals, payment service banks (PSBs), payment service providers (PSPs), international money transfer operators (IMTOs), mobile wallets, peer-to-peer (P2P) lending, payment gateways and central bank digital currencies (Evans, 2018; Raji, 2020; David-West, 2016; Ozili, 2023). These channels are used to provide affordable access to digital financial services to increase level of digital financial inclusion. However, data from the Global Findex data shows that there are substantial differences in the usage of digital financial services between men and women. The indicators of digital financial inclusion (in table 1) shows that the level of digital financial inclusion is higher for men than women as men use digital means to a make or receive payments to a greater extent than women. This digital divide between men and women in Africa is corroborated by existing studies such as Elouardighi and Oubejja (2023) which show that women experience some obstacles in access to digital financial services such as high cost of mobile financial services, lack of income, lack of access to a mobile phone, and too much dependence on men to provide women's needs. Similarly, Sekantsi (2019) and Obiora and Ozili (2024) found that women are less financially included compared to men.

Table 1. Indicators of digital financial inclusion							
		Male			Female		
		2014	2017	2021	2014	2017	2021
Made or received a digital payment, female (% age 15+)	Sub-Saharan Africa	32	39	56	24	30	44
	World	47	56	61	41	48	61
Made a digital payment, female (% age 15+)	Sub-Saharan Africa	19	25	40	19	25	40
	World	39	48	62	34	41	55
Received digital payments, female (% age 15+)	Sub-Saharan Africa	23	29	40	18	21	30
	World	35	37	46	31	32	40
Made a digital in-store merchant payment: using a mobile phone, female (% age 15+)	Sub-Saharan Africa			13			9
	World			32			28
Used a mobile phone or the internet to buy something online, female (% age 15+)	Sub-Saharan Africa		5	8		2	5
	World		25	40		24	38
Used a mobile phone or the internet to pay bills, female (% age 15+)	Sub-Saharan Africa			7	19	4	14
	World			24	37	20	32
Used a mobile phone or the internet to send money, female (% age 15+)	Sub-Saharan Africa			36			28
	World			39			32

Source: Global Findex database 2021

2.2. European region

The level of digital financial inclusion in Europe has risen tremendously over the years. European countries with a high level of digital financial inclusion are Denmark, the Netherlands, the United Kingdom, Finland, Sweden and Norway. European countries with a

low level of digital financial inclusion are Greece, Hungary, Italy, Croatia, Portugal, Poland, Slovenia, Slovakia, Malta and Lithuania; while European countries with moderate a level of digital financial inclusion are Estonia, Ireland, Belgium, Latvia, Luxembourg, Germany, the Czech Republic, France, Austria, Spain. Meanwhile, European countries with a critically low level of digital financial inclusion are Bulgaria and Romania (Pakhnenko et al, 2021). The level of digital financial inclusion is higher in Western European countries and in the Organization for Economic Co-operation and Development (OECD) countries but is averagely lower in southeast European (SEE) countries (OECD, 2022). More people in Western European countries and OECD countries frequently use digital financial services to access a wide range of financial services including digital banking services, mortgage, insurance, investment products, pensions, car leasing and other services. This is due to high societal trust, high digital literacy, high levels of financial literacy and strong consumer protection regulations in Western European countries and in OECD countries.

The major challenge of digital financial inclusion in Europe is that many people in the region are either underserved or the digital financial services that are being offered to them are designed to serve the corporate interests of financial service providers rather than the interests of users of digital financial services, thus making them unsuitable for users and ineffective to promote sustainable digital financial inclusion in Europe (BankingCircle, 2019). In addition to this, the financially excluded in Europe often have insufficient liquid savings to rise above the poverty threshold for more than 9 weeks. This problem is amplified by the inadequate social safety net coverage in some European countries (Eurodiaconia, 2020). Most of the people affected are in southeast Europe. Despite the increase in financial education about digital financial services in southeast European (SEE) countries, people in SEE countries are still less likely to use digital financial services due to low levels of digital literacy, low levels of financial literacy and high risk of falling victim to digital fraud or cyberattacks in SEE countries (OECD, 2022).

Notwithstanding these challenges, one of the major hallmarks of digital financial inclusion in Europe is that digital financial inclusion has offered cost-saving modes of access into the formal financial system, something that previously unbanked or underbanked individuals lacked. This has been made possible through fintech services and digital platform-based services such as banking-as-a-service (BaaS) and payment-as-a-service (PaaS), while

blockchain-based solutions such as cryptocurrency and central bank digital currencies (e.g., the digital Euro) are being designed to bring in people with no access to a bank account and with low digital or financial skills, into the formal financial system. The region is also advancing digital financial inclusion through several channels such as through regulated open banking which provides users with a consolidated view of their accounts, professional monitoring of account activities, better financial management and planning, better automated payment services, better payment initiation services, enhanced security against digital fraud, and it strengthens the infrastructure necessary for financial inclusion (Bianco and Vangelisti, 2023; Leong and Gardner, 2021; Preziuso, Koefer and Ehrenhard, 2023). The region is also advancing digital financial inclusion for its 24 million SMEs through fintech applications that offer access to flexible funding, provide merchant accounts to sole traders, extend credit to small businesses, and provide basic business bank accounts to entrepreneurs (BankingCircle, 2019). The region has also witnessed some coordinated efforts to enable and support the uptake of new technologies such as blockchain, artificial intelligence and digital currencies in the financial sector, together with strong cybersecurity, to increase the level of digital financial inclusion in Europe.

2.3. Asian region

Existing research identified some benefits of digital financial inclusion in Asia. They include preserving banking stability (Banna and Alam, 2021), ensuring inclusive and sustainable economic development (Banna and Alam, 2021), reducing carbon dioxide (CO2) emission, increasing economic growth (Wang et al, 2022; Ahmad et al, 2021; Liu et al, 2021), reducing poverty level (Wang and He, 2020), and increasing consumption smoothing by increasing households' ability to insure themselves against transitory income shocks to consumption (Lai et al, 2020). Digital financial inclusion is also helping Asian users to improve their financial management and spending decisions, close the inequality gap in access to formal financial services, manage their cashflow, prove credit worthiness, attract new customers, access credit, purchase insurance to mitigate risk, and it is also having a positive impact on gross domestic product (GDP) growth (Banna and Alam, 2021).

Regarding the developments in digital financial inclusion in Asia, digital financial inclusion in the Asian region is enabled by internet banking, mobile banking, short message service (SMS) banking, electronic banking (e-banking), agent banking, mobile money accounts, and mobile

wallet banking, which are helping to close the gap in digital financial inclusion (Kabir, 2022). The common channels used to achieve digital financial inclusion in the region are smartphones and digital innovations such as cashless payments and Buy Now Pay Later (BNPL) products which have been facilitated by increasing digital financial education and literacy. Significant growth in digital financial inclusion can be seen in southeast Asia where there is high trust in both banks and digital financial service providers even though trust in digital financial service providers is lower than trust in banks (Aziz and Naima, 2021). In most parts of the region, Fintech players are gaining consumer trust and are competing intensely with traditional banks. Traditional banks are focusing on extending cheap credit through formal loans and credit cards to people with sufficient credit history (Morgan, 2022), while the Fintech companies in the region are developing their own credit scoring systems which would allow them to extend credit to people who do not qualify to obtain formal credit from traditional banks. Fintech companies in the region are also offering innovative products, such as 'buy now pay later' offerings (Kapron, 2021) and they are rapidly advancing digital financial inclusion in Bangladesh, India, China, Indonesia and Hongkong, particularly in the areas of banking and insurance.

In the Middle East, digital financial inclusion is low although growing. The growth in digital financial inclusion in the Middle East has been facilitated by the explosive growth of mobile phones, the rapid adoption of digital payments, the changing preference to digital wallets and contactless payments as preferred means of payments, the entry of FinTech, Bigtech companies and telecom companies alongside incumbent banks, and the gradual adoption of open banking (Almuhammadi, 2020; Lyons and Kass-Hanna, 2021).

These emerging tools are helping to address several challenges facing digital financial inclusion in the Middle East such as lack of secure digital means of storing money, saving, borrowing, or making payments. Digital financial inclusion is also helping to spur economic growth, increase self-reliance, reduce youth unemployment, reduce income disparities, improve access to health care and contribute to financial well-being for countries in the Middle East (Almuhammadi, 2020; Banna et al, 2022; Sanz and De Lima, 2013).

2.4. Australia and Oceania regions

Digital financial inclusion is also on the increase in Australia. Digital financial inclusion in Australia is enabled by fintech and a US$1 billion New Payments Platform (NPP) that allows people to make real-time payments in the digital economy and provide broad access to payments and access to a banking account (Alam and Imran, 2015). There are over 1,000 fintech companies operating in Australia since 2015 and the largest of the fintech companies are Prospa, Zip Money and AfterPay. These fintech providers are using digital technology to make financial services more convenient, accessible and affordable in Australia with the aim of increasing digital financial inclusion. Digital financial inclusion through fintech is also helping small and medium business owners to grow and expand their businesses which leads to job creation and decrease in unemployment. Digital financial inclusion through fintech is also helping to reduce inequality, increase financial inclusion for Australian women, reduce poverty and bring disadvantaged businesses into the formal financial sector (Alam and Imran, 2015; Tilley, 2020)

In the Oceania region, New Zealand has made significant progress in digital financial inclusion through fintech. The growth in digital financial inclusion in New Zealand is due to the COVID-19 pandemic which accelerated digital transformation in the finance industry with the help of fintech companies. More consumers embraced fintech solutions during the pandemic and it led to greater digital financial inclusion in New Zealand (Elers et al, 2022). Another factor driving the growth in digital financial inclusion in New Zealand is the changing expectations among consumers who want access a wider range of financial products and services using digital software or platforms (Chowdhury et al., 2019; Grimes and White, 2019; Yashiro et al, 2022).

2.5. Region of the Americas

There are uneven developments in digital financial inclusion in the region of the Americas. For example, the United States (U.S.) has a high level of digital financial inclusion due to the proliferation of digital technologies that have helped to expand digital financial inclusion in the U.S. The U.S. had over 10,000 fintech providers in 2023, some of which have helped to expand digital financial inclusion to all demographics including minority households such as Hispanic and non-white households. A large majority of U.S. households own and use a formal

account or a mobile money account. Many individuals and households in the U.S. who cannot get the formal financial services they need from traditional financial institutions often turn to alternative financial services providers, such as fintech and online lenders, that offer tailored digital financial services. But, doing so, could attract substantial cost which affects poor individuals and households disproportionately. This means that access to safe and affordable financial services in the U.S. is often costly especially for poor and low-income consumers.

Canada also has a very high level of digital financial inclusion. The banking sector in Canada adopts a digital-first approach to financial inclusion by using digital technology to provide user-friendly financial products and services that enhance customer experience, save time and money, and protect user data. Fintech players are also using machine learning and artificial intelligence (AI) tools to expand access and use of financial services. However, the challenge to digital financial inclusion in Canada is that access to internet connectivity and smartphones is not universal due to the high cost to purchase internet broadband and smartphones.

Latin America and the Caribbean (LAC) countries are also making significant progress in digital financial inclusion according to the 2021 Global Findex data. The adoption and use of digital financial services in LAC countries is slightly above the average for developing countries, with 40 percent of adults reporting to have made digital merchant payments in the past year in 2021. The COVID-19 pandemic also accelerated the adoption of digital payments, with 34 percent of adults reporting to have made a digital merchant payment. The number of cards in circulation rose to 1.8 billion in 2021 during the COVID-19 pandemic and payment methods like QR code payments and mobile payments became popular in LAC countries. These digital technologies are advancing financial inclusion in LAC countries by enabling people to use digital financial services to save money, start or expand businesses, manage risk and better sustain financial shocks (Polloni-Silva et al, 2021; Gershenson et al, 2021Motta and Gonzalez Farias, 2022). Despite the improvements in digital financial inclusion, the LAC countries continue to lag behind other regions in terms of digital financial inclusion (Gershenson et al, 2021). There is still a high gender gap, digital inequality, weak financial resilience, lack of Fintech competition and a constraining regulatory environment in the form of stringent know-your-customer requirements that hinders progress in digital financial inclusion (Polloni-Silva et al, 2021) Gershenson et al, 2021). Many of these barriers affect women, low-income

people, the uneducated, the unemployed, the informal population and the rural population (Motta and Gonzalez Farias, 2022).

3. Determinants and other effect of digital financial inclusion

Some determinants of digital financial inclusion are documented in the literature. Liu et al (2021) showed that education is a determinant of digital financial inclusion in China while Ali et al (2020) showed that financial literacy, religious commitment and regulation are determinants of digital financial inclusion in Indonesia. A related study, Kirana and Havidz (2020) also showed that financial knowledge, perceived usefulness, and perceived ease of use of mobile payments are determinants of digital financial inclusion in Indonesia. Bathula and Gupta (2021) showed that education and workforce participation are determinants of digital financial inclusion in India. Ali and Ghildiyal (2023) showed that socio-economic factors, mobile phone ownership and individual's borrowings and savings patterns are determinants of digital financial inclusion in India. Amoah et al. (2020) showed that being youthful, having an education and income are determinants of digital financial inclusion in Ghana. On the effect of digital financial inclusion, existing research show that digital financial inclusion reduces carbon intensity and increases the use of green space and green technology (Lee et al, 2022), promotes green innovation (Xue and Zhang, 2022), reduces vulnerability to poverty (Wang and Fu, 2022), promotes portfolio diversification and reduces the probability of households taking extreme portfolio risks (Lu et al, 2021), reduces carbon emission and improves environmental quality (Salman and Ismael, 2023), and improves household well-being (Du et al, 2023).

4. Areas for future research in digital financial inclusion

One, additional research is needed on how regulators can introduce regulations or safeguards to mitigate risks without stifling innovation in the digital financial inclusion space. This is crucial because introducing strict regulations can mitigate risks but can stifle innovation in the digital financial inclusion space which could be a setback for digital financial inclusion.

Therefore, future research should suggest soft-touch regulations that could mitigate risks while permitting safe innovation in the digital financial inclusion space.

Two, there is a need to examine the association between a country's progress in digital financial inclusion and the size of government finances because countries whose government have little fiscal resources may lag behind in developing a robust national digital payment infrastructure that supports digital financial inclusion. Advanced countries in Europe have strong fiscal resources with budget surplus and they also have high levels of digital financial inclusion while many African countries have little fiscal resources with high budget deficit, and they also have low levels of digital financial inclusion. Therefore, future research should examine whether there is an empirical correlation between a country's progress in digital financial inclusion and the size of its fiscal resources.

Three, the effect of culture, religiosity and terrorism on digital financial inclusion has not been explored in the literature. It is possible that certain cultural norms, religious beliefs and other belief systems may oppose rapid technological growth and could make adherents of certain beliefs refuse to accept digital technologies that are designed to advance digital financial inclusion, especially in African and Asian countries (Ozili, 2024). Therefore, it is interesting to investigate whether strong cultural norms and religious beliefs are averse to advancement in digital technology for digital financial inclusion.

Four, additional research is needed on how to increase users' information security on digital finance platforms. As more people become digitally included, there will be concerns about the security of user information. Future research studies can explore innovative approaches to increase user data security.

Five, the digital financial inclusion literature needs more critical regional research studies. Currently, there is little research studies that present a critique of the growth in digital financial inclusion in several regions. Much of the existing studies present positive views about digital financial inclusion and conclude that digital financial inclusion will improve people's welfare and boost the digital economy. However, there is a need to acknowledge that technological innovations bring its own problems to society and the economy. Therefore, there is need for research studies that critique digital financial inclusion developments.

5. Conclusion

This study presented an overview of digital financial inclusion research and developments around the world. It was shown that there are uneven positive developments in digital financial inclusion across regions and every region is faced with a unique set of challenges that limit progress in digital financial inclusion. The study also showed that the determinants of digital financial inclusion are varied according to regions and digital financial inclusion may have beneficial positive effect on society and the economy.

The overview presented in this article has implications for practitioners and policymakers. Practitioners should regularly assess the impact of the digital tools they use to advance digital financial inclusion and adapt them to changing consumer preferences, where necessary. It is important to constantly assess their impact on households and businesses and adapt them if necessary. The digital technology used to advance financial inclusion should not only be made available but should also be monitored through feedback and evaluation tools, to ensure they remain relevant and customer-focused. Policymakers across regions should embrace international collaboration and partnerships that expand the scale, scope and reach of digital financial services with the aim of increasing digital financial inclusion. This may entail expanding existing digital infrastructure to expand access to financial services and give priority to promoting digital financial services. There should also be coordinated national strategies and action plans across the public and private sectors that give priority to promoting digital financial services to achieve digital financial inclusion. Policymakers in all regions should also be cautious of old and new risks that could arise from encouraging the use of digital technology to advance digital financial inclusion. They should, as much as possible, find the right balance between digital innovation and risk through collaborative learning and information sharing between the private sector and regulators either in the form of a “test and learn” arrangement or a “learn and test” arrangement, whichever works best. Policymakers in all regions should also develop legal and regulatory frameworks that are country-relevant and region-consistent. The legal and regulatory frameworks should be clear, predictable, technology-neutral, risk-based and fair. Regulators also need to ensure that they have the capacity and supervisory resources to monitor compliance effectively and efficiently.

Abbreviations

AI = artificial intelligence (AI)

BaaS = Banking-as-a-service

CO2 = carbon dioxide

GDP = Gross domestic product

IMTO = international money transfer operator

LAC = Latin America and the Caribbean

OECD = Organization for Economic Co-operation and Development

PaaS = Payment-as-a-service

POS = point-of-sale

PSB = payment service bank

PSP = payment service provider

P2P = Peer-to-peer

SEE = southeast European

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